The Economic Effects of Democracy and Dictatorship

Carl Henrik Knutsen
Ph.D. Thesis
Department of Political Science, University of Oslo
Contact: c.h.knutsen@stv.uio.no

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To Carl Frederik and Caroline Victoria

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Preface

This Ph.D. Thesis is part of a project with roots back to Spring 2004, when I was a Bachelor student at the Department of Political Science, University of Oslo. During that semester, I was supposed to write a 15-page essay on a self-selected topic. I opted to write on the effect of democracy on economic growth, a topic that I knew relatively little about. Neither before nor after have I read as much as I did that semester; the literature on the topic simply fascinated me. After having invested time in reading the literature and having become even more interested in the topic, I decided to write my Master Thesis in Political Science on the effect of democracy on economic growth. I handed in this thesis at the end of the spring semester in 2006. Thereafter, I handed in my Master Thesis in Economics, on the effect of democracy on the protection of property rights, in the autumn of 2007. Perhaps strangely, my fascination for the subject had grown further after these projects, and I started my Ph.D. project on the economic effects of political regime types at the Department of Political Science in October 2007 with a high degree of enthusiasm.

This enthusiasm has not faded in the three and a half years that have passed since then. Being allowed to spend my days pondering on and writing about how democracy and dictatorship affect various economic factors has been a true pleasure, and it has, I think, also borne fruits. In addition to this thesis, I have produced several other papers during my time as a Ph.D. Fellow. Many of these papers are related to, and often extend on, issues discussed here. I mention these papers' main arguments and results where they are relevant in the various chapters. However, I will also mention some of the most important papers here, to clarify their relation to the analysis presented in this thesis.[1]

The article "Measuring Effective Democracy" can be read as an extension of the discussion on the measurement of broad and substantive democracy concepts in Chapter 2. There is, however, little direct overlap between the article and the chapter, as the article focuses on some selected and quite specific validity and relia-

[1] I am the sole author of all the papers mentioned below.

bility problems, particularly related to the "Effective Democracy Index" constructed by Ronald Inglehart and Christian Welzel. "Measuring Effective Democracy" was published in 2010 in *International Political Science Review 31*(2): 109–128.

Two articles that are much referred to in this thesis, and which expand on important issues dealt with here, are "Investigating the Lee thesis: How bad is democracy for Asian economies?" and "Africa's Growth Tragedy Revisited: Weak States, Strong Rulers". The first article was published in 2010 in *European Political Science Review 2*(3): 451–473. The second article is published in the GARNET Working Paper Series (NO 71/09), and will hopefully soon be published in a peer-reviewed journal. The empirical results from these papers on the economic effects of democracy and dictatorship in Asia and Africa, respectively, are important points of departure for the analysis in Chapter 7, where I focus on the large variation in economic outcomes between dictatorships. Moreover, the empirical results from these two articles are also discussed briefly in Chapters 1 and 3. However, the empirical results from the articles are only referred to, and not reproduced, in this thesis. Furthermore, some parts of the theoretical discussion in Section 5.2 on regime type and physical capital draw on a section of the theoretical discussion in the "Asia article", and the Benin–Togo comparison in Section 1.4.4 is a slightly rewritten version taken from the "Africa article".

I discuss the sources of variation in economic outcomes between dictatorships intensively in this thesis, but not the sources of variation in economic outcomes between democracies. One exception is the literature review in Section 3.5.4, where I also refer to my article "Which Democracies Prosper? Electoral Rules, Form of Government and Economic Growth". This article can be read as a natural extension of the empirical analysis in Chapter 6. However, there is no overlap between this chapter and the article. The article is published in *Electoral Studies 30*(1): 83–90.

The discussion on solutions to the endogeneity problem, and more particularly the discussion and tests of the new proposed instrument for democracy in Chapter 4, draw and extend on the methodological discussions in "Democracy, Dictatorship and the Protection of Property Rights". Indeed, the instrument was developed and used already in my Master Thesis in economics in 2007, but the discussion of the instrument has been refined, and I did not validate the instrument empirically there. "Democracy, Dictatorship and the Protection of Property Rights" was published in 2011 in *Journal of Development Studies 47*(1): 164–182. This article tested only the general effect of democracy on property rights protection. In this regard, Section 7.3 is an extension of that analysis, as it presents theoretical arguments and conducts empirical tests on the differences in property rights protection between different

types of dictatorships.

The discussion in Section 6.6.3 refers to and draws on the arguments and results from "Democracy an Economic Growth: A Changing Relationship?", which is published as a book chapter in *Governing the Global Economy: Politics, Institutions and Economic Development*. The book is edited by Dag Harald Claes and myself, and is published on Routledge.

A rewritten version of Section 5.4 will be included in a forthcoming book, titled *Technology, Innovation and Governance*, published on Routledge. Helge Hveem and I are the editors of this book. The proposed title of the chapter is "Democracy, Dictatorship and Technological Change". Despite strong similarities, the book chapter does not contain the formal model presented in Section 5.3, and the qualitative theoretical discussion is extended in the book chapter.

Section 7.1 is forthcoming as an article in *International Interactions* in a rewritten form under the name "Security Threats, Enemy-Contingent Policies and Economic Development in Dictatorships". Section 7.2 (minus 7.2.1 and in a slightly rewritten form) currently has the status of "Accepted with minor modifications" in *Dynamiques Internationales* with the title "I'll mind my own business if you mind yours: The OAU and the African Peace".

I am very grateful to the Department of Political Science for having provided an intellectually stimulating and very pleasant work environment during my years as a Ph.D. Fellow. I am particularly grateful for all the comments I have received on my work from various colleagues at numerous Tuesday Lunch Seminars and other seminars at the department. During this period of time I have also had a Researcher position at the Centre for the Study of Civil War (CSCW) at PRIO and I have been an Associated Researcher at the Centre of Equality, Social Organization, and Performance (ESOP) at the Department of Economics, University of Oslo. The interactions I have had with several researchers at these institutions have contributed strongly to my own academic development and to the quality of this thesis. I would also like to thank Sciences Po at the University of Bordeaux and the Department of Political Science at Columbia University, New York, for two very interesting and productive stays as a guest researcher. I am thankful for the funding I received for my stay in Bordeaux (Fall 2009) from the EU-sponsored GARNET networks' Mobility Fund, and for the funding I received for my stay in New York (Spring 2010) from the Norwegian Research Council's Leiv Eiriksson Grant.

There are also several individuals who deserve extra gratitude for their comments, suggestions and practical advice to my work with this dissertation.

First, I would very much like to thank my excellent supervisors, Helge Hveem and Håvard Hegre. Helge also supervised my Master Thesis in political science, and was my sole Ph.D. supervisor until autumn 2008. From then on, Helge and Håvard have been co-supervisors. It has been a true pleasure to have had such a team of supervisors, both at the academic and personal level. Helge and Håvard always provide very productive comments and engage me in discussions that make me think more deeply about my underlying assumptions. Moreover, both have given me important practical advice and moral support. Helge and Håvard have both had a vital influence not only on this thesis, but also on my academic development more in general. I hope to continue working with both of them in the years to come.

I have also been very fortunate to have been in contact with many other excellent colleagues who have been willing to read my work and provide comments and suggestions. First, I would like to direct a very large thank you to Bjørn Høyland. Not only has Bjørn commented and provided excellent suggestions to different parts of this thesis, but he has also given me many practical suggestions on everything from writing in Latex to publication advice. Tor Otterholt also deserves particular mentioning. Tor has been an important discussion partner throughout the process, and he has given me a large number of valuable comments and suggestions to Chapters 1, 2, 4, 5, 8 and 9. I would also like to thank Asmund Rygh for his very instructive comments to the work presented in this thesis, particularly to Chapter 3, and for his comments to my work on the economic effects of political regimes more generally. I direct a special thanks also to Daniel Bach and John Huber for helping me arrange my stays as a guest researcher in Bordeaux and New York, respectively. I have also received fruitful comments to my work from both Daniel and John.

Seven others deserve particular mentioning for their comments and kind advice throughout this process; these are Kalle Moene, who was also my supervisor for the Master Thesis in Economics, Oddbjørn Knutsen, Bjørn Erik Rasch, Dag Harald Claes, Michael Alvarez, Jardar Sørvoll and Nils Olve Gillund. Moreover, I have been fortunate enough to receive thorough and excellent comments on particular parts of my thesis from Øivind Bratberg (Chapter 1), Olle Törnquist (Chapter 2) and Jon Hovi (Section 7.2). I also want to thank various Ph.D. Fellows at the Department of Political Science for pleasant dinner conversations and productive comments to my work. In addition to those mentioned elsewhere in this extensive thank you note, Kristian Helland-Hansen, Anders Ravik Jupskås, Dag Einar Thorsen and Håvard Nygård are four of the Ph.D. fellows I remember giving helpful comments to various parts of this thesis (but, I have most likely forgotten to mention others who should have been thanked).

I have presented parts of this thesis and work related to it at a large number of seminars, workshops and conferences in Norway and abroad. I have received countless helpful comments and suggestions to my work at these events, and I want to thank all those participants who have contributed to making this a better thesis. Some of these participants have made quite significant contributions with their comments, but I prefer to not mention anyone explicitly, in fear of unjustly forgetting to name others.

Finally, I would like to thank my fantastic family for productive discussions and especially for their moral and practical support in this process. Particularly, I would like to thank Angélique for always being supportive and understanding, even when I work long nights and weekends, and for our countless discussions on topics such as policy making in dictatorial regimes.

This dissertation is dedicated to the two most important people in my life, my children Carl Frederik and Caroline Victoria.

Oslo, March 2011

Carl Henrik Knutsen

Chapter 1

Introduction

This introductory chapter presents the main research questions discussed in this thesis and a gives brief overview of the thesis' structure. Thereafter, the chapter presents five of the most important theoretical arguments for why democracy should affect economic growth differently than dictatorship. Finally, the chapter presents some descriptive statistics and some brief case-descriptions in order to illustrate how democracy and dictatorship may affect the economic performances of countries.

1.1 Analyzing the economic effects of political regime types

1.1.1 Democracy and economic growth; general hypotheses and patterns in the data

This thesis investigates whether and how different political regime types, mainly classified along the democracy–dictatorship dimension, affect various economic outcomes. The thesis for example revisits the very general and much asked question: does democracy enhance economic growth?

Let me for a minute side-step the important questions discussed in Chapter 2 of how to define and measure democracy,[1] and simply classify relatively democratic regimes (for convenience referred to as 'democracies') as those that score above or equal to 6 on the (-10 to 10) Polity Index (PI) (see Marshall and Jaggers 2002), and relatively dictatorial regimes (for convenience referred to as 'dictatorships') as regimes that score below 6 on the PI. When I do so, I find that dictatorships have, on average, very seldom had higher economic growth rates than democracies from the mid-19th century and up until today. Rather, democracies have on average mostly had about equal or higher growth rates than dictatorships, despite the dramatically changing composition of the "democracy club" over the period. From 1850 to 1913 democratic economies grew by 1.6% (annually) on average, whereas dictatorial economies grew by 1.2%, according to GDP per capita data from Maddison (2006). From 1914 to 1945 the corresponding numbers were 1.5% and 1.1%. From 1946 to 2003 the average growth for democracies was 2.3%, whereas it was 1.7% for dictatorships.

Despite this pattern, several academics and policy makers seem to believe strongly in the "Lee thesis" (Sen 1999, 15), credited to former Singaporean PM Lee Kuan Yew. The Lee thesis postulates that particularly in developing countries, a strong authoritarian regime is necessary for promoting economic development. The East Asian Tiger states, Pinochet's Chile and present-day China are considered decisive empirical evidence for this assertion. A second position on the effect of democracy

[1] To give a preview, in Chapter 2 I draw on Beetham (1999) and define degree of democracy as the degree to which there is popular control over public decision making, combined with the degree to which there is political equality. I also expand on the various attributes, like elite competition for political offices and the existence of civil liberties, that support a high degree of democracy, and discuss the institutional structures that again enhance high scores on these attributes. Furthermore, I discuss how measures like the Polity Index and the Freedom House Index relate to such a democracy concept, and evaluate their strengths and weaknesses.

on economic growth, backed up by more systematic evidence than the Lee thesis, is the "agnostic position" (see e.g. Przeworski and Limongi 1993; Przeworski et al. 2000; Burkhart and Lewis-Beck 1994; Helliwell 1994; Brunetti 1997). The proposition that democracy does not affect growth, or at least that there is little evidence that it does, is widely accepted among prominent political scientists. Diamond (2008, 96), for example, asserts that the "evidence is murky" for the hypothesis that democracy spurs economic development, while Tsebelis (2002, 70) reports it as a surprising fact that there is no evidence of democracies producing superior economic outcomes. However, several more recent studies have found that democracy is indeed beneficial for economic growth (e.g. Baum and Lake 2003; Bueno de Mesquita et al. 2003; Halperin, Siegle and Weinstein 2005; Feng 2005; Papaioannou and Siourounis 2008). Despite this, the results on democracy's effect on growth vary quite a lot between different studies (see Doucouliagos and Ulubasoglu 2008), and the jury is still out on the question.

If one takes a closer look at the pattern from more recent years, there are empirical examples of democracies with good and with poor economic track records, and there are examples of dictatorships with good and with poor economic performances. Hence, one can establish that there is no *necessary* relationship (at least no necessary, *general* relationship) between political regime type, classified along a democracy–dictatorship dimension, and different economic outcomes, including economic growth. This does of course not mean that the democracy–dictatorship distinction is irrelevant for example for economic growth. Figure 1.1 shows average annual GDP per capita growth over the 1970–2000 period along the Y-axis, whereas the X-axis measures the average score on the Freedom House Index (FHI) between 1972 and 2000. The FHI (see e.g. Freedom House 2010) is another much used measure of democracy, which in contrast to the PI incorporates also the existence and functioning of civil liberties. The FHI ranges from 1 (most democratic) to 7 (most dictatorial).

Figure 1.1 shows a positive correlation between average degree of democracy and long-run economic growth over this particular 30-year period. This correlation does not logically imply that there is a positive effect of democracy on growth, as there may for example be other variables affecting both growth and democracy systematically and because democracy may be endogenous to growth. Nevertheless, the empirical analysis in Chapter 6, which does take these issues into account, finds a relatively robust and positive effect of democracy on economic growth.

Perhaps equally interesting as the correlation, is the large degree of variation among countries with approximately similar FHI scores. This goes especially for

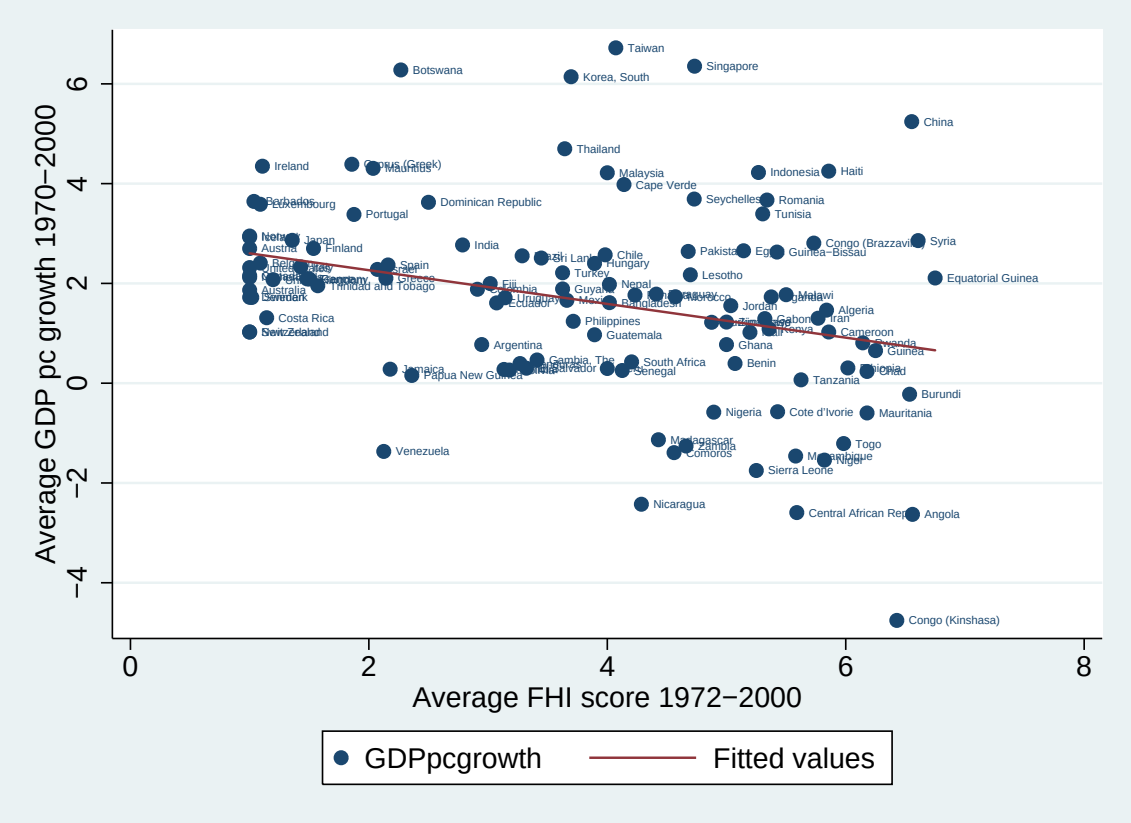

Figure 1.1: The figure shows the average annual growth in GDP per capita (1970–2000) along the y-axis and the average FHI-score (1972–2000) along the X-axis. Source: Knutsen (2006), based on data from Penn World Tables and Freedom House.

countries run by the most dictatorial regimes. As I will return to in Chapter 7, there are very good theoretical reasons for why there is particularly high degree of variation in growth rates among dictatorial countries. However, for now, let me note that democracy may seem to introduce a safety net against the worst economic outcomes, but that some non-democratic countries have been able to grow equally fast as, if not even faster than, democracies, at least in recent decades.

1.1.2 A few methodological remarks on studying the economic effects of political regime types

As already stated, this thesis investigates how different political regime types affect various economic outcomes. The questions raised are complex, and, sometimes, so are the answers provided. Questions such as "does democracy increase economic growth relative to dictatorship?" can be responded to on several levels of abstraction. This thesis does not shy away from answering this particular question with a *yes*,

although this *yes*, is qualified with both a *most likely* and an *in general*.

The latter qualification (*in general*) indicates that the relationship between regime type and economic growth is contingent on other factors. Some plausible examples of such factors are a country's initial level of economic development, a country's degree of state capacity, the international economic and technological environment, the international political system's structure, the type of democracy in question, the type of dictatorship one compares the democracy to, the motivations of the dictator in question, the constraints facing the dictator, and the time horizon of the comparison. As many of these factors co-vary with geographical region and time period, there are also likely spatio-temporal differences in the effect of democracy on (for example) economic growth. This thesis only investigates a subset of the potential nuances indicated above, so let me mention two such nuances here:

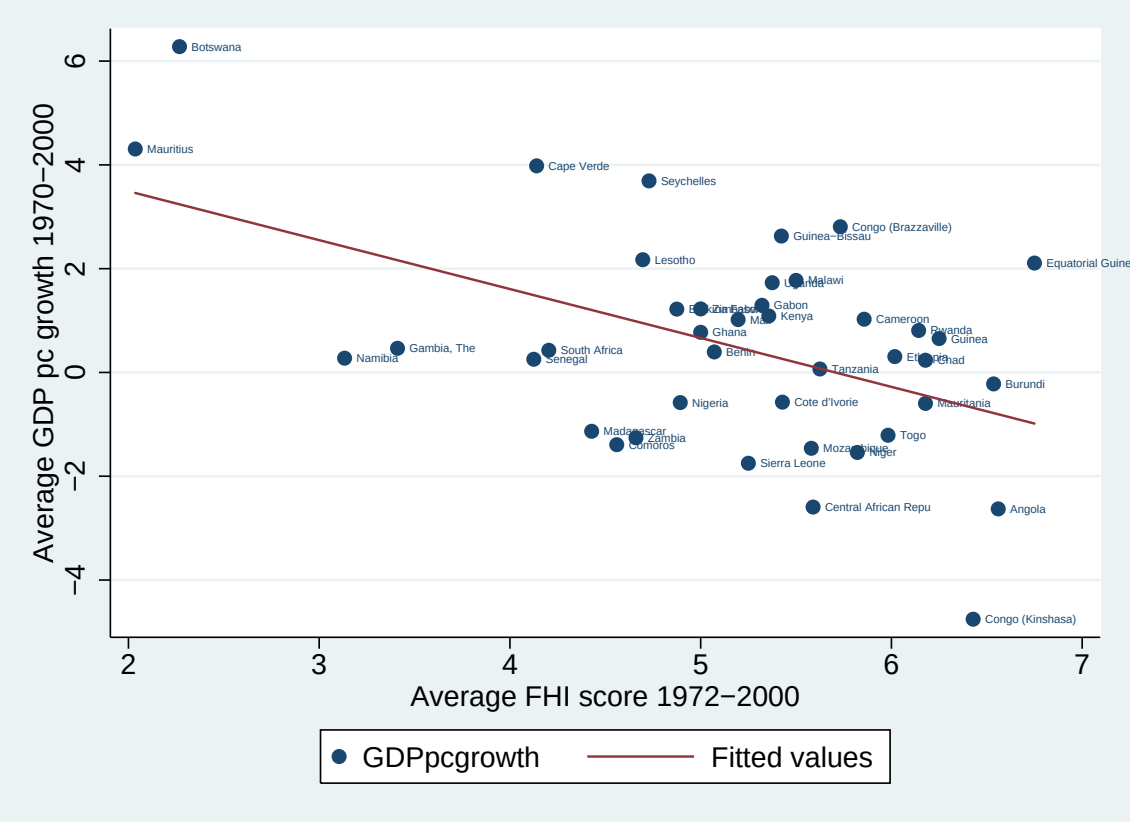

Figure 1.2: The figure shows the correlation between democracy (average FHI score from 1972 to 2000) and economic growth (average GDP per capita growth rate from 1970 to 2000) in Sub-Saharan Africa. Source: The cross-sectional data set from Knutsen (2006), based on data from Penn World Tables and Freedom House.

In Knutsen (2011*a*), I find empirical evidence for the hypothesis that the effect of democracy on economic growth has changed after circa 1980. Hence, the effect of

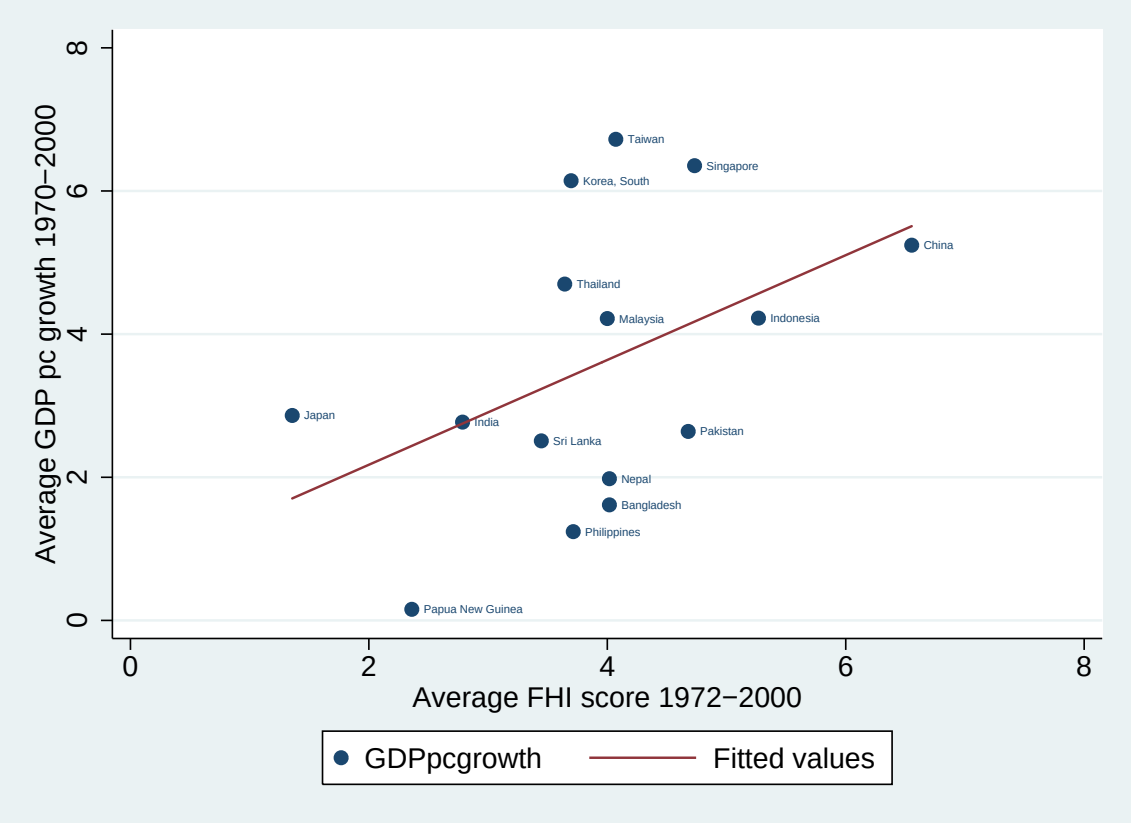

Figure 1.3: The figure shows the correlation between democracy (average FHI score from 1972 to 2000) and economic growth (average GDP per capita growth rate from 1970 to 2000) in Asia. Source: The cross-sectional data set from Knutsen (2006), based on data from Penn World Tables and Freedom House.

democracy is contingent on temporal factors, and there are several good explanations for this related for example to the structure of the international political and economic context (Knutsen 2011*a*). Moreover, the relationship between democracy and growth also seems to vary systematically according to geographic region, and I will come back to some potential explanations for this in Chapter 7.[2] For now, consider Figures 1.2 and 1.3. These figures show the correlation between democracy, measured according to the FHI, and average annual growth from 1970 to 2000 in Sub-Saharan Africa and Asia respectively. There is a quite strong positive correlation between democracy and growth in Sub-Saharan Africa, whereas in Asia the correlation is negative, and quite strong. But, two cases that would have reduced the correlation, North Korea and Myanmar, are left out of the graph because of lacking the specific GDP data from the Penn World Tables used in Figure 1.3. Nevertheless, there seems to be geographical variation in the relation between democracy on the

[2]I have also dealt extensively with this issue in Knutsen (2010*b*) and Knutsen (2009).

one hand and economic growth and other economic variables on the other.

The former qualification (*most likely*) indicates our limited ability to precisely decipher causal relationships. At the deepest level, although there is legitimate disagreement on this point, causality is an ontological relation between singular events (see e.g. Lewis 1973, 1986; Menzies 2008). Neither political regime type, X, nor economic outcomes, Y, are singular events, so a hypothetical complete description of political regime type's effect on an economic outcome would provide a myriad of linked causal chains between events, including actions by individuals. Further, the actually existing regime, $\bar{X}_{i,t}$, in country i at time t, would ultimately have had to generate a different value on $Y_{i,t+\Delta}$ than would have been generated if $\bar{X}_{i,t}$ were to be counterfactually replaced with $\hat{X}_{i,t}$, holding specific values on other variables constant at time t.[3] Such complete causal structures are too complex for the human mind to establish. Thus, as all social science studies do, this thesis systematically selects types of initial conditions and events according to a theoretical framework when presenting descriptions of causal chains and mechanisms, and the inferences are hefted with a great deal of uncertainty.

Political scientists have over the last decades become increasingly explicit regarding their focus on identifying causal effects and mechanisms, and have adopted or developed several techniques to deal more properly with these issues in empirical analysis (Box-Steffensmeier, Brady and Collier 2008). However, as *counterfactuals* are unobservable, and our descriptions and knowledge about causal chains are incomplete, social scientists use the best tool they have available to produce causal inferences (when experiments are difficult or even impossible to conduct): comparative evaluations with other relatively similar *factual* observations. Historical variation and cross-country comparisons therefore guide inferences regarding causal effects in the issue areas studied in this thesis. Theory, coherent sets of abstractions about how the world works, guides the selection of hypothesis and structures empirical tests. More fine-grained hypotheses on causal mechanisms derived from theory, for example on how individuals act under specific constraints and ultimately produce different outcomes, are sometimes difficult to evaluate comparatively, and are hence often measured against observations in singular cases.

If our theories' predictions on broad macro-outcomes are corroborated when using comparative evidence, *and* the fine-grained hypothesis on actions and processes are not rejected by observations from singular cases, there is better reason to believe

[3] Although causality ultimately is a relation between singular events, this does not preclude generalization to relations between broader classes of events (see e.g. Lewis 1973), nor does it preclude a probabilistic view of causation (Lewis 1986).

in our postulated argument. Popper (2002) famously argued that expanding the number of substantially different hypotheses derived from theory, and subsequently testing them, improves our abilities to make solid inferences. Several social scientists have argued convincingly for such an approach also in the social sciences (e.g. King, Keohane and Verba 1994; Gerring 2007). Interpretations of case-based evidence and the implications drawn from large-n studies may, however, diverge. If so, one way of utilizing the interplay between inferences drawn from large-n comparative analysis and thicker case studies could then be to invoke a type of "reflective equilibrium approach" (see Rawls 1999, 18–19). When applying such an approach, initially diverging results could for example lead to either a re-interpretation of the case-based evidence or to the testing of new, and more informed, statistical model specifications. Although relying mainly on comparative testing, drawing on both cross-country and within-nation variation over time, this dissertation also introduces historical case-based evidence and a couple of more structured small-n comparisons to evaluate different hypotheses on the economic effects of democracy and dictatorship.

1.2 The structure of the thesis

The remainder of this chapter consists of a brief presentation of some of the main arguments on how democracy may affect economic growth (in Section 1.3) and some illustrative descriptive statistics and brief case descriptions (in Section 1.4). Sections 1.3 and 1.4 are intended as appetizers to the theoretical and empirical literature on the economic effects of democracy, and also serve the function of illustrating the complexity (theoretical, methodological and empirical) one faces when attempting to describe and analyze the economic effects of political regime types. Some of the arguments and issues described in these sections will reappear in later chapters, and will then be expanded on. Let me first, however, give a brief presentation of these later chapters.

In Chapter 2, I discuss the democracy concept. I argue in favor of a relatively broad democracy concept, and seek to specify this concept's structure and how it may be operationalized. I then, in Chapter 3, present a literature review. I focus on the comparative political economy literature, and more in particular on studies investigating relationships between regime types and various economic factors. In Chapter 4, I present the statistical methodology and data material used in this study, before I, in Chapter 5, analyze how regime type affects physical- and human capital accumulation and technological change. The main result from this chapter is that democracy has a strong, positive effect on technological change, and this is a

vital channel through which democracy increases economic growth. However, there are also indications that democracy may reduce growth through reducing savings rates and thus physical capital accumulation. In Chapter 6, I proceed to investigate empirically whether there is a net effect of democracy on economic growth. This analysis finds a fairly robust, and substantially large, positive effect of democracy on growth.

After having looked at the effects of democracy on economic growth in general, I analyze more closely the large variation in economic outcomes in different dictatorships in Chapter 7. Among others, I argue that the type of security threat facing a dictator has important implications for economic policy and subsequent economic outcomes. In extension, I argue that the relative lack of external security threats and strong presence of internal threats facing African dictators contribute to explaining the weak economic performances of African dictatorships. In Chapter 8, I analyze how income and democracy may affect subjective well being. The empirical results from this chapter, when combined with those of Chapter 6, indicate that democracy may actually contribute more to the enhancement of subjective well being (indirectly) through raising income levels than (directly) through the provision of political freedom. At last, in the concluding Chapter 9, I review the main arguments and results from the thesis, and discuss the normative desirability of democracy and some policy implications in the areas of foreign aid and loans to poor countries.

Let me expand by giving a more extensive introduction to the chapters and their main arguments and results.

Chapter 2 discusses the democracy-dictatorship distinction conceptually and operationally. One main proposition from this chapter is that regime type (considered along the democracy–dictatorship axis) is a continuous variable, best defined according to the degree of popular control over political decision and degree of political equality among citizens (see e.g. Beetham 1994, 1999). The regimes I refer to as 'democracies' are regimes that score high values on these two dimension, and 'dictatorships' are those that score low. This definition is broad and relatively vague. Institutional definitions of democracy (e.g. Schumpeter 1976; Przeworski et al. 2000) are more concrete and easier to operationalize. However, I argue that what the above definition lacks in terms of precision and regarding how easily it lends itself to operationalization, it makes up for in terms of validity.

I further develop a conceptual model of democracy where seven supporting dimensions affect the degree of popular control over political decisions and political equality. Lists of such supporting dimensions, and related institutions that facilitate them, have been provided before in the literature, for example in Dahl (1971). I

add to the literature by explicitly specifying the relations between these supporting dimensions, and how they interact in terms of affecting degree of democracy. I seek to boil the relationship down to a function with specified signs on first-derivatives and cross-derivatives.

When it comes to empirical research, democracy needs to be operationalized, and this has proved very difficult.[4] Drawing on the seven-dimensional conceptual democracy model, I sketch out some guidelines for what a plausible operationalization of democracy would look like. I then evaluate some of the currently existing democracy measures. I argue that the Freedom House Index (FHI) has many benefits over the other measures, although it has its own serious problems. However, this study often uses the Polity Index (PI), mainly for pragmatic reasons: the PI has very extensive time series, and allows me to investigate the economic effects of democracy using data back to the 19th century.

Chapter 3 provides a literature review, focusing on literature that has direct relevance for the arguments and empirical tests that appear later in the thesis. The chapter first reviews the economic growth literature, focusing largely on productive inputs and technological change. The insights from this literature are vital to the analysis in the subsequent chapters, as the economic growth literature provides a good guide in the search for plausible models of how democracy might affect growth. Then the comparative political economy literature is reviewed.

I define political economy as the study of interrelations between political institutions and processes and economic institutions, policies and outcomes.[5] There are contributions to this field from political scientists, economists, sociologists and historians. This literature recognizes the reciprocal causal relationship between political and economic factors. Hence, the chapter reviews the literature on how economic or economic institutional variables like income level, income growth, income inequality and property rights protection affect the probability of democratization and democratic breakdown. The literature indicates that the type of analysis conducted in this thesis may run into serious endogeneity problems if no plausible methodical solutions are explored, and the insights from this literature is therefore fruitful for the thesis' later empirical analysis.

The chapter also reviews the literature on so-called "deep determinants" of eco-

[4] As mentioned in the Preface, I have discussed the problems related to operationalizing broad, substantive democracy concepts in depth in Knutsen (2010*c*), particularly focusing on Ronald Inglehart and Christian Welzel's "Effective Democracy" index. This article can be read as a natural extension of the discussion in Chapter 2.

[5] For discussions on definitions of 'Political Economy', see for example Caporaso and Levine (1992) and Persson and Tabellini (2000).

nomic growth (see e.g. Rodrik, Subramanian and Trebbi 2004), focusing particularly on the empirical literature on how political institutional factors affect various economic outcomes through systematically facilitating the selection of specific economic policies and through influencing the structure and functioning of different economic institutions. Various political institutional aspects are discussed, but the main focus of the review is naturally placed on the democracy–dictatorship distinction's relevance for economic outcomes. The focus is mostly on earlier statistical analyses, although small-n contributions are also discussed. Also the literature on other plausible "deep determinants" is reviewed. This literature provides important suggestions for the types of variables that are important to control for in empirical analysis of democracy's economic effects.

Thorough studies have already been conducted on democracy's effects on human capital accumulation (e.g. Lake and Baum 2001), physical capital accumulation (e.g. Tavares and Wacziarg 2001), foreign direct investment (FDI) (e.g. Busse and Hefeker 2007), corruption (e.g. Rock 2009*a*), property rights protection (e.g. Clague et al. 2003), state capacity (e.g. Charron and Lapuente 2010), population growth (Przeworski et al. 2000), wages (Rodrik 1999*a*) and income inequality (see e.g. Timmons 2010). In general, most these studies find that democracy enhances the "good" economic outcomes, although often with important nuances and qualifications.

However, when it comes to the net effect of democracy on economic growth, there are several studies seemingly contradicting each other (see e.g. the reviews and meta analyses in Sirowy and Inkeles 1990; Przeworski and Limongi 1993; Brunetti 1997; Doucouliagos and Ulubasoglu 2008). The probably most well-known empirical study, Przeworski et al. (2000), finds no effect of democracy on GDP growth, although it does find indications of a positive effect on GDP per capita growth, which is the most commonly used measure for economic growth. More recent studies have often found positive effects of democracy on economic growth (see Doucouliagos and Ulubasoglu 2008).

A baseline model on how democracy affects economic outcomes, drawing on insights from the literature review, is established at the end of the chapter. The model identifies likely channels of reverse causation and confounding variables that should be controlled for in an empirical analysis. Furthermore, the model indicates that democracy affects both economic institutions, like property rights, and various economic policies (fiscal, monetary, industrial, etc.). Economic institutions and policies again affect the "immediate sources of economic growth" (Hall and Jones 1999), which are labor supply, physical capital, human capital and technological change. Improvements in any of these sources lead to an increased income level,

and at least higher medium-term economic growth (see Solow 1956; Barro and Sala-i Martin 2004; Helpman 2004).

Chapter 4 presents the statistical methodologies used in this thesis' empirical analysis, for example ordinary least squares (OLS) with panel corrected standard errors (PCSE), fixed effects, random effects, two-stage least squares (2SLS) and non-parametric matching. The presentations are non-technical and intended for readers with limited prior knowledge of these techniques. Furthermore, some of the main methodological challenges for statistical studies on the topics treated in this thesis are also discussed. These include the endogeneity and omitted variable bias problems, sample selection problems as well as measurement errors and attenuation biases.

Thereafter, the data material used in the thesis is presented. I discuss the different dependent variables and control variables used in the subsequent empirical chapters' regressions, drawing on the discussions and general model produced in Chapter 3. The discussion focuses on concrete operationalization issues, and the validity and reliability of these variables are extensively discussed. Moreover, descriptive statistics of the variables' distributions are presented. This discussion is rounded off with a specification of the concrete regression models used in the later chapters' empirical analyses.

I also extend on this thesis' specific solutions to solving the important endogeneity problem. Crucially, I discuss a new instrument for democracy (WAVE), which is based on Huntington's (1991) observation that democratization and reverse democratization processes have tended to be clustered temporally (see also Knutsen 2007, 2011*b*). This instrument is used in Chapter 6 to mitigate endogeneity problems in the empirical estimation of democracy's effect on economic growth. The validity of this instrument, and another instrument based on lagged democracy scores (see Helliwell 1994), is discussed theoretically, and tested empirically.

Chapter 5 briefly presents the main theoretical arguments and statistical analysis on how democracy affects physical and human capital accumulation. The empirical results are a bit mixed, but there are indications that dictatorship enhances economic growth via increasing domestic savings rates, and thus physical capital investment. The chapter also finds some evidence for the well-established hypothesis that democracy enhances human capital accumulation. But, in contrast to previous studies (e.g. Baum and Lake 2003) it finds no ultimate effect of democracy on economic growth via this channel.

The main focus of the chapter is, however, on the relationship between regime

type and technological change. A theoretical model is developed, and this model highlights how self-interested dictators, motivated by power and personal consumption, affect technological change through restricting civil liberties and different types of information flows.[6] Despite the poor quality of data on technological change, the chapter finds quite strong evidence for the hypothesis that democracy promotes technological change-induced economic growth. The empirical analysis thereby corroborates the main empirical implication from the theoretical model. Other implications are also derived from the model, and one of these is tested: the model indicates that dictatorships with high bureaucratic quality may mitigate democracy's technological advantage. However, there is little evidence to support this last hypothesis.

Economic growth, operationalized as growth in GDP per capita, is the dependent variable in **Chapter 6**. This chapter is purely empirical. The likely channels through which regime type affects growth and how they work were described in previous chapters, notably in Chapter 5. It thus remains to be tested whether the net effect of democracy on growth is positive or negative.

The evidence reported in Chapter 6 points in favor of the hypothesis that democracy enhances economic growth, and the evidence is quite strong and robust. The effect is for example relatively robust to choice of estimation technique, control variables, democracy indicator and lag structures, and the effect holds up in different samples. The extensive data samples used in the chapter cover most of the world's countries, and in some analyses, several countries have data going all the way back to the 19th century. Also models that take into account that democracy may be endogenous to economic growth (Granger and 2SLS models) and that the effect of democracy on growth may be non-linear (non-parametric matching models) find a significant positive effect of democracy on growth.

Thus, the main conclusion from this chapter is that democracy, in general, seems to enhance economic growth rates. The estimated effects are moreover quite large, often indicating a positive effect of going from least to most democratic of more than 1 percentage point extra annual GDP per capita growth.

Chapter 7 discusses the result that dictatorships vary a lot more in economic performance than democracies do (see also Rodrik 2000; Besley and Kudamatsu 2007).[7] The chapter reviews several earlier theoretical models that might contribute

[6] As noted in the Preface, an extended, non-formal version of this argument is presented in a forthcoming book chapter (Knutsen 2012).

[7] However, there is systematic variation in performance also between democratic regimes. I have analyzed the variation in economic growth rates between democracies in Knutsen (2011*c*). Here, I study the effects of electoral rules and presidential versus parliamentary forms of government on growth. I find that whereas the latter distinction has no robust effect, electoral rules im-

to explaining this result, before introducing an alternative, or rather a complementary, explanation. Earlier research has indicated that under some conditions, dictators facing domestic security threats may have a strong incentive to generate policies that inhibit economic development (e.g. Robinson 1998; Acemoglu and Robinson 2006*a*; Bueno de Mesquita et al. 2003), as was also indicated by the theoretical model developed in Chapter 5. The chapter (Chapter 7) contributes to this literature by presenting a formal model that focuses on how the type of security threats self-interested dictators face affects economic policy. An external security threat (foreign state) is argued to provide dictators with incentives to produce policies that are conducive to economic growth, whereas dictators facing mainly internal security threats often have strong incentives to pursue policies that are detrimental to economic development.

Qualitative historical evidence from different countries is presented, including a quasi-experiment involving Chiang Kai-shek and the Kuomintang's change of economic policy when moving from mainland China to Taiwan. This relocation generated a shift in the type of main security threat to the Kuomintang, from internal to external. The economic policies promoted by the Kuomintang were very different in the two contexts, as the Kuomintang switched from pursuing "predatory" to pursuing "developmentalist" economic policies. This empirical pattern follows the prediction generated from the theoretical model.

The chapter then briefly discusses statistical results presented in two previous papers (Knutsen 2009, 2010*b*) that indicate a different effect of dictatorship on economic outcomes in Sub-Saharan Africa than in Asia. This difference is not due to dictatorship being particularly conducive to growth (relative to democracy) in Asia (there is no significant effect of democracy on growth in the statistical analyses), it is rather due to African dictatorships having performed very poorly, and much worse than African democracies have. The chapter briefly discusses previous explanations from the literature that can be tied to these results. The chapter then presents a game-theoretic model on how the Organization of African Unity (OAU) mitigated the external security threats to African dictators. African leaders were, among others because of the OAU, able to coordinate on non-intervention policies among themselves. No comparable regime existed in Asia, where several dictators faced relatively grave external security threats. The model on security threats and economic policies presented earlier in the chapter can thus *contribute* to explaining the large differences in performance between African dictatorships, and at least

pact strongly on growth rates; proportional representation systems and semi-proportional systems enhance economic growth relative to plural-majoritarian systems.

some East and Southeast Asian dictatorships.

The literature reviewed both in Chapter 7 and in Chapter 3 indicate that also institutional variation among relatively dictatorial countries matter quite a lot for economic performance. Therefore, Chapter 7 also conducts an empirical investigation into the question of whether different dictatorship types, classified along the lines of Hadenius and Teorell (2007*a*,*b*), have different impacts on property rights protection. The empirical results indicate that certain autocratic regimes, like monarchies and dominant party regimes, are far better at protecting property than others, like military regimes and multiparty authoritarian regimes. However, there is no robust evidence that any of the dictatorship types enhance property rights protection relative to democracy.

Chapter 8 discusses some results from the so-called happiness literature on the determinants of subjective well being. Different theoretical arguments and previous empirical studies are presented, focusing particularly on the possible effects of GDP per capita, income inequality and democracy on subjective well being. The statistical analysis in this chapter indicates, perhaps surprisingly, that democracy might in the long run improve subjective well being more by increasing GDP per capita than by reducing inequality and providing political freedom. The analysis, based on data from about 100 countries, finds a positive and robust effect of GDP per capita on a measure of self-reported life satisfaction, but the effect is concave, and hence declining in the level of income. Moreover, the chapter presents some correlations indicating that GDP per capita is not a worse predictor of subjective well being than the Human Development Index or Sen's welfare function.

The concluding chapter, **Chapter 9**, briefly reviews the main arguments and empirical results. Moreover, concrete policy implications are drawn from the analysis conducted in the thesis' earlier chapters on the issues of providing loans and aid to poor democracies and to poor dictatorships. However, policy implications rest on normative premises as well as descriptive. The concluding chapter discusses the desirability of democracy when relying on various normative premises, for example those related to aggregate utility maximization (see e.g. Bentham 1987), Rawls' maximin principle (Rawls 1999) and Sen's welfare function (Sen 1973). Independent of underlying normative assumptions, democracy seems to be desirable, given the empirical results presented in this study.

As noted above, the next section consists of an overview of five of the most important arguments on how democracy and dictatorship affect economic growth. These arguments are related to how regime type is expected to affect among others property rights protection, capital accumulation and technological change. The

arguments thereby not only provide a background for the empirical tests that are conducted in Chapter 6, but they are also a preview of issues dealt with more carefully in Chapters 5 and 7.

1.3 Democracy, dictatorship and economic growth; five theoretical arguments

A number of political regimes have throughout history conducted economic policies that are widely recognized to generate poor macroeconomic performance. In order to understand why such policies are selected, one needs to develop "Theories of Bad Policy" (Robinson 1998), and ask questions such as "Are good policies good politics" (Moene 2011)? A general argument that recurs throughout this thesis is that different political regime types generate different incentives for politicians regarding policy choices. Along these lines, the theoretical models presented in Chapters 5 and 7 indicate that some dictators and their close associates, when compared with democratic politicians, have stronger incentives and better opportunities for conducting policies that hurt, for example, economic growth, but which serve the political elites' own interests.

Empirical illustrations of dictators conducting economically disastrous policies, which arguably could never have been pursued in democracies, are plentiful: Louis XIV's tax increases on the general public and the diversion of much of the French states' public expenses to finance his own dream project of Versailles (see e.g. Palmer, Colton and Kramer 2002, 173–174) would not have passed democratic political processes, especially in a country where most citizens lived in utter poverty. Mao's Great Leap forward, which ended not in industrialization but in hunger catastrophe for Chinese farmers with possibly 30 million dying of famine (see e.g. MacFarquhar 1983), was a type of policy experimentation no electorate likely would have approved of. Nor would democratic electorates have approved of the education and infrastructure policies of various Russian Tsars and Austrian (Habsburg) Emperors, who "opposed the building of railways and infrastructure" and did not "attempt to develop an effective educational system" (Acemoglu and Robinson 2006*a*, 129). These were policies the rulers mainly pursued with an eye to reducing the risk of revolution, and which were thereby followed mainly because of self-interested political survival purposes. Along the same lines, the North Korean requirement for a permit to visit Pyongyang is both unpopular and bad for economic efficiency, but nevertheless a way for Kim Jong Il to reduce the probability of demonstrations, or

even revolutions, in his capital.

Macroeconomically disastrous *monetary* policies have also been conducted by numerous dictatorial regimes. Spain's many defaults under Habsburg and Bourbon monarchs, on loans among others used to finance expensive wars, would have been difficult to conduct for a regime with more vertical and horizontal checks on its power (e.g. North 1981); "Spain's defaults establish a record that remains as yet unbroken. Indeed, Spain managed to default seven times in the nineteenth century alone, after having defaulted six times in the preceding three centuries" (Reinhart and Rogoff 2008, 20). The even more extreme monetary policy conducted by Equatorial Guinean dictator Macias Nguema is completely inconceivable in a democracy; he allegedly stored his country's currency reserve and much of its foreign exchange in his house, and later in a hut where much of the money rot to the ground (Meredith 2006, 240–241). These are only a few of the countless examples that could have been invoked to illustrate the economic dangers of dictatorship.[8]

However, there are also some examples of dictatorial regimes presiding over countries with high, or even spectacular, economic growth rates. Some of the most famous examples are Taiwan, South Korea and Singapore in the 1960s and 70s, and present-day China. Multiple theoretical arguments exist that may contribute to explaining these, and other, dictatorial growth successes, and some of the arguments indicate that the authoritarian nature of these regimes indeed may have contributed vitally to the high growth rates (see e.g. the three arguments presented in Knutsen 2010*b*). The economic effects of democracy and dictatorship are thus not straightforward to determine theoretically.

In their seminal study, Przeworski and Limongi (1993) evaluated four theoretical arguments on the relationship between political regime type and economic growth. These four arguments are only a subset of the existing arguments in the literature on democracy, dictatorship and effects on growth (see Knutsen 2006, 58–142), but they are among the most important. The arguments highlight how regime type might matter for I) property rights, II) investment, III) autonomy of the state and IV) checks on predatory rulers, which all again are expected to impact strongly on economic growth. Below I will take a fresh look at these arguments, and include some new theoretical insights, as well as relevant empirical findings from recent years' research. I also add, and briefly present, a fifth argument on democracy and technological change. I will elaborate further on this argument in Section 5.4.

[8]See Knutsen (2009) for several specific examples of how various African dictators have conducted fiscal, monetary, exchange rate and industrial policies to the detriment of their economies, but to their own benefit. See also the many examples in e.g. Meredith (2006); Ayittey (2006); Baland, Moene and Robinson (2010)

As Przeworski and Limongi (1993), I score the arguments after whether they seem to indicate that democracy increases (in favor of democracy) or decreases (against democracy) economic growth relative to dictatorship. The evaluation conducted below differs from the one in Przeworski and Limongi's article, and is generally more optimistic on behalf of democracy's economic effects.

1.3.1 I) Democracy and protection of property rights – in favor of democracy

There exist multiple arguments on how democracy may affect the protection of property rights, and these arguments point in different directions (for a more thorough account, see the review in Knutsen 2011*b*). As I will discuss below, most (large-n) empirical studies find a positive net effect of democracy on property rights protection. However, the conviction that democracy leads to extensive redistribution of property from the rich to the poor, with subsequent negative effects for aggregate production, is old, and was shared by for example John Stuart Mill, David Ricardo and Karl Marx. Przeworski and Limongi (1993) assess the debate on democracy's economic consequences from the nineteenth century, and claim that the right to vote and freedom of organization were widely perceived to have adverse effects on protection of private property rights, and thereby economic growth.[9]

The underlying argument is very simple, and can easily be expressed in modern political economic language (see also Meltzer and Richards 1981; Boix 2003; Acemoglu and Robinson 2006*b*; Knutsen 2007, 2011*b*). Consider a hypothetical country where the median citizen's property entitlement is below the average property entitlement, and where property (only) can be redistributed *progressively*. There are aggregate economic costs related to redistributing property, for example economic loss due to tax distortions or disincentives for investment due to increased uncertainty about security of property in the future. Under democracy, if one assumes one-dimensional politics, the median voter's preferred outcome would be a policy that redistributes property until the marginal personal gain of redistribution is equal to the median voter's share of the marginal national economic loss from redistribution.[10] If the costs related to redistributing property are not too high, there will be property redistribution under democracy. However, in a right-wing authoritarian regime, where the median member in the regime's group of backers has a property

[9]Empirical studies have produced quite convincing support for the hypothesis that strong property rights protection enhances economic growth rates (e.g. Torstensson 1994; Knack and Keefer 1995; Hall and Jones 1999; Acemoglu, Johnson and Robinson 2001*b*).

[10]It is assumed that the cost function is convex.

entitlement above or equal to the average entitlement, there will be no progressive property redistribution. Although property will be more equally distributed under democracy, national income will be lower since property redistribution implies an overall economic cost.

The argument above provides a limited account of the politics of property rights protection, as is explained in depth in Knutsen (2011*b*). If we for example relax the questionable assumption that property can only be redistributed progressively, there are strong counterarguments to the claim that democracy weakens property rights protection. As will be discussed in Chapter 2, democracy is associated with power distribution, both horizontal and vertical. These features provide checks against violations of property rights. In principle, any form of government implies concentration of coercive power and therefore the possibility of state-led confiscation of property, since a political position within a state apparatus "provides the opportunity for individuals with superior coercive power to enforce the rules to their advantage, regardless of their effects on efficiency" (North 2000, 50).

However, democracies will have certain specific advantages over dictatorships in terms of constraining regime-associated property expropriation. First, in democracies the politically advantaged will constitute a larger segment of the population. In Mancur Olson's model (Olson 1993, 2003; McGuire and Olson 1996), a larger group will internalize more of the indirect negative incentive effects of property rights violation on the overall economy, even if they gain directly from redistributive activity: "The majority's interest in its market earnings induces it to redistribute less to itself than an autocrat redistributes to himself" (Olson 2003, 122). Second, there is more power dispersion in democracies, also between different state institutions, which reduces the possibility for single actors to enforce their will at the cost of others. Because of lack of protection of individual rights, poor political accountability and concentration of power, property rights will be less protected in dictatorships, since these features will allow dictatorial elites to confiscate property with fewer costs. Confiscation of property with subsequent redistribution of property as 'private goods' to political backers is also much cheaper in dictatorships, where the 'winning coalitions' supporting the political ruler are smaller (Bueno de Mesquita et al. 2003). Under democracy, where winning coalitions are generally larger, rulers motivated by political survival will have greater incentives to provide the 'public good' of universal property rights protection.

Przeworksi and Limongi recognize the multiplicity of arguments on the relationship between democracy and property rights. Their overall assessment is therefore that "[w]hile everyone seems to agree that secure property rights foster growth,

it is controversial whether democracies or dictatorships better secure these rights" (Przeworski and Limongi 1993, 51), and they further conclude that "[t]he idea that democracy protects property rights is a recent invention, and we think a far-fetched one" (Przeworski and Limongi 1993, 52). I disagree with this conclusion, among others because the median-voter based model on redistribution of property captures only one aspect of the politics of redistribution (see Timmons 2010). Democracies have historically followed a range of redistributive policies, but these have often taken other, and more productivity-enhancing, forms than expropriation and redistribution of property from rich to poor (see e.g. North, Wallis and Weingast 2009). Actually, the most compelling argument for refuting Przeworski and Limongi's conclusion is the conclusion reached by several empirical studies conducted after Przeworski and Limongi's article was published in 1993. These studies find a positive net effect of democracy on property rights protection (e.g. Leblang 1996; Boix 2003; Adzera, Boix and Payne 2003; Clague et al. 2003). In Knutsen (2011*b*), I find that democracy enhances the protection of property rights, even when taking into account that regime type is endogenous to property rights protection.

1.3.2 II) Dictatorship and investment – either way

Singapore had the highest average $\frac{investment}{GDP}$ ratio of all countries (with data) between 1970 and 2000. On average, 45 percent of the Singaporean GDP was invested (Knutsen 2006, 411). The investment ratio for the Soviet Union in the 1930's was equally high, and today China is racking up annual investment ratios over 0.40.[11] Could these high investment rates have been viable under democratic regimes? Probably not! Dictatorships have several policy means that allow them to drive up investment rates, thereby increasing medium to long run growth rates (Solow 1956; Romer 1990).

First, dictatorships often suppress freedom of association, thus crippling the independent organization of unions. In the absence of strong, independent unions, wages are lower, and relatively rich capital owners take a larger share of total production (e.g. Rodrik 1999*a*). When combined with the assumption that savings rates increase with income (The Kaldor Hypothesis), this yields the prediction that aggregate savings and thereby probably investment rates will be higher in dictatorships. Political accountability is also lower under dictatorship, among others due to the lack of free and fair elections. This reduces the pressure on political rulers

[11] For a fascinating treatment of the early Soviet Union's economic policy and economy, see Davies, Harrison and Wheatcroft (1994).

to channel resources to immediate public consumption over the national budget. Instead, dictators can channel resources to investments, independent of the desires of "short-sighted electorates". A similar political logic underlies the argument that dictatorial governments need not provide as much social security to its populations. The response of rational citizens living under dictatorial rule is to save privately in order to self-insure for the future (see also Knutsen 2010*b*).

The argument that dictatorships are *better able* to generate higher savings and investment rates is therefore founded on solid theoretical reasoning. However, political mechanisms that allow dictatorships to generate a higher investment rate, should the regime want so, does not imply that most dictatorial governments have *incentives* to generate high investment rates. As discussed in Knutsen (2010*b*), the case-based empirical evidence often cited in favor of the argument above (e.g. Wade 1990; Leftwich 2000) seems prone to selection bias. There are relatively few historical dictatorships with extremely high savings rates; these are quite frequently recycled as examples in the literature, and general inferences on high savings rates under dictatorship are thereafter drawn. This likely gives rise to a systematic bias (regarding the effect of regime type) stemming from selecting cases on specific values (high savings and investment rates) on their dependent variable (see for example Geddes 2003*b*).

Nevertheless, I find some evidence indicating that dictatorship in general enhances savings rates, but not investment rates, in Chapter 5, although the evidence is far from robust. Moreover, the growth accounting exercise presented in Chapter 5, based on data going back to the 19th century, shows a positive, although not completely robust, effect of dictatorship on physical capital-induced growth. Also, for example, the thorough study conducted by Tavares and Wacziarg (2001) finds that democracy reduces economic growth via the savings and investment channel, and Tavares and Wacziarg (2001) moreover find that this is the most sizeable negative indirect effect of democracy on growth.

Despite this, the empirically estimated negative effect of democracy on growth via the savings and investment channel reported in Chapter 5 is perhaps not as large as many theorists would have expected. Although there are notable exceptions, most dictatorships do, as noted above, not generate very high savings- and investment rates, and there are several reasons for this. First, self-interested dictators might not see it in their interest (monetary or related to political survival) to pursue policies that generate investment-induced growth, as will become clear from the argument below on predatory dictators. A second related point is that investment, and particularly foreign direct investment, is sensitive to the protection of

property rights; as seen above, democracy likely strengthens property rights protection in general. Third, a high degree of corruption deters investment, and democracy probably reduces corruption, at least in relatively rich countries (Fjelde and Hegre 2007) and when democracy is consolidated (Rock 2009*a*). Therefore, even if certain dictatorships generate extremely high investment rates because of the large scope of possible policies under limited political accountability, most dictatorships do not produce high investment rates.

Mankiw, Romer and Weil (1992) expanded the traditional Solow model of economic growth by including human capital. The traditional Solow model postulated that income is a function of technology, labor and physical capital. If one stretches the capital concept to include human capital, democracies have an extra advantage over dictatorships, since democracies invest more in schooling and health. Mankiw, Romer and Weil (1992, 417–418) estimated that human capital is at least equally important as an input to the economy as traditional physical capital. Even if Mankiw et al.'s estimation procedures have been criticized (Klenow and Rodriguez-Clare 1997), human capital is widely agreed among economists to be important at least for short and medium term economic growth rates (see e.g. Barro and Sala-i Martin 2004; Helpman 2004; Acemoglu 2008).

Although education and other factors linked to human capital may impact on the likelihood of having a democracy (e.g. Lipset 1959; Inglehart and Welzel 2006),[12] democracy likely enhances human capital.[13] Education and basic health care are highly valued by most people. One would thus expect more widely distributed high-quality education and health care in democracies, as democratic politicians are assumed to be more responsive to citizens' preferences than dictatorial (see e.g. Lake and Baum 2001; Lindert 2005). According to Acemoglu and Robinson (2006*b*, 64), Lindert (2000) finds a strong and positive effect of democratization on educational expansion in Western Europe. Engerman, Mariscal and Sokoloff (1998) find the same effect in Latin America. Stasavage (2005) finds that democracy has a positive effect on primary education spending in Africa. More generally, Baum and Lake (2003), Tavares and Wacziarg (2001) and Doucouliagos and Ulubasoglu (2008) find a positive indirect effect of democracy on growth via human capital, and these studies even indicate that this is the most important positive indirect effect of democracy on economic growth. As with the relationship between democracy and

[12]But, see the thorough study and skeptical results in Acemoglu et al. (2005)

[13]As I will discuss in Chapter 5, some dictatorships have historically provided relatively well-functioning, broad-coverage education and health care systems. However, there are solid theoretical arguments for a general, positive effect of democracy on various health and education measures, and most large-n studies also tend to find such an effect. See particularly Lake and Baum (2001).

physical capital, the relationship between democracy and human capital is described and investigated more extensively in Chapter 5.

In conclusion, dictatorship on average likely increases investment in physical capital, although there is large variation among different dictatorial regimes in this area. However, it also seems likely that democracy increases the accumulation of human capital. If we apply a broad definition of capital, including both physical capital and human capital, it is quite unclear whether democracy on average increases investment. Chapter 5 tests the effect of democracy on both physical and human capital-induced growth, and the results are not robust enough to conclude with certainty on this matter.

1.3.3 III) Dictatorship and autonomy of the state – against democracy

Scholars studying East Asia have, as Przeworski and Limongi (1993) noted, often linked the fantastic economic performances of some Asian dictatorships to the autonomy of the dictatorial state (see the more extensive treatment of this literature and argument in Knutsen 2010*b*). "In this view, the key to the superior economic performance of the Asian "tigers" is "state autonomy," defined as a combination of the "capacity" of the state to pursue developmentalist policies with its "insulation" from particularistic pressures, particularly those originating from large firms or unions. This argument takes two steps: "state autonomy" favors growth, and "state autonomy" is possible only under authoritarianism" (Przeworski and Limongi 1993, 56).

Olson (1982) argues that democracies are prone to capture from special interest groups. This may conceivably lead to policies that are incoherent with the interests of the broader populace; economic growth may be sacrificed for the protection of specific business sectors or pivotal voting blocs whose interest is not aligned with economic growth. In any case, such lobby processes will be associated with wasteful rent-seeking, which will detract financial resources and focus from more productive ventures (see e.g. Grossman and Helpman 2001).

One argument is that politicians and bureaucrats are insulated from such pressures under authoritarianism and are therefore better able to conduct "proper" policies (see e.g. the discussions in Wade 1990). One important special case is that of economic reforms. Certain microeconomic reforms for example improve the efficiency of resource allocation in the medium to long run, but an adjustment process towards an efficient equilibrium may be painful and certain previously privileged

groups may lose out. Under democracy, the potential losers may be important political actors, so-called "veto players" (Tsebelis 2002), who will block reform. Trade liberalization is often considered a particularly fitting example, where protected industries might block liberalization, even if the expected result from liberalization is an increase in national GDP.[14] Under dictatorship, the dictator is assumed to have the means, and in some instances also the incentives, to carry out "painful" reform (but, see Rodrik 1999*b*). Reform is also assumed to be conducted more speedily under a dictatorial regime, since many of the procedural steps needed in democracy as well as complex and time-consuming negotiation can be skipped (see also Knutsen 2010*b*).

There are counterarguments that modify the picture painted above. First, more than state autonomy alone is required for successful political decision making. Political and bureaucratic processes need to be "embedded in a concrete set of social ties that binds the state to society and provides institutionalized channels for the negotiation and renegotiation of goals and policies" (Evans 1995, 12). Such 'embeddedness' may suffer under dictatorship because of the regime's insulation from the general populace, and the lack of an organized civil society with extensive knowledge of local conditions. Local knowledge is important in order to achieve efficient implementation of political decisions, and dictators are likely to be at an information disadvantage (in addition to the discussions in Chapter 5, see e.g. Sen 1999; Mueller 2003). When it comes to the speed of reforms, Lijphart (1999, 259) notes that speedy reform processes and speedy implementation may have negative consequences, especially if there is large uncertainty about a reform's effects. A certain degree of political inertia, with thorough debates on the consequences of reform and subsequent adjustments of the reform proposal, may be beneficial for the final economic outcomes.

Most importantly, the assumption that dictators are indeed as autonomous as described above is questionable. Even if there is lack of free and fair elections linking the regime to the broader electorate, no dictator could survive without backing from specific groups, be it the party, the landlord elite or the military. Bueno de Mesquita et al. (2003) recognize this, and claim that every leader "answers to some group that retains her in power: her winning coalition" (Bueno de Mesquita et al. 2003, 7). The

[14] In reality, the relationship between democracy and trade policies is far more complex, depending for example on the factor intensities of the country's economy, more specifically the relative intensities of capital to labor and particularly land to labor (see e.g. the brilliant analyses in Rogowski 1989; O'Rourke and Taylor 2007). The relationship also depends on more specific institutional structures, like the electoral system (Rogowski 1987; Persson and Tabellini 2003; Persson 2005).

winning coalition is again drawn from a 'selectorate', the group of actors that can potentially influence the selection of leaders. The difference between democracies and dictatorships within this framework is therefore not the degree of autonomy of the regime, but the sizes and natures of the underlying winning coalitions and selectorates. Kim Jong Il might be heavily dependent on his backers for political survival, but his backers are few, the high-ranking military officers and possibly also some high-ranking party members (see various chapters in Kihl and Kim 2006). The question of whether a small underlying winning coalition is conducive to growth is different from the question of whether more state autonomy is conducive to growth. This may lead us to rethink the economic effects of dictatorial insulation from the general populace.[15]

1.3.4 IV) Democracy and constraints on predatory rulers – in favor of democracy

According to Evans (1995, 45), if autonomy is defined as not having goals shaped by social forces, Mobutu's regime in Zaire was a very autonomous regime. Mobutu's Zaire is an infamous prime example of a 'predatory regime', where the dictator and his inner clique mainly used their powers to enrich themselves and secure their continuation in office. One may ask: Why would self-interested dictators not use their vast powers to promote policies to their own benefit, even in instances where the population in general would suffer economically? Historical examples of dictators that have used their power for following personal goals with disastrous macro-consequences are numerous, ranging from the Roman Emperors Caligula and Nero's extravagant and extremely expensive cultural and architectural projects to Khmer Rouge and Pol Pot's decision to kill Cambodians with education or glasses. The most clear-cut examples come from rulers that steal or confiscate socially productive resources for their own material benefit, predatory rulers in the true sense of the word. However, the point is more general; rulers might use strategies that are well-designed for achieving personal goals, but which reduce economic growth.

One special case emerges when dictators want to minimize the probability of being thrown out of office: *If* the dictator for example should happen to believe that modernization theory is correct, with economic growth and industrialization leading to a strong middle class and calls for democracy, the dictator will be better off not industrializing. This type of argument is discussed more intensively in Chapter 7

[15]This qualification may also impact on the validity of the other theoretical arguments presented here, for example Argument II). I will come back to these types of questions, related to the incentives of rulers and the importance of context for preferred policies, particularly in Chapter 7.

(see also Robinson 1998, 2001; Acemoglu and Robinson 2006*a*). Another rational strategy could be to spend excessive amounts on a repressive apparatus instead of using resources for productive investments (see e.g. Wintrobe 1990, 1998; Acemoglu and Robinson 2006*b*). In democracies, leaders who try to engage in predatory activities are more likely to be detected because of freedom of media, more likely to be stopped by other institutions like the legislature and courts, and more likely to be thrown out of office in the next election. Democratic institutional features thus provide checks on predatory behavior.

Not all dictatorships are predatory. One reason is that dictatorships vary in terms of institutionalized checks and balances (e.g. Przeworski et al. 2000; Gandhi 2008). Some dictatorships have legislatures and parties that play at least some political role, also when it comes to constraining predatory behavior. Moreover, in some contexts, rational dictators may not see it in their long term interest to act predatorily. Olson (1993, 2003) argues that dynastic regimes may refrain from predatory activities because of their rulers' relatively long time horizon. These rulers do not want to diminish the overall size of the future tax base (see also McGuire and Olson 1996), as they assume there is a good chance that either they or their close relatives will be around to reap the long-term benefits of a productive economy. Robinson's model (Robinson 2001) indicates that willingness to engage in predatory behavior depends on how the dictators' survival probability is affected by predation, and this again is a function of several contextual variables. Bueno de Mesquita et al.'s (2003) analysis indicates that if dictators have relatively large winning coalitions, they will have incentives to provide public goods instead of engaging in predatory behavior. Besley and Kudamatsu (2007) argue that winning coalitions that are to likely retain their positions as crucial political players if a particular dictator falls from power are better able to discipline the dictator into refraining from predatory behavior.

Nevertheless, an extension of most of the arguments in the above paragraph to include democracies, from institutional checks to size and autonomy of the winning coalition, indicate that democratic leaders will have *even* less incentive to engage in predatory behavior than dictators who rule under the conditions described above.

1.3.5 V) Democracy and technological change – in favor of democracy

The question of what drives economic growth has been intensively scrutinized by economists. Technological change is commonly accepted as the most crucial aspect

underlying long-term growth (see e.g. Romer 1990; Helpman 2004).[16] Thus, if there is a link between democracy and technological innovation and diffusion, there is a link between democracy and growth. Sah and Stiglitz (1986) point to one such potential link. They show that polyarchical organizations, where decision power is distributed horizontally, have higher probabilities of accepting good, novel projects under uncertainty than hierarchical organizations. As democracies exhibit greater dispersion of authority, the above logic may indicate a democratic technology advantage.

Halperin et al. claim that democracies "realize superior developmental performance because they tend to be more adaptable" (Halperin, Siegle and Weinstein 2005, 14). They view democracies as "learning organizations", where individuals are engaged in the gathering of new information, debate, adjusting positions and revising pre-existing knowledge. Evaluating and changing old ways of doing things and achieving progress by trial and error are important for political and economic dynamism. Civil liberties, inherent characteristics of democracy (in addition to the discussion in Chapter 2, see Beetham 1999), are especially relevant for these processes. Free and open debate is instrumental for eliminating unfounded knowledge and for opening up to new ideas. John Stuart Mill, referring to political suppression of ideas, noted that "the opinion which it is attempted to suppress by authority may possibly be true. Those who desire to suppress it, of course, deny its truth; but they are not infallible" (Mill 1974, 77).

Economics and politics are not empirically separate domains, and freedom of expression and debate, as well as norms related to competition between alternative views and to acceptance of change, may spill over from the political to the economic sphere. In the economic sphere the aforementioned norms will likely contribute to "creative destruction" (Schumpeter 1976), thereby speeding up the process of technological change, which again increases economic growth. Openness to new and alternative domestic and international ideas and willingness to try out alternative ways of doing things generate a dynamic economy. Freedom of speech crucially contributes to better opportunities for actors to evaluate and disseminate ideas from abroad, and may spur intense and inclusive debates on what the most efficient and proper solutions to a specific problem are (Halperin, Siegle and Weinstein 2005).[17]

[16] But, see Mankiw, Romer and Weil (1992).

[17] Of course, information and learning in the marketplace is not identical to openness of political debate and the freedom to voice political opinion. Imitation of technologies can of course also be conducted in a society where political debate is limited. The Asian Tigers and Communist China may be decent empirical examples. But, *even* Chinese-style control and censorship of certain selected websites, conducted for political reasons, might hinder information flow and use of communication technologies that could have given economic benefits. This will be discussed

Neo-Schumpeterian economists have stressed the importance of diversity of ideas and introduction of novel ideas into the economy. According to Verspagen, the evolution that characterizes a dynamic economy "is the outcome of a constant interaction between variety and selection" (Verspagen 2005, 495). Selection reduces variety since more efficient techniques are adopted through learning or through "victory in the marketplace", thus competing out more inefficient methods of production (e.g. Alchian 1950; Nelson and Winter 1982; Fagerberg 2003). In order to keep up variety, one needs a steady introduction of novel ideas. Freedom of speech and open idea exchange under democracy enhance both variety and selection; both the introduction of new ideas, either from abroad or from local entrepreneurs, and learning processes rely on the possibility of collecting and processing information in a relatively unrestricted manner. Harsh restrictions on civil liberties are incompatible with the latter conditions. Given the importance of technological and organizational change for long-term growth, the mechanisms sketched up above are presumably very important channels through which democracy enhances economic growth.

On a general note, dictatorial regimes may out of political survival motivations restrict civil liberties and general diffusion of information both from abroad and within the country. This may, however, result in reduced absorption and spread of new productive ideas and technologies. This can be the case even if the regime wants economic growth, as it is difficult for the regime to fine-tune policy so that only politically dangerous information is stopped, and economically productive information allowed. This argument is developed in greater detail in Section 5.4.

1.3.6 Evaluation of the arguments; a quick summary

The overall evaluation of the above theoretical arguments indicate that democracy's negative economic effects are not as severe as some authors (like e.g. Huntington 1968; Haggard 1990) have suggested. I sum up Przeworski and Limongi's (1993) evaluation of the four first arguments above, which were also discussed in their article, and compare their evaluation with my evaluation in Table 1.1. The arguments are simply scored as "For", "Against" or "Either way" regarding democracy's effect on economic growth via the particular channel discussed in the argument.

In my judgment, there is a lot more going for democracy than what Przeworski and Limongi suggested, and these authors are again more "optimistic" than other academics in the field (see e.g. the literature reviews in Sirowy and Inkeles 1990; Przeworski and Limongi 1993). First, given the strong arguments proposed by

extensively in Chapter 5.

Argument	P&L's (1993) conclusions	My conclusions
Democracy and property rights	Either way	In favor of democracy
Dictatorship and investment	Against democracy	Either way
Dictatorship and autonomy	Against democracy	Against democracy
Autonomous rulers are predatory	In favor of democracy	In favor of democracy
Democracy and technology	—	In favor of democracy

Table 1.1: Theoretical arguments and their implications for the effect of democracy on economic growth.

among others North (1990), Olson (2003) and Bueno de Mesquita et al. (2003) on the incentives for dictators to grab property to their own or their supporters advantage, and the statistical evidence pointing to a positive effect of democracy on property rights protection, I score the property rights argument as "For democracy". Some of these theoretical studies on the political economy of property rights in dictatorships, and the statistical studies, have been published after Przeworski and Limongi wrote their article, in which they scored the argument as "Either way". On the argument that dictatorship enhances investment, I agree with Przeworski and Limongi's evaluation that one may expect a dictatorial advantage, *if* one considers only physical capital. However, when including also human capital, I conclude that "Either way" is a more proper score, as democracies are found to have a substantial human capital advantage in the literature. As Przeworski and Limongi, I score the "Autonomy argument" in disfavor of democracy (although there were several strong counterarguments to that argument), and the "Predation argument" in favor of democracy. Moreover, the "novel" argument on the proposed effect of democracy on technological innovation and diffusion point to an extra economic advantage for democracy. Thus, the best a priori guess, I would argue, is a net positive effect of democracy on economic growth.

In addition to the five important arguments discussed above, there are several other arguments on how and why political regime type may impact on economic growth. These arguments mostly discuss how democracy matters for growth through affecting different types of economic policies or economic institutional structures, like institutions that control corruption. However, democracy may also affect growth through affecting factors like probability of conflict and the opportunity to receive foreign aid. Some of these arguments will be briefly discussed in Chapter 3, and in later chapters.[18]

The five arguments above will be further elaborated on in subsequent chapters,

[18]In Knutsen (2006, 58–142), I discuss a very extensive list of arguments, twenty arguments in total, from the literature.

and some will be relatively directly tested empirically. For example the argument on regime type and technological change will be elaborated on in Section 5.4, and some hypotheses deduced from this arguments are tested empirically. Stringent empirical tests on the *net* effect of democracy on growth will, as mentioned, be conducted in Chapter 6. But, before I start a more thorough and extensive analysis, let me quickly present some patterns in the data and some brief but relevant descriptions of specific countries' histories.

1.4 Regime type and economic growth: descriptive statistics and illustrative cases

1.4.1 The economic environment in average democracies, semi-democracies, and dictatorships in 2004

There are systematic economic and social differences between democratic and dictatorial countries. Democratic countries are generally richer, have lower income inequality, protect property better and provide intermediate and higher education to a larger share of their populations. This does not *imply* that democracy has a positive effect on all these economic outcomes.[19] But, the correlations between degree of democracy and these variables are too strong to be due to any coincidence. It may be that one or several factors affect both regime type and economic outcomes systematically, such as specific historical patterns, other political institutional variables or geographical factors (see e.g. Acemoglu et al. 2005, 2008). It may, as will be discussed extensively in Chapter 3, also well be that economic factors affect prospects for democratization and democratic stability (see e.g. Przeworski and Limongi 1997; Boix and Stokes 2003). Finally, the correlation between democracy and economic outcomes may be due to democracy impacting on the economy. My best guess is that all these three types of causal structures are of relevance.[20] I will investigate the economic effects of democracy more methodically and carefully in later chapters, but let me present some interesting descriptive statistics as a starting point.

Table 1.2 shows the averages of different important economic statistics in 2004 for democratic, semi-democratic and dictatorial countries. The regime types are

[19]Notice also that a lacking correlation between two variables, X and Y, does not imply absence of effect of X on Y. Y's effect on X, or an omitted variable bias caused by Z affecting both X and Y, may counter the effect of X on Y.

[20]For an excellent contribution that highlights the reciprocal effects between political openness and economic processes, as well as the importance of underlying social and political conditions for democracy and economic development, see North, Wallis and Weingast (2009).

classified according to the Freedom House Index (FHI), which is described more thoroughly in Chapter 2. In brief, the FHI takes into account the existence and functioning of different political rights and civil liberties in a country, and goes from 1 (most democratic) to 7 (most dictatorial). Countries scoring 2.0 or lower are here classified as democracies. Regimes scoring above 2.0 and below 5.0 are classified as intermediary regimes, let me call them "semi-democratic", and countries scoring 5.0 or above are classified as dictatorships.

	Democracies $FHI \leq 2$		Semi-dem. $2 < FHI < 5$		Dictatorships $FHI \geq 5$	
	(Obs.)	Mean	(Obs.)	Mean	(Obs.)	Mean
GDP p.c.	(66)	16282	(56)	4606	(43)	4216
Gini	(49)	36.6	(50)	44.9	(29)	40.7
Gross savings	(59)	20.1	(56)	13.8	(44)	19.6
Gross investment	(59)	24.4	(58)	21.1	(45)	23.4
Primary schooling	(67)	103.6	(50)	105.1	(45)	97.6
Secondary schooling	(66)	92.3	(45)	60.3	(42)	60.4
Tertiary schooling	(53)	46.4	(37)	19.1	(39)	17.4
Rule of law	(76)	0.81	(60)	-0.50	(53)	-0.80
Corruption control	(72)	0.79	(60)	-0.48	(53)	-0.70
Property rights	(53)	19.8	(50)	14.2	(36)	14.3
Bureaucratic quality	(53)	3.1	(50)	1.7	(36)	1.4

Table 1.2: Average scores on different economic factors by regime type in 2004. Sources: The GDP-, education-, savings- and investment data are from the World Development Indicators (WDI). The GDP data are PPP-adjusted, and measured in 2000$. The education data are all gross school enrollment ratios. The savings- and investment numbers are gross savings and investment as shares of GDP. The Gini coefficient, which records the most recent data up until 2004, is from the World Income Inequality Database. Rule of law and control of corruption are measured by indexes taken from the World Governance Indicators (WGI). The bureaucratic quality and property rights data are from the ICRG Researchers Dataset, constructed by the PRS Group. The property rights index is similar to the one used in Chapter 7, and is constructed from two subcomponents in the ICRG dataset. See Chapter 4 for a closer description of these data.

According to the 2004 data, democracies are on average more than three times richer than are both semi-democratic and dictatorial countries. The democracies' average Gini-coefficient is also somewhat lower, implying less income inequality in an average democracy than in an average semi-democracy or dictatorship. Democracies also generally save and invest somewhat more than semi-democracies, and on the same level as dictatorships. There are no large differences when it comes to gross primary school enrollment ratios, as all the regime types provide most of their children with primary schooling. However, democracies have an average secondary school enrollment ratio above 90%, whereas the corresponding numbers for the other

regime categories are about 60%. Moreover, democracies have an average tertiary enrollment ratio that is more than double that of the other groups' ratios. Democracies on average also clearly outperform the other regime-categories when it comes to rule of law, control of corruption, property rights protection and bureaucratic quality. To sum up, and without claiming anything about causal relationships, in an average democracy, income is higher and more equally distributed, more citizens receive higher education, and the economic institutional environment is far gentler than in an average semi-democracy or an average dictatorship.

Interestingly, there are only small differences between semi-democracies and dictatorships on most statistics reported above. Semi-democracies fare somewhat better on average when it comes to primary school enrollment, corruption control and rule of law, but they save and invest less than dictatorships. Let me mention once again that these statistics alone do not tell us anything about the economic effects of democracy. But, as we will see in later chapters, more stringent analysis indeed finds that democracy has a positive effect on a range of economic outcomes. Let us now take a look at some descriptive statistics that reveal the economic growth records over time for relatively democratic and relatively dictatorial countries.

1.4.2 Fast- and slow-growing countries in recent decades

Singapore

Let us consider one example of a fast-growing authoritarian, or at least semi-democratic, regime, namely Singapore. As seen from Figure 1.1, Singapore was one of the countries with the highest average economic growth rates from 1970 to 2000, and has been classified both as a "Growth Miracle" (Przeworski et al. 2000) and as an "Asian Tiger Economy" (e.g. Young 1995).

Singapore was ruled for many years by Prime Minister Lee Kuan Yew, who has vigorously defended the hypothesis that an authoritarian regime is needed in developing countries in order to boost economic development (see e.g. Sen 1999; Knutsen 2010*b*). This has, as mentioned in Section 1.1, led some authors like Sen (1999) to dub this hypothesis the "Lee thesis". If one wants to selectively pick evidence for the Lee thesis, Singapore seems to be the perfect case. Not only has the regime, led by the People's Action Party (PAP), managed to maintain domestic political stability in an ethnically fractionalized city state; it has also overseen an impressive growth of the Singaporean economy. This small city state is strategically located along one of the world's major shipping routes, arguably an economic advantage,

but has little land or natural resources. The city developed from an economy based on the transhipment of goods produced and resources extracted elsewhere under British colonial rule (see e.g. Huff 1994) to an industrialized economy and then further to a center for finance and high-tech production. Singapore has also become a large regional hub for transnational corporations investing in the wider Southeast and East Asian region.

Many case studies of the Singaporean economy point to the key role the regime played for economic growth by promoting specific types of economic policies (e.g. Huff 1994; Lim 1983; Bellows 1989).[21] The regime seems to have been intentionally geared towards promoting high economic growth. The Singaporean regime supported strong protection of property rights, also for foreign investors, and enhanced investment and saving through a wide variety of means. Subsidized credit and provision of cheap land areas for large companies were among these, but also the politically induced low wages contributed to high savings- and investment rates. As mentioned above, no other country had a higher $\frac{investment}{GDP}$ ratio than Singapore between 1970 and 2000.

The regime also contributed to economic development by providing excellent infrastructure projects, like the city's subway network, and by expanding education and health services. Moreover, the regime actively engaged in industrial policy that seems to have worked quite well, at least in many instances, in terms of spurring growth in sectors that were considered particularly beneficial for overall economic development (see e.g. Parayil 2005). Instrumental in this process was the Economic Development Board (EDB), established in 1961. One crucial factor underlying Singapore's economic development was the well-functioning economic institutional environment, earning Singapore top marks on different business environment-, corruption-, rule of law- and property rights protection indexes (some of these indexes are presented in Chapter 4). As is discussed in Chapter 3, such economic institutional aspects are not exogenous, but endogenous to political decision making.

At least partially as a result of the above-mentioned factors, Singapore experienced an average real GDP per capita growth rate of 6.4 percentage points between 1970 and 2000, second only to Taiwan's growth rate in that time span (Knutsen 2006, 242). This growth rate implies almost a doubling of the economy's size in ten years, and thus an eightfold increase in 30 years. Singapore also became an extremely open economy, not only in terms of attracting substantive amounts of FDI,

[21] Interested readers should definitely look up the well-written "Singapore Story" authored by Lee Kuan Yew himself (Lee 2000).

but also by increasing its $\frac{totaltrade}{GDP}$ ratio to 3 already in 1990. During this period of economic development, the PAP regime maintained strict control over government and the vast majority of parliamentary seats (see e.g. Sikorski 1996; Bellows 1989). This was in part due to repression of civil liberties and manipulation of rules related to the electoral process, and by harassing opposition politicians. Nevertheless, the PAP most likely has had, and still has, broad popular support, perhaps mainly due to its effective economic policies.

Zaire (Congo)

Zaire, present-day Democratic Republic of Congo, under Mobutu is a perfect illustration of how dictatorship can result in economic disaster. Singapore's excellent economic management and economic performance after decolonization contrast starkly with the policies and outcomes in Zaire after decolonization. The economic decline in Zaire was dramatic, and this was even before the civil wars and foreign incursions that later ravaged the country further (see e.g. Clark 2002; Prunier 2008). The dismal economic growth in Zaire/Congo from 1970 to 2000 is showed in Figure 1.1; indeed the country had the lowest average growth rate in this period of all countries with recorded data. I will not go into detail here on how Mobutu Sese Seko and his political supporters conducted dictatorial politics that contributed to the country's economic decline, but there are several good historical and analytical accounts (see e.g. Wrong 2000; Meredith 2006; Reno 1997; Naniuzeyi 1999; Evans 1995).

Congo, as the country was called also before Mobutu's "authenticity campaign" in 1971, had suffered dramatically under its colonization period, particularly when it was the personal colony of Belgian King Leopold II before the Belgian state took over in 1908 (see e.g. Ewans 2002). The predatory practices, notably including the extraction of labor and raw materials, the lacking effort in setting up or maintaining well-functioning institutions, and the atrocities committed towards the Congolese population have made the Congolese colonial experience the archetypical example of bad colonial governance (see e.g. Acemoglu, Johnson and Robinson 2001*b*). Thus, in 1960 when Congo became an independent state, after a speedy process that caught the Belgians by surprise, the country had very poor prospects for stable economic development. The political and economic institutional structures were lacking, which again contributed to the dramatic power struggle that eventually ended with Army Chief of Staff Mobutu taking power with good help from the CIA (for a dramatic first hand account, see Devlin 2007). Moreover, there were only a handful of Congolese citizens with secondary education, and as colonial government

posts had been virtually shut for Congolese, there were few with any civil service training. Adding to the problems, Congo stretched out over a vast geographical area, and there were rebellions in several provinces, and calls for independence for example in the Katanga province. High economic growth would therefore likely have been difficult even in the absence of the economic policies pursued by Mobutu.

Congo did possess vast resources of various minerals and other natural resources. But, with lacking institutional structures such resources may, as the resource curse literature discussed in Chapter 3 tells us, rather contribute to rent seeking and weak growth in other sectors (e.g. Mehlum, Moene and Torvik 2006*b*; Humphreys, Sachs and Stiglitz 2007), and even power struggles and civil war (e.g. Ross 2004). Both these predictions turned out to be true for post-colonial Congo. Nevertheless, Mobutu's economic policies arguably contributed quite a lot to the country's economic stagnation. After some progress in the early years, the country now called Zaire experienced a dramatic economic decline from the mid-1970s onwards (e.g. Reno 1997). The already poor country for example witnessed decomposition of its few factories and degradation of its infrastructure (see e.g. the accounts in Meredith 2006).

Several policy-factors contributed to the poor economic development record of Zaire after decolonization. For example, Mobutu refused to build or maintain roads, mainly because of political survival reasons (Sundstøl Eriksen 2003) and neglected spending on basic public goods and services like health care and education. A substantial amount of public revenue was pocketed personally by Mobutu, or spent on his core supporters, among others military officers. The investment climate in Zaire was highly uncertain, largely because of expropriation by the regime and its allies. Also, outright looting by different actors, which was a consequence of the country's lacking rule of law, contributed to the poor investment climate. Corruption was rampant, further contributing to reducing the gains to productive activity. Zaire never realized the potential from its mineral riches, its human capital base remained weak, and industries were mismanaged.

As noted above, production declined particularly after the late 1970s when the regime's worst excesses began. Although the decline in income and production may be overstated by publicly available statistics, as private actors withdrew production from the formal to the informal economy (Reno 1997; Emizet 1998), the Zairian GDP per capita is estimated to have dropped by an astonishing 4.8 percentage points annually from 1970 to 2000, as can be seen from Figure 1.1. Zaire was a poorer country after Mobutu was forced from power than it had been when the Belgians left in 1960. The nature of the dictatorial regime, with concentration of

power in the hands of Mobutu, seems to explain a great part of that disastrous performance.

Other examples

Although there are no democratic examples of economic mismanagement comparable to the Zairean case, democracy does not guarantee economic development. Jamaica is one example of an economically stagnating democracy. The country's real GDP per capita in 2000 was about similar to that in 1970; as seen from Figure 1.1 the average growth rate over the time period was close to zero. Jamaica's poor record on crime and its lacking rule of law have likely contributed to this result. However, there are not many cases like Jamaica. Most democracies have experienced modest, but positive economic growth rates after 1970. Before 1990 most democracies were fairly rich countries, which contributes to explaining why growth rates have not been spectacular. For already rich countries, with preexisting high levels of physical and human capital investment, growth mostly has to come from technological change (see e.g. Solow 1956; Barro and Sala-i Martin 2004). A country's maximum rate of technological change is however bounded by the development of new ideas and techniques at the global level; long-run growth rates are not easily manipulated above the growth rate of the "global technology frontier". I will come back to these issues in Chapter 5. Note, however, that it is vital to take initial level of income into account when studying factors that affect economic growth.

When it comes to relatively poor democracies in recent decades, there are some examples of countries starting out very poor, and with seemingly bleak development prospects, that managed to conduct effective policies and enhance growth under relatively democratic regimes. Two prominent examples are post-colonial Botswana and Mauritius (see e.g. Acemoglu, Johnson and Robinson 2001*a*; Leith 2005; Danevad 1995; Tsie 1996; Sacerdoti et al. 2005; Bräutigam 1997; Meisenhelder 1997; Subramanian and Roy 2003).[22] The most sizeable poor democracy, India, was for a long time known for its slow, but relatively steady, "Hindu growth rate". But, the pace of the Indian economy's growth has picked up dramatically in recent years (De Long 2003; Rodrik and Subramanian 2004). All in all, the track record for democracies when it comes to economic growth is not as mixed as that of dictatorial countries. There are some democracies with negative growth rates over longer time periods, but most democracies have experienced modest positive or relatively high positive growth rates.

[22] I have previously described these two cases in detail in Knutsen (2006).

1.4.3 Democracy, dictatorship and growth over time

Social science studies based on cross-country evidence seldom draw on data from before WWII, or even 1960, which has been labeled "year zero" for statistical studies on economic development (Chang 2006, 145). By expanding the data back in history, one can make better inferences, for example on the effect of democracy on economic growth. Although there were few democracies of a decent modern standard before WWII, there were differences between polities on several dimensions relevant for degree of democracy long before 1945. Historians seem to have no problem with concluding that Athens was relatively more democratic than Sparta (see e.g. Ober 2008; Raaflaub, Ober and Wallace 2007), or that the British political system was relatively more open than the Russian in the 18th century (North 1981). Neither do they seem to have any problem with arguing that there were more and better protection of liberties in Dutch cities than in Habsburg Spain after the time of separation between these political entities (see e.g. Palmer, Colton and Kramer 2002; Maddison 2006; De Long and Shleifer 1993).

Luckily, the combination of the Polity data (Marshall and Jaggers 2002) and Angus Maddison's historical GDP data (Maddison 2006) allow me to map the average growth rates of relatively democratic and relatively dictatorial countries back to the 19th century. If there had been systematic data on polities along democracy-relevant dimensions and data on economic outcomes further back in history, I could have utilized far more information when drawing inferences. Indeed, a very exciting study is De Long and Shleifer (1993), which finds that European cities within political entities that protected their inhabitants' liberties had far more economic progress than cities within polities that provided less such protection. However, De Long and Shleifer (1993) are forced to use population growth as a proxy for economic growth because of lacking data.

Figure 1.4 shows the smoothed five-year average growth rates, calculated on the basis of the data from Maddison (2006), for relatively democratic and for relatively dictatorial countries from 1855 to 2003.[23] Here, I have used data from Polity IV (Marshall and Jaggers 2002), which have longer time series than the data from Freedom House, and categorized all countries with a score above or equal to 6 on the PI, which ranges from -10 to 10, as democracies.[24] I have taken out all country-

[23]The few countries that were classified as democracies also had generally higher average growth rates between 1821 and 1850 (which is the last year of growth not used for calculating the five-year average growth rates), which are also years with GDP data from Maddison. However, I did not add these in the Figure, since GDP is measured every tenth year for most these countries in this time interval.

[24]The PI will, along with the FHI, be described more in detail in Chapter 2.

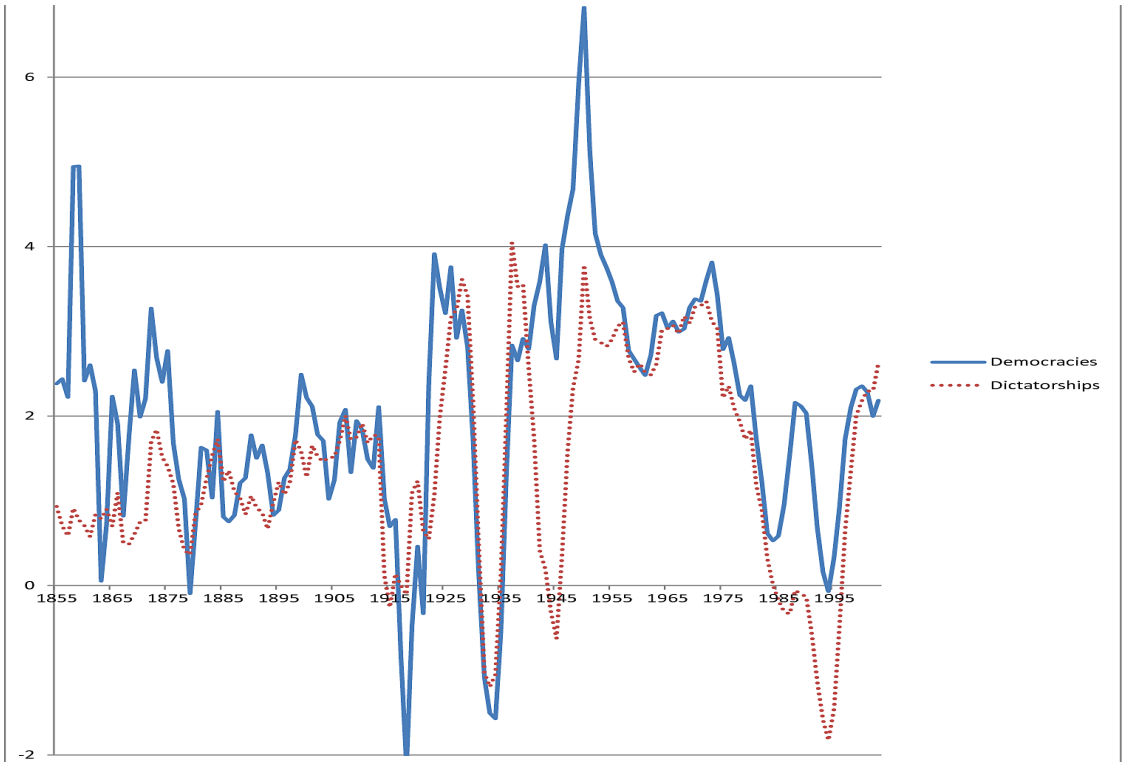

Figure 1.4: The figure shows smoothed five-year average GDP per capita growth for relatively democratic (Polity-index$\geq$ 6) and relatively dictatorial countries from 1855 to 2003. Sources: Maddison (2006) and Polity IV.

years that were in a state of anarchy or that experienced foreign occupation.

A visual inspection of Figure 1.4 indicates that dictatorships have, on average, very seldom outgrown democracies with a large margin, and this is despite the changing composition of the "democracy club" during this 148 year interval. During the recovery from the Great Depression in the 1930s, the world's dictatorships on average had higher growth than the more struggling democracies, mainly placed in North America, the Pacific and Northwestern Europe. This was the period when the Soviet Union industrialized quite rapidly under Stalin's 5-year plans, and Germany experienced relatively speedy recovery from the depression under the NSDAP and Hitler. However, this is more the exception than the rule, with another exception being a few years around the end of World War I (WWI).

From 1850 onwards, democracies have rather, on average, mainly had about equal or higher growth rates than dictatorships. This was, as mentioned above, the case at the end of the 20th century, during the "third wave of democratization" (Huntington 1991). But, it was also the case in earlier years when the group of democratic countries was far less numerous. Two such periods were the 1850, 60s and

70s, and the early and mid-1920s. Also, according to the Maddison data, the 1940s did not only contain the military defeat of prominent dictatorships at the hands of democracies; it also seemingly contained an economic triumph of democracy over dictatorship. However, several countries lack growth statistics for the first half of this decade.

In the Post-World War II (WWII) period, dictatorial countries on average seldom outperformed democratic countries with any large margin. Democratic countries grew much faster on average in the first few years after WWII, which may be partly due to the reconstruction of Western Europe. Perhaps more interestingly, democratic countries also outgrew dictatorships on average more or less during the entire period from the mid-70s to the end of the millennium.

Even if the differences in growth rates between democracies and dictatorships generally may seem modest, even modest difference in growth rates produce large differences in income level over time. If two countries started out equally rich in 1855, and one country had a one percentage point higher growth rate than the other, the faster-growing country would have been between four and five times as rich as the slower-growing country in 2003.

The relatively large year to year variation in average growth rates in the democratic category before 1900, as seen from Figure 1.4, is likely due to the fact that there were relatively few democracies in that time period. Business cycles in a few of the North Atlantic economies thus had great impact on the average numbers. Figure 1.5 shows the number of democratic countries (Polity ≥ 6) and the total number of countries registered in the Polity IV data set from 1800 to 2003. The share of democracies has had an upward trend over the last two centuries, but one may also see indications from Figure 1.5 of the different democratic "waves" and "reverse waves" noticed by Huntington (1991). For example, there is a drop in both the absolute and relative frequencies of democracies during the reverse wave from the 1920s to the mid-1940s, and there is an expansion in the relative and absolute frequencies of democratic regimes from the mid-1970s and onwards.

1.4.4 Controlled comparisons

The wide variation in economic performances, especially among dictatorships, that can be identified from Figure 1.1 (see also, in addition to Chapter 7, e.g. Rodrik 2000; Besley and Kudamatsu 2007), means that any comparison between a single democracy and a single dictatorship is too thin for generalizing about the economic effects of regime type. For example, the fact that the Chinese economy has outgrown

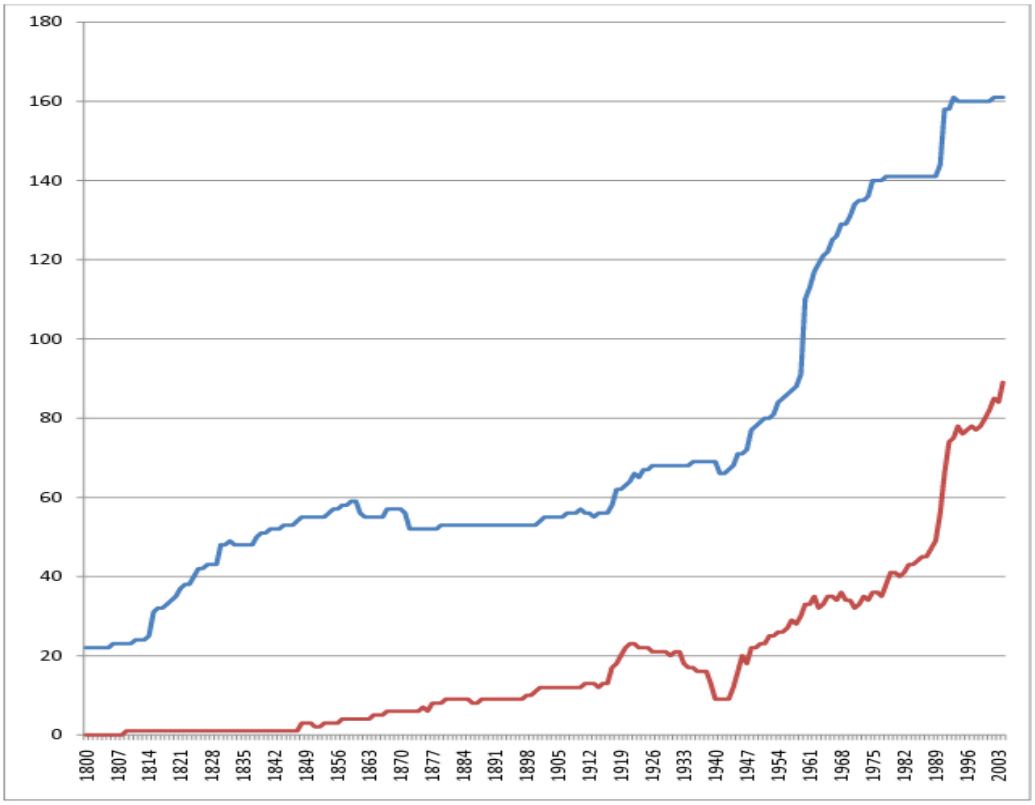

Figure 1.5: The figure shows the number of all countries with data on the Polity Index and the number of relatively democratic countries (Polity Index ≥ 6), from 1820 to 2004. Source: Polity IV.

the Indian after 1979 can not be considered conclusive evidence for the Lee thesis.[25] The problems with drawing valid inferences are aggravated when an analysis is not based on a conscious choice of cases that allows for *controlled* comparison. Economic, social, cultural, historical and other political factors may affect both regime type and economic growth systematically. This is a reason for being very careful when selecting cases in small-n comparative studies, and for thoughtful modeling and inclusion of several control variables in statistical studies. Let me provide one example of a controlled comparison:

Consider Benin and Togo, two relatively similar countries that after Benin's democratization in 1990 have had different regime types.[26] Both countries are small, poor West African neighbors with a relatively similar ethnic fragmentation structure, French colonial history (although Togo was first colonized by Germany), a post-

[25]This example is not randomly picked. Numerous newspaper articles, and even academic studies, draw such a conclusion from this comparison.

[26]The section on Benin and Togo is taken from Knutsen (2009).

colonial history of military rule (although Benin had less political stability) and even a shared currency (the CFA). A comparison of these countries therefore comes close to a quasi-experimental study on democracy's economic effects.

Benin's democracy after 1990 had, and still has, its deficiencies. Many analysts and policy makers doubted the Beninese democracy's quality particularly after former military dictator Mathieu Kerekou was rejuvenated as an elected leader in 1996 (see e.g. Magnusson 2005). Nevertheless, despite the fact that there were allegations of fraud under Kerekou's period in office (Magnusson 2005), Benin has had (at least) partially free and fair elections since 1990 (Lindberg 2006). Despite its democratic deficiencies, Benin is an unlikely democratic success story (Magnusson 2005, 77–79), and there have even been multiple alternations of executive power after 1990. Civil liberties, like freedom of press, speech and assembly, are also relatively well protected (Lindberg 2006; Freedom House 2008).

In Togo, long time ruler Gnassingbe Eyadema and his supporters managed to block the introduction of democracy in the early 1990s after initially yielding for pressure to institute a multi-party system (Bratton and van de Walle 1997). Although elections have been held, Eyadema, and to a somewhat lesser degree his son who succeeded him in 2005, picked broadly from the "menu of election manipulation" (Schedler 2002*a*,*b*). The Togolese courts are also heavily influenced by the ruling regime, freedom of assembly has not been present and there has been extensive government control over the media (Freedom House 2008). Benin and Togo have thus differed on degree of democracy after 1990, which make them well fit for a "most similar systems" comparison.

Figure 1.6 shows Benin and Togo's GDP per capita in constant 2000 US$ from 1960 to 2008.[27] The figure shows general economic stagnation at a very low level of development for both countries. However, the divergent economic development paths of Benin and Togo from around 1990, and indeed Benin's pre- and post-1990 record, may suggest an economic growth benefit of democracy.

In terms of PPP-adjusted income, the picture of divergence is even clearer. According to this statistic, an average Beninese was 30 percent wealthier than a Togolese in 1990. In 2008, however, she was 77 percent wealthier. The PPP-adjusted GDP per capita of Benin in 2008 was 1357$, compared to 767$ in Togo. Benin is still poor, but it has improved on some key factors that earlier held the economy back, like human capital. According to the WDI, the gross secondary school enrollment ratio in Benin improved from 9 to 32 percent between 1990 and 2005. The primary

[27]The data are from the WDI (World Bank 2009).

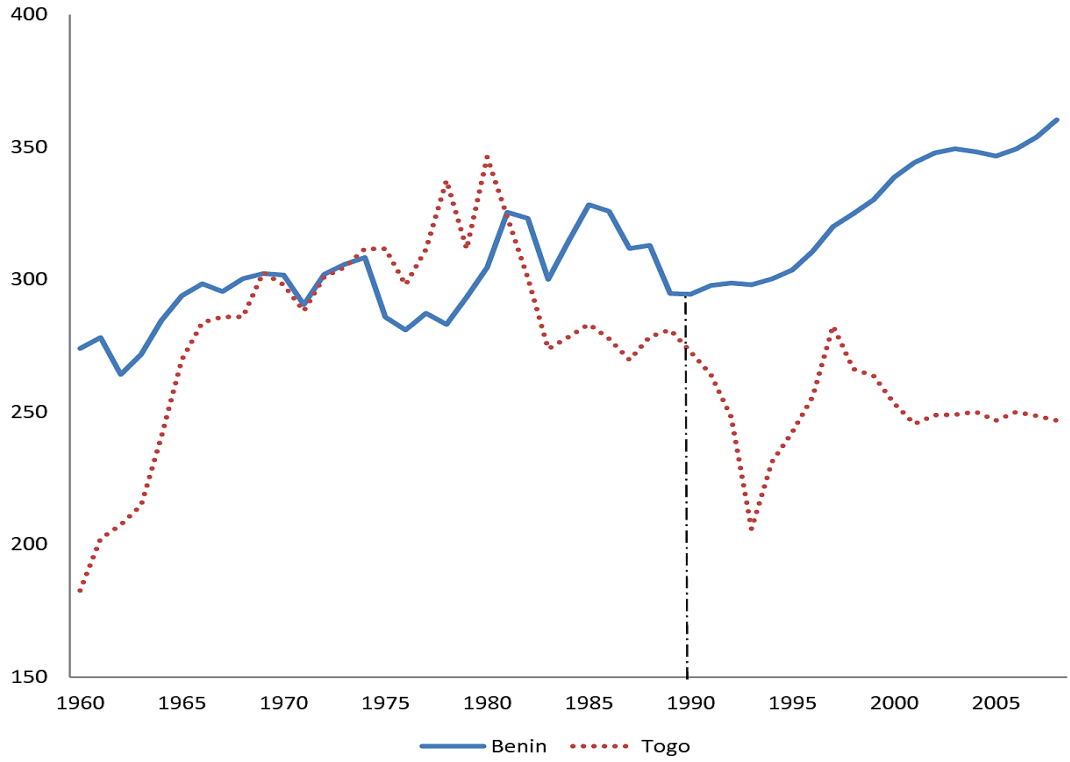

Figure 1.6: The figure shows the real GDP per capita (exchange rate-adjusted 2000 USD) in Benin and in Togo from 1960 to 2008. Source: World Development Indicators.

enrollment ratio in the same period doubled from 48 to 96 percent. Although data are scarce, Benin's health expenditure also seems to be on the rise. According to the WDI, the population-share with access to "improved sanitation facilities" improved from 12 to 30 percent between 1990 and 2006. In Togo, the equivalent number sank from 13 to 12 percent. However, the picture is not unequivocal. Togo has improved on some accounts, and Benin has for example regressed when it comes to the percentage of roads that are paved. Nevertheless, Benin has outpaced Togo on a broad range of economic indicators after 1990. This divergence in economic performance may be due to these otherwise similar countries' different political regime types.

Another type of controlled comparison is the study of pre- and post regime change growth rates in countries that have experienced democratization or the reverse process. The benefit of such studies is that one controls for country-specific factors. There have been some thorough studies of democratization experiences and economic growth. Rodrik and Wacziarg (2004), for example, found no indication that democratization inhibits economic growth, and the study by Persson and

Tabellini (2006), which includes data back to 1860, finds that regime transitions into democracy generally increase economic growth rates. Furthermore, Papaioannou and Siourounis (2008) found that on average democratization seems to increase growth, and the growth effect seems to peak three years after democratization and then stabilize.[28] Several African countries, like Malawi and Mozambique, experienced increased economic growth rates after democratization in the early 1990s, although it should be noted that initial economic growth rates were very low. Also Poland experienced increased economic growth after the fall of Communism, although it is difficult to establish whether this was due to democracy, an increasing use of markets for allocating economic resources, or increased integration with Western Europe. The Philippines is another country that experienced a higher growth rate after democratization; the growth rate was 2.5 percentage point higher in the decade after Marcos' was ousted from power in 1986 than in the decade before. Chile under Pinochet has received much attention as an authoritarian economic success story (see e.g. Ward 1997; Sigmund 2007). Nevertheless, in the decade after Chile's democratization, GDP per capita growth was about 3 percentage point higher than in the last decade of Pinochet's rule.

However, some other democratizing countries experienced lower growth rates in the five to ten years after democratization than in the five to ten years before. Examples are the South European countries that democratized in the 1970s, namely Greece, Spain and Portugal. South Korea also experienced a slight decrease in its growth rate after democratization in the mid-1980s. All these countries had high growth rates and relatively high income levels prior to democratization, and convergence effects (see e.g. Barro and Sala-i Martin 2004) may have contributed to the reduction in growth rates over time for these countries (for alternative explanations of the decrease in South Korean economic growth after democratization, see Mo and Moon 1998). But, also some countries with more modest growth rates and lower income levels under their last years of dictatorial rule experienced declining growth rates after democratization.

The picture related to the impact of democratization on economic growth is thus one of variation. That being said, although holding country-specific factors constant, one does not control for factors that change over time, like global business cycles, when investigating pre- and post-democratization growth rates for single countries. Moreover, comparing the growth record only for a few years before and after democratization may be too narrow, especially if the effect of democracy, positive or negative, is first established after a certain period of time (see e.g. Papaioannou and

[28]The following examples are taken from Knutsen (2006).

Siourounis 2008; Clague et al. 2003; Rock 2009*a*). In chapter 6, I present analyses that control for country-specific factors, but which also take these latter points into account when investigating the effect of regime type on economic growth. The results from these analyses indicate a positive effect of democracy, although the result is not completely robust.

The quite mixed empirical patterns described above indicate that one needs to incorporate as much data material as possible if one wants to generalize about the effect of regime type on growth. Moreover, there are several variables that may affect both regime type and economic growth, and these need to be controlled for. Several other methodological problems, like the endogeneity of regime type to economic outcomes, also need to be addressed before one can say anything plausible about causal effects. Finally, the empirical examples above indicate that an analysis of variation in economic outcomes *within* the political regime categories may be at least equally interesting as an analysis of the general effect of regime type on growth. All of these points will be addressed in the following chapters, but first I take a closer look at the concept of 'democracy'.

Chapter 2

Democracy

This chapter discusses the democracy concept. First, the chapter presents previous debates and literature on the appropriate specification of the democracy concept, and discusses the strengths and weaknesses of various institutional and substantive democracy definitions. The chapter then presents a novel suggestion for how to structure the democracy concept. A substantive definition, provided by Beetham (1999), is taken as point of departure. The discussion identifies seven second-level dimensions of the democracy concept and discusses the interrelations between second-level dimensions and how these relate to the (first-level) definition. Thereafter, the chapter briefly discusses how democracy should be measured, before it presents and evaluates some of the leading democracy indicators in the literature.

2.1 Democracy as a contested concept

2.1.1 General issues regarding the choice of democracy definition and the classification of political regimes

There is no consensus among political scientists on how to define democracy.[1] First, there is disagreement over whether democracy is a dichotomous concept, or whether there are degrees of democracy (see e.g. Przeworski et al. 2000; Elkins 2000; Hadenius and Teorell 2005). Second, there is disagreement over whether democracy should be defined according to the existence of particular political institutions ('institutional definition') or according to some underlying principles ('substantive definition') (e.g. Schumpeter 1976; Przeworski et al. 2000; Beetham 1999; Knutsen 2010*c*). Third, even among those agreeing on either an institutional or substantive definition, there is disagreement over which particular elements should be included in, and excluded from, the concept. For example: Should institutional arrangements that protect freedom of speech be included in institutional definitions? Should economic equality be included in substantive democracy concepts? Fourth, and this follows partly from the disagreements above, there is disagreement over the democracy concept's logical structure (Goertz 2005). Are there, for example, necessary or sufficient requirements for a regime to be considered democratic, or are there multiple, but related, factors that can ensure democracy without any one factor being necessary or sufficient?

Different democracy definitions have different weaknesses, either of a conceptual nature or regarding how easily they lend themselves to operationalization. Choice of definition, which is related to the positions taken on the four issues identified above, is inherently plagued by trade-offs. A more stringent definition, which is likely easier to operationalize, may have less face validity and exclude relevant elements of democracy. In the presence of trade-offs, choice of definition is to a certain degree tied to subjective judgements. However, I argue below that some definitions are more plausible than others. It is at least important for researchers to be aware of different definitions, their benefits and drawbacks, how conceptual definition affects choice of operationalization and how choice of definition might affect empirical analysis (see e.g. Hadenius and Teorell 2005)

Political regime types can be classified along several dimensions; degree of democracy is only one. The multiple dimensions indicates that one should expect large institutional variation among both democracies and dictatorships. Therefore, sev-

[1] Some authors, like Crick (2002, 1), even go as far as calling democracy "an essentially contested concept".

eral authors have separated between different types of democracies (see e.g. Lijphart 1999; Powell 2000; Shugart and Carey 1992) and different types of non-democracies, or as I call them, dictatorships (see e.g. Linz and Stepan 1996; Wintrobe 1998; Geddes 2003*a*; Hadenius and Teorell 2007*b*). The term 'dictatorship' has been used quite differently by different researchers (and politicians), which generates confusion. One obvious solution to this is to provide a stringent definition of dictatorship. Here, 'dictatorship' means the opposite of democracy. When dichotomizing regimes along a degree of democracy dimension, dictatorship is thus used as a category for all regimes not categorized as democratic; dictatorships are regimes that have a relatively low degree of democracy.

Regarding multi-dimensional definitions of regime type in the literature, some dimensions have been explicitly identified (by various contributions in the literature) according to specified criteria. This allows researchers to combine these "additional dimensions" with the degree of democracy dimension and generate multidimensional classification schemes. When all n dimensions are dichotomized, this results in regime definitions with 2^n categories. Other classification schemes lack such logical stringency, but are results of inductively constructed ideal-typical regimes, based on empirically observed cases. This has resulted in several "democracy with a prefix" labels, such as illiberal- or quasi-democracy (see Carothers 2002; Diamond 2002; Schedler 2006). Other classification schemes start out with clearly identified definitions and classification criteria, although these do often not easily lend themselves to combination with the democracy dimension. Some of these, like 'size of the winning coalition' (Bueno de Mesquita et al. 2003) and 'number of veto players' (Tsebelis 2002) can be viewed as 'conceptual competitors' to the democracy concept, rather than nuances of regime type classifications with democracy as one dimension.[2]

2.1.2 An outline of the discussion in this chapter

The rest of the chapter will proceed as follows: In Section 2.2, I present the literature on and discuss institutional definitions of democracy, which as the name indicates define democracy according to the existence or non-existence of one or more specified institutional structures. In Section 2.2.1, I present the by now classic literature on the problematic aspects of concepts such as 'the general will' and 'the common good'. This discussion provides a backdrop for understanding the attractiveness of "minimalist" institutional definition of democracy, which are discussed in Section

[2]Nevertheless, the empirical correlation between degree of democracy and 'number of veto players' and especially 'size of winning coalition' is (presumably) high.

2.2.2. These definitions have centered around the existence or non-existence of competitive elections. However, as is discussed in Section 2.2.3, one may criticize these definitions for not elaborating on the institutional requirements that must be in place for elections to be "competitive". An even more fundamental criticism of the minimalist position, discussed in Section 2.2.4 is that competitiveness of elite selection is only *one* attribute of the democracy concept, and that other attributes such as "participation" are vital for democracy. This again points to the need for broadening the set of institutional criteria that should be taken into account when identifying a regime's degree of democracy.

In Section 2.3, I review and further elaborate on discussions of the appropriateness of defining democracy according to one particular institution or a list of institutions, or broader attributes, in the first place. So-called "substantive" democracy definitions take one or more underlying principles as a point of departure, and thereafter ask which particular attributes, and in the last instance institutional structures, that need to be in place for the fulfillment of these deeper principles. In Section 2.4 I discuss whether one may combine substantive definitions, with their high degree of face validity, with the stringency and clarity often associated with particularly minimalist institutional definitions.

In Section 2.5, I sketch out a plausible structure for a democracy concept, based on the substantive definition provided by Beetham (1999). In Section 2.5.1 focus particularly on describing seven attributes or second-level dimensions of democracy, on how they relate to the core definition, and on the institutional requirements that contribute to realizing high scores on the seven attributes. Moreover, in Section 2.5.2 I contribute to the literature by explicitly discussing the interrelations between the seven attributes, and how they *interact* regarding their effects on degree of democracy. In Section 2.6, I draw on the conceptual discussion when proposing some general comments and suggestions for the construction of "appropriate" measures of democracy.

Finally, in Section 2.7, I discuss existing democracy measures and their strengths and weaknesses. More particularly, I focus on the two measures that are most used in the empirical analysis in Chapters 5 and 6, namely the Freedom House Index (FHI) and the Polity Index (PI). I conclude that the FHI is the more appropriate operationalization of the broad, substantive democracy concept sketched out in Section 2.5. The PI can be considered an operationalization of a somewhat more narrow democracy concept, but it is nevertheless much used in this study because of its extensive time series. Moreover, the use of the PI, and also the contested elections-based dichotomous measure from Alvarez et al. (1999), in this study's em-

pirical analysis means that those who are more skeptical than I am regarding the use of broad democracy concepts, can still accept the empirical results presented in Chapters 5 and 6.

Below, I do not review the democracy concept's history. This is brilliantly done among others in Dahl (1989).[3] Rather, I focus on the most important alternative conceptions of democracy in modern-day political science, and restrict the discussion to representative democracy in large political units, more specifically the modern state.[4] Rousseau (2004) famously denounced all forms of indirect representation as improper, if the 'will of the people' were to be translated into policy; this is not a common position today. The Marxist notion of 'real democracy' focused to a larger degree on societal power relations and economic structures than on 'super-structural' political institutions.

Nevertheless, as Diamond (1999*b*, 8) points out, today's use of 'democracy' focuses more strictly on political matters, leaving out social and economic components from the definition of democracy itself. One obvious benefit, for this study, of leaving economic components out of the definition, is that I avoid establishing relationships between democracy and economic variables by definition. Rather than postulating *analytical* relationships, this study asks and investigates whether there are *empirical* relationships between democracy, defined as a purely political concept, and economic factors, such as investment and economic growth. There exist legitimate arguments pointing out for example that a minimum level of income may be necessary for people to have the capacity to exercise their democratic rights properly (see Beetham 1999, 95–103), and that this should be captured within the boundaries of the democracy concept. However, I doubt whether this is indeed an analytical relationship. Rather, my view is that the proposition that widespread poverty (in general, but not necessarily) reduces the values on several of the second-level dimensions of democracy, discussed in Section 2.5, is a very plausible empirical hypothesis. Analogously, a high degree of economic inequality may likely reduce democracy through increasing political inequality (again, see Beetham 1999). But, this is, I think, also an empirically testable hypothesis, rather than an analytical relation.

Hence, the below discussion takes a purely political democracy concept as a point of departure.

[3]Interested readers could confront for example Plato (2003), Aristotle (2000) and Machiavelli (1997). Rousseau (2004) can also be read as background for discussions on democracy and the general will.

[4]See Dahl (1989, 1998) for discussions of direct democracy in smaller political units

2.2 Institutional definitions of democracy

When discussing the democracy concept, it is useful to start with considering whether democracy is defined institutionally or substantively. This choice has repercussions also for the three other fundamental issues raised in Section 2.1.1, regarding dichotomous versus continuous definition (of democracy), the boundaries of the democracy concept and the concept's logical structure.

2.2.1 The 'common good' and the 'general will': Do they exist?

A review of discussions tied to concepts such as the 'general will' and the 'common good' helps one understand the attractiveness of institutional democracy definitions. Joseph Schumpeter (1976, 250) famously claimed that the "eighteenth century philosophy of democracy may be couched in the following definition: the democratic method is that institutional arrangement for arriving at decisions which realizes the common good by making the people itself decide issues through the election of individuals who are to assemble in order to carry out its will". Schumpeter's critique of this "classical definition", in short, was that defining democracy according to institutions' ability to ensure implementation of a 'general will' or 'common good' is problematic. These concepts simply lack a meaningful reference. Schumpeter (1976, 251) argued that for "different individuals and groups, the common good is bound to mean different things".

Nine years after Schumpeter's seminal book was published, Kennneth Arrow (1951) struck another blow at 'the general will'. Arrow showed the impossibility of aggregating fixed, well-defined individual preferences to a determinate, well-defined collective preference, when the number of individuals and issue-dimensions increase sufficiently. A large literature has elaborated on Arrow's theorem, on its necessary conditions and on in what situations preference aggregation is possible (see e.g. Sen 2002). Numerous studies have also considered how specific institutional rules determine the outcome of voting and other preference aggregation mechanisms, and how players with control over the agenda can manipulate rules to achieve their personally desired outcome (see literature overviews and analysis in e.g. Riker 1980; Shepsle and Boncheck 1997; Mueller 2003; Austen-Smith and Banks 1999, 2005; Persson and Tabellini 2000). I will not go into this literature and its implications for the democracy concept here. Note, however, that Schumpeter's and Arrow's criticisms of 'the general will' have left most modern democracy theorists wary of

defining democracy according to the possibility of achieving such an outcome.

Some have tried to side-step Arrow's problem by considering the *transformation* rather than *aggregation* of preferences. Democracy has been considered a system that allows for *deliberation*, with the possibility of reaching a final consensus on the common good in different issue areas.[5]. I am not convinced by these efforts, independent of whether one considers a representative democracy or direct democracy.

Certainly, preferences on complex policy issues are not fixed for all voters (or policy makers), at least not before a proper discussion on alternatives and different implications of policy choices have taken place.[6] Then again, institutions that secure debate and allow citizens to reach enlightened understanding of issues *are* indeed important requirements for democracy. This is also acknowledged by authors not adhering to a "deliberative-common-good" definition of democracy (see e.g. Dahl 1971, 1998). Some voters may even be swayed by moral arguments to alter their "meta-preferences" (Elster 1989), for example by becoming more prone to accept just solutions rather than solutions that maximize personal income, although one should not assume this happens to often.

Politics is inescapably linked to conflicts between different actors over access to and control over resources, and the various actors' preferred policies are often based on individual self interest (which is often furthered through the associations of like-minded). Moreover, experimental research indicates that even conceptions of justice are colored, perhaps subconsciously, by personal interest (Babcock and Loewenstein 1997). Even if citizens may experience preference convergence after deliberation, full convergence among all citizens seems unlikely on any issue; even partial convergence is likely impossible on some issues.[7]

Therefore, Arrow's aggregation problem remains, and a definition of democracy as a system that allows for the common good to be implemented is highly suspect. Habermas' ideal theory of requirements for a non-coercive discourse yields valuable insight into what democratic deliberation *could* (and perhaps *should*) look like (see e.g. Habermas 1996), and Rawl's theory of justice (Rawls 1999) yields convincing prescriptions for the boundaries for just institutional structures and some very general principles for just policies. However, even these elaborate frameworks, presented

[5]See for example Gutmann and Thompson (1996), and see Shapiro (2003, 10–34) for a review of the literature and a very good discussion

[6]See for example Fishkin (1995) on deliberative polls.

[7]Convergence in point of view on an issue may also result from various forms of intentional manipulation by some of the actors. There is a large political psychological literature on so-called priming and framing effects (see the review and discussion in Beyer, Knutsen and Rasch 2011), and actors' cognisant of such effects could utilize them to their own advantage.

in idealized settings, yield no specific policy implications on concrete issues. It is therefore unlikely that discussions among real-world individuals would unequivocally converge on *one* particular, specific and implementable policy that contributes to a common good or a just outcome, without coercion. Preference aggregation is unavoidable. Let us now return to the discussion of institutional democracy definitions.

2.2.2 Minimalist definitions: Democracy as a regime holding contested elections

Schumpeter's alternative to a classical democracy definition was defining democracy, or more precisely the democratic method, as the "institutional arrangement for arriving at political decisions in which individuals acquire the power to decide by means of a competitive struggle for the people's vote" (Schumpeter 1976, 269). Thereby, Schumpeter by-passed the issues related to the (existence and meaningfulness of the) general will by referring directly to a particular institutional mechanism, competitive elections. With this, he escaped the fuzziness, indeterminacy and even emptiness (democracy is logically impossible) of classical democracy definitions. More recently, Adam Przeworski and colleagues have argued strongly in favor of a "minimalist", institutionally based democracy definition (see e.g. Przeworski 1999).[8] Przeworski et al. (2000, 15), for example, define democracy simply as a political regime in which "those who govern are selected through contested elections". The benefits of minimalist, institutional definitions are analytical stringency and precision, which ease subsequent problems of operationalizing democracy for empirical research (Przeworski et al. 2000). Hence, the perhaps best argument for defining democracy institutionally is the need to move beyond "intuition" towards stringent empirical measurement; a minimalist conceptual definition is considered appealing partly because it is easy to operationalize.

Przeworski et al.'s (2000) definition of democracy is exemplary in terms of stringency and logical clarity. A regime is classified as a democracy if it passes four operational rules; a regime's failure to comply with one or more of these rules will put it in the dictatorship category. The first two rules relate to whether or not relevant offices are filled through elections, and the following two establish whether eventual elections were contested. The first and second rules are simply "[t]he chief executive must be elected" and "[t]he legislature must be elected" (Przeworski et al. 2000, 15). The third rule says that "[t]here must be more than one party". This rule

[8] See also Przeworski et al. (2000, 13–35).

is extended to consider whether governments used elections to subsequently establish no-party or one-party rule, or permanent electoral domination (pp. 20–21).

The fourth, and most controversial, rule is the "alternation rule". According to this rule, which applies to regimes that have passed the first three rules, regimes must prove themselves democratic by allowing for leadership change through election. Thus, at least one alternation of government after election must be observed for a country to be classified as democratic (pp. 23–28). As Przeworski et al. (2000) correctly argue, it is difficult to reveal the democratic intentions of governments before they are tested by losing an election. Better then, they propose, to be careful with assigning the democracy label to regimes that have not proved themselves through actions rather than words. This results in Botswana being put in the dictatorship category, as the Botswana Democratic Party had yet to lose an election. If Przeworski et al.'s book had been written some years earlier, Japan would also have been classified as dictatorial, given the Liberal Democratic Party's dominance until 1993. As the authors recognize, the stringent rules eradicate much of the subjective element in classifying democracies, but come at the cost of more "Type II errors": genuinely democratic regimes are classified as dictatorial because their governments have yet to experience an election loss.

The resulting dichotomous democracy measure is recorded in the Alvarez-Cheibub-Limongi-Przeworski (ACLP) data set (Alvarez et al. 1999), and is henceforth referred to as AREG, after its coded name in the ACLP data set.

2.2.3 Institutional requirements for contestability

Different criticisms can be raised against Przeworski et al.'s (2000) minimalist position. Below, I will present arguments from the literature on the need to expand the democracy concept to include other attributes, and related institutional requirements, than only contested elite selection. However, even if one adheres to a minimalist definition of democracy, focusing on elite selection through contested elections, one may ask the question: which factors, formal institutional and others, increase the probability of an election being contested? This question may lead analysts in the direction of criticizing among others the minimalist operationalization presented in Przeworski et al. (2000, 13–35). There may be trade-offs related to expanding the amount of information through adding institutional and other requirements, for example between validity gained by including all relevant information on the one hand and the reduced reliability due to increased degree of subjectivity in judgements on the other. Przeworski et al. (2000), I think, prioritized avoiding

subjectivity too much.

Presumably, we have more information about elections' contestability than information on whether elections exist, the number of parties, and whether there is alternation of government or not. We can in principle observe restrictions on freedom of speech, election fraud, and other means of political manipulation. Protection of civil liberties are relevant for contestability, since without such protection the government can control political discussion and processes prior to the election, which again influences the opposition's chances. Therefore, regimes can not score high on contestability if civil liberties are lacking (see e.g. Diamond 1999*b*, 8). Blatant violations of the election result at election day, like ballot box stuffing and manipulation of election lists, are also detrimental to contestability (e.g. Schedler 2002*a*,*b*). Why not utilize all relevant information before passing judgements on whether a regime holds truly contested elections? The list of institutions that guarantee competitive elections presumably includes guarantees of freedom of speech, freedom of association, independent electoral commissions, and perhaps also an independent judiciary that can settle eventual election disputes. Summed up, rather than only relying on observations of actual government changes for measuring contestability, one should look for predefined institutional guarantees, or at least helping conditions, that enhance competitiveness.

The argument above also indicates elections are insufficient for securing democracy, even when contested elections is the key criterion. One needs additional institutional guarantees, and the democracy definition needs to be broadened. One paradigmatic list of such "institutional guarantees" is presented in Robert Dahl's "Polyarchy" (Dahl 1971, 3). This list includes for example freedom of expression and alternative sources of information. More generally, some requirements, like freedom of speech seem to figure in most lists of institutional guarantees, but others, like laws on campaign financing and restrictions on money in politics are only included by some authors. Hence, there is no consensus on the exact make-up of the list of institutions guaranteeing elections' competitiveness. This is perhaps one of the reasons for why Przeworski et al. (2000) opt for the observational outcome of actual government change through elections when scoring regimes.

2.2.4 Additional attributes of democracy and lists of institutions

As seen above, specifying the set of requirements for what makes elections competitive also lead to the inclusion of some additional institutions and civil liberties as

requirements for democracy. However, many scholars consider not only the competitiveness of elections, when stressing the significance of for example freedom of association or speech. They rather focus on a set of dimensions or "attributes" (see e.g. Munck and Verkuilen 2002) of democracy, whereof contestability of political elite selection is only one. One may even argue the equation of democracy and elections make for a "fallacy of electoralism" (Diamond 1999*b*, 9). Many researchers view also, for example, civil liberties as inherent attributes, or dimensions, of democracy. With these extra attributes comes extra institutional requirements for democracy.[9] Some authors are relatively explicit about which specific institutional requirements are needed to ensure a high value on each dimension (see e.g. Dahl 1998), but others are not (for reviews on this point, see e.g. Goertz 2005; Munck and Verkuilen 2002).

The most commonly added (to contestable elite selection) democratic attribute in the literature is the degree of 'participation' in political processes (or 'inclusiveness') (e.g. Dahl 1971). Competitive elections where only a fraction of the adult populace can participate produce competitive oligarchy rather than democracy (Dahl 1971). Democracy is therefore considered by many authors to be an (at least) two-dimensional concept. Several measures of democracy draw on this two-dimensional structure (Vanhanen 2000; Coppedge and Reinicke 1991; Gasiorowski 1996). Universal suffrage and extensive citizenship rights are two institutional elements that arguably enhance scores on the participation dimension. Institutionally guaranteed voting rights for the entire, or almost entire, adult population is considered a hallmark of modern democracy. According to this type of democracy definition, Great Britain, to name one important example, was more democratic after each of its expansions of the franchise, first to middle and working class men in the 19th century and then to women and young adults in the 20th century, than before (see e.g. Acemoglu and Robinson 2006*b*). The participation dimension will be discussed more extensively in Section 2.5.1.

The list of democratic dimensions can arguably be expanded further. As discussed by e.g. Munck and Verkuilen (2002), it matters also whether those elected are the ones actually exercising power over political agenda setting and decision making. This attribute is discussed further under what I call the "Political Effectiveness" dimension in Section 2.5.1. If, like in present Iran, an independent entity dominates important aspects of political life and elected officials have little power, democracy is but a facade. Elected officials' ability to exercise power over decision making is therefore often argued to be an important aspect of democracy. This

[9] In Section 2.4, I will clarify the relations between "attributes" and "institutional requirements", by drawing on the work of Goertz (2005) on multi-level concepts.

has been reflected in some popular democracy indicators (Bollen 1980; Arat 1991; Hadenius 1992; Marshall and Jaggers 2002).

The expansion of democratic attributes has led to concerns of "inflating" the democracy concept. One solution is to separate between democracy defined according to a minimalist or "electoral" definition on the one hand and the *quality* of democracy on the other. Diamond and Morlino (2005, x-xxxi), for example, list different dimensions of democratic quality. They distinguish between five procedural dimensions of democratic quality and two substantive. Their five procedural dimensions are 1) rule of law, 2) participation, 3) competition, 4) vertical accountability and 5) horizontal accountability. The two substantive dimensions are 6) civil and political freedoms and 7) political equality. The authors also include 8) responsiveness as a link between the procedural and substantive dimensions. As will become clear below, I am skeptical of such a solution. The reason is that what I consider a proper democracy definition implies that some of these "qualitative" dimensions are highly relevant for *degree* of democracy. Indeed, when applying a substantive definition, as I do below, it can be argued that the separation of degrees of democracy and quality of democracy is non-existent (see also e.g. Knutsen 2010*c*).[10]

Leaving the "quality debate" aside, the expansion of democracy-relevant attributes also means that the institutional requirements necessary for guaranteeing a high degree of democracy is expanded. The more attributes are added, the more evident it becomes that democracy is not only tied to what happens at election day, but to the entire event-chain from pre-election political discussions, via election day, to the post-election implementation of policies. The degree of democracy can be reduced at each step. Several different institutional (and non-institutional) requirements are thus needed for a regime to be a democracy; some are relevant for the opposition's ability to conduct effective campaigns, and other for example for transparent and non-corrupt implementation of policies. As mentioned already, Robert Dahl has been one of the preeminent scholars when it comes to identifying institutional requirements for democracy (e.g. Dahl 1971, 1989, 1998). For example, Dahl (1998) provides six answers to the question: "What political institutions does large-scale democracy require?" (pp. 85–86). Dahl lists 1) elected officials, 2) free, fair and frequent elections, 3) freedom of expression, 4) alternative sources of

[10]This argument is indeed strengthened by Diamond and Morlino's definition of a high-quality democracy, which is a democracy "that provides its citizens a high degree of freedom, political equality, and popular control over public policies and policy makers through the legitimate and lawful functioning of stable institutions" (Diamond and Morlino 2005, xiii). As will become clear below, these elements are either included in a substantive definition of democracy (political equality and popular control), or they are are potential outcomes affected by degree of democracy (legitimacy and stability).

information, 5) associational autonomy and 6) inclusive citizenship.

2.3 Substantive definitions of democracy

Lists of attributes, or alternatively lists of specific institutional structures, are sometimes presented as multi-dimensional democracy definitions. However, these lists do not identify what democracy *is*, but rather identify crucial elements of what a functioning democracy *requires*. These lists are not, I think, proper as core definitions of democracy (first level of the democracy concept). Rather, such lists play a central role at the second (attribute), and even third (indicator), concept levels (see Goertz 2005). This is, for example, recognized by Dahl (1998). Dahl argues that the six institutional categories, which were listed at the end of last section, are necessary requirements for large-scale democracies because they help realize five "core criteria" for democracy. These core criteria are effective participation, equality in voting, citizens enlightened understanding of political matters, control over the political agenda and inclusion of adults in the political process (pp. 37–38).

Further, Dahl answers the pressing follow-up question "[w]hy these criteria?", with the answer "each is necessary if the members ... are to be politically equal in determining the policies of the association" (Dahl 1998, 38). By digging deeper and deeper, one may recognize that lists of institutions are not what democracy *is*, but rather they are requisites for realizing certain attributes, which *again* enhance the degree of democracy. In other words, *"What is democracy?"* is best answered with a substantive definition, a definition that points to some core principles. Thereafter, one may ask what attributes are relevant for realizing these core principles. Then, one could ask which institutional and other requirements that are needed, individually or in conjunction, for realizing a high value on these attributes.

Hence, substantive democracy definitions take the populace's role in political decision making as point of departure, rather than specific institutions. One prominent proponent of substantive democracy definitions is David Beetham (e.g. Beetham 1994, 1999). According to Beetham, definitions that consider democracy merely as a matrix of various institutions and rights are problematic. The pressing question is why particular institutions and rights are considered democratic? How can we answer that question without invoking a tautological argument? According to Beetham, "[t]he only way to avoid circularity is by specifying the underlying principles which these institutions embody or help to realize, and in terms of which they can plausibly be characterized as democratic" (Beetham 1999, 90). Beetham claims that "[t]he core idea of democracy is that of popular rule or popular control over

collective decision making" (Beetham 1999, 90), and he furthermore adds political equality as a second criterion. This is the definition of democracy used in this study.[11] Conversely then, dictatorships are regimes with lacking popular control over collective decision making and large political inequalities.

Notice that both political (in)equality and popular control over collective decision making are continuous concepts. Hence, when one adheres to such a substantive definition of democracy, there are also degrees of democracy. Moreover, as no observed societies have come even close to fulfilling these criteria perfectly, and no society is ever likely to do so, the defining characteristics of a completely democratic regime are best viewed as ideals. This point was recognized by Dahl (1971) who used the term 'Polyarchy' to distinguish empirical regimes with a sufficiently high score on the degree of democracy dimension(-s) from the idealized regime at the positive pole(-s). Here, an ideal democracy is considered a regime with completely equitable distribution of possibilities to exercise control over public decision making among all adult individuals in the population. The negative pole, the ideal dictatorship, is a regime where one man controls all political decisions. As is true for the ideal democracy, such a regime has never existed.[12]

I will not produce an elaborate positive defence of the choice of underlying principles in Beetham's definition. The interested reader should rather confront Beetham (1999). At one point, it becomes difficult defending underlying principles, as one is forced either to ground them in an even deeper set of principles which may ultimately lead either to a regress, an argument that goes in circle, or a claim the principles are intuitive, axiomatic starting points. This is the famous Münchhausen's trilemma. A defense can be made for the above mentioned principles along the lines of the last suggestions, namely that popular control over politics and political equality seem to be intuitive, axiomatic criteria for whether a regime is a democracy or not.[13] Anyhow, the alternative to a substantive definition seems to be a minimalist democracy definition, or to keep adding attributes and institutional requirements in an in-

[11] There exist several other interesting attempts at providing definitions of democracy that starts with plausible underlying principles. For example, Ringen (2007, 25) proposes that "a polity is democratic if its citizens hold the ultimate control over collective decisions in a securely institutionalized manner". Tilly (2007) also provides a thorough discussion of the democracy concept and concludes that "a regime is democratic to the degree that political relations between the state and its citizens feature broad, equal, protected and mutually binding consultation" (Tilly 2007, 13–14).

[12] See Bueno de Mesquita et al. (2003) and Besley and Kudamatsu (2007) for interesting analysis on the role of a dictator's supporters for policy making in dictatorships.

[13] This may for example be indicated by the fact these principles are often either implicitly or explicitly invoked in several conceptual discussions of democracy and analyses of democracy's causes and effects.

ductive, and often unsystematic fashion, in order to keep the democracy definition in accordance with one's intuitive understanding of what an empirical democracy should look like. Both of these two latter alternatives have serious drawbacks.

The proponents of substantive democracy definitions thus argue that institutions in themselves do not make or equate with democracy. Institutions only contribute to democracy *if* they contribute to realize the underlying democratic principles. One can still be interested in particular institutions when studying democracy, but these are only instruments that underpin democracy.

One important advantage of substantive democracy definitions is that they do not miss "the political reality behind the formal and observable structures of government" (Grugel 2002, 22). The *existence* of a particular institution is not the only relevant factor for degree of democracy; also how particular institutions actually *function* are important. Moreover, there may be non-institutional factors affecting democracy. For example, acts of election violence or coercion of legislators by small groups would reduce degree of democracy, according to the definition above, as such acts reduce egalitarian popular control over political decision making.

The list of requirements that must be in place for a country to reach a high democracy level is long, and, as noted above, the requirements are not all related to the existence of formal institutions and constitutional provisions. One way to recognize and appreciate this point is through investigating empirical political processes, and record how political elites in different countries undermine political control by the populace. This is not only achieved through denying the establishment of elections or through putting restrictions on civil liberties into the constitution. Political elites often act more subtly, undermining competition, participation and rights through actions that are not detectable in the formal constitutional make-up. Democracy theorists need to take this into account when formulating democracy concepts and measures. Put differently, certain formal institutions are important but not sufficient for bringing about democracy. Power distribution and the actual functioning of institutions are crucial aspects.

The subsequent abolition of elections after a military coup will show up also in a minimalist, institutional definition of democracy. But, more subtle influences, such as elected politicians and large social groups restraining their policy options due to the fear of a possible military takeover, will not necessarily be relevant for minimalist definitions. They will, however, be relevant for the substantively oriented democracy definition presented here. Another area where discrepancy in the evaluation of democracy may occur relates to "clientelism" in politics. Although multi-party elections occur in for example the Philippines, there are serious concerns about the

autonomy with which the poor peasantry express their political preferences in these elections (Sidel 1999).

Africanist scholars have been particularly skeptical of focusing solely on formal political structures when studying politics, as will be discussed also in Chapter 7. The "African state" has for example been characterized as a "shadow state" (Reno 1995), and has been given several other resembling labels, indicating that real political decision making and resource allocation take place outside formal institutions, for example through informal patron-client networks (see e.g. Clapham 1996*a*, 249–256). African politics is informalized, and the undermining of state institutions can be used as a tool by political elites to further their own power and interests (e.g. Chabal and Daloz 1999). This points to the importance of considering informal structures when classifying political regimes; formal institutions, like multi-party elections and constitutionally guaranteed freedom of speech, do not necessarily ensure a high degree of democracy. The reason why a substantive democracy definition is fruitful in this regard, is that the analyst can always ask: "does this political practice (that we observe in country x) contribute to or reduce popular control over political decision making or political equality?"

At first glance, the substantive definition provided by Beetham might look relatively similar to the "classical definition" scorned by Schumpeter (1976). However, it is not. This definition does not define democracy according to any particular *outcome*, but looks at the populace's *opportunities* for controlling politics, and their status in terms of political resources (political equality). By not referring to a 'general will', the definition therefore evades some of Schumpeter's criticisms of classical democracy definitions. However, the "vagueness" and "indeterminacy" criticisms still apply to a certain degree: what does actually 'popular control' mean? Moreover, one may ask what delineates "the public sphere" from the "private sphere". One may also ask who constitute the relevant demos? I will not discuss these inherently difficult issues in depth here.[14] As Törnquist (2009, 10) notes, "[t]he definition of the demos can not be taken for granted". At the national level, one could perhaps think that the relevant "demos" would be citizens over a certain minimum age. However, as discussed in Section 2.5.1 under the Participation dimension, political rules may use the allocation of formal citizenship selectively to exclude certain groups from having voting rights and a right to stand for office. An alternative heuristic for identifying the demos could be to utilize a residence criteria (given that a person has spent a certain minimum amount of in the country, to exclude for example tourists).

[14]For discussions on a substantive democracy concept and the delineations of both the public sphere and the demos, see e.g. Törnquist (2009).

When it comes to the delineation of the public and private spheres, the empirical boundaries between these spheres have varied quite a lot, both geographically and over time. Some issue areas are inherently difficult to locate, even if one opts for a specific guiding principle such as "an issue is within the public sphere if and only if actions taken by one actor in the issue area has consequences for at least one other actor".

Hence, an important criticism of substantive definitions is that they are vague and difficult to operationalize. However, even if "contested elections" is easier to operationalize than "popular control over public decision making under political equality", is it necessary to let the operational definition determine choice of conceptual definition? I argue below that this is not the case. Rather than starting with a clear, logically well-structured operational definition and then choose a corresponding conceptual definition, my approach is to start with the conceptual definition, ask what attributes are related to this definition, and then ask how institutions and other political practices affect the attributes. One needs to strive for logical clarity, however, not the least when taking such an approach. A precise, logical concept structure is vital, for example, to discussions of validity and reliability of operationalization. I will below discuss how particular second-level dimensions, or attributes, contribute to degree of democracy, as defined by Beetham (1999), and thereafter how particular institutional structures relate to the different attributes.

2.4 Discussion: The best of both worlds? Substantive definition and logical clarity

Social science concepts often have multi-level structures, and quite often they have a three-level structure (Goertz 2005). The democracy concept arguably has such a three-level structure, with a core *conceptual definition* of democracy at the first level, *supporting dimensions or attributes* at the second level, and different *concrete institutions and other non-institutional political factors* at the third level. Above, I agreed with Beetham that democracy "is realized to the extent that such [public] decision-making actually is subject to the control of all members of the collectivity considered as equals" (Beetham 1994, 28). These two principles of *popular control over public decision making* and *political equality* constitute the first level of the democracy concept, the deeper principles (Goertz 2005). A sufficiently high score on both these dimensions is required for a country to be democratic; the first level of the concept is therefore structured logically as a conjunctural "and" proposition.

However, these principles say little about *how* democracy is realized. Which features are needed to ensure popular control over political decision making and political equality? Some plausible answers, indicated above, are political contestation and participation. Such dimensions make up the second level of the democracy concept. However, answers to the question of how democracy is realized, in the last instance, crucially include specific institutional structures, like multi-party elections and constitutional guarantees of freedom of speech. These institutions are thus integral in backing up the attributes that constitute the concept's second level (Goertz 2005); they are facilitating structures that help realize popular control over politics and political equality. In this view, the proponents of a Schumpeterian democracy definition start at the wrong end. Competitive elections are not the underlying constitutive element of democracy; rather, they are vital *empirical* requirements to help realize democracy. A substantive democracy definition does not, therefore, necessarily downplay the importance of elections for democracy; it is difficult to ensure popular control over politics, at least in entities larger than small city states (Dahl 1989), without them. They are, however, not the defining characteristic of democracy.

Also for empirical research, much is gained from operating with a substantive democracy definition with core principles at the first, supporting attributes at the second, and specific institutional and other political factors at the third level. One reason is that there are several institutional requirements many analysts consider important for a political regime to be democratic, in addition to elections. Adolf Hitler also held elections under the Third Reich, but few would call this regime democratic. One reply may be that these elections were not competitive, but then we at least need to know what makes elections competitive; we thus need some principles to decide which extra requirements are needed for elections to be competitive rather than uncompetitive.

Moreover, politics does not stop after election day is over. An elected government may concentrate power to itself, restrict debate on policy formation, restrict people's access to provide input to or even learn about political processes. Arguably, such a regime does not score very high on degree of democracy, and we need definitional principles that clearly indicate why. This means that also broad institutional democracy definitions, and not only minimalist Schumpeterian definitions, are problematic. The reason is that it is difficult to answer: "what institutional characteristics should be included or excluded in the democracy definition?", if there are no overarching principles to judge their relevance by. Why is for example protections of freedom of speech regularly included in broad institutional definitions? It is preferable to be

explicit about the guiding principles that determine which empirical, institutional characteristics that are found important or necessary for democracy.

Explicitly stating the underlying principles has some practical implications. First, the lists of democratic institutions vary widely between different authors. An a priori agreement on overarching principles enables a more thorough evaluation and discussion of the different lists' relative merits. Second, political elites have proved to be very creative, perhaps more so than democracy researchers. The menu of election manipulation is long (Schedler 2002*a*,*b*), and researchers may be forced to add institutional requirements to their democracy definition, as history rolls along, in an ad hoc fashion. This is less problematic with a substantive definition, where the definition is history-independent, but where adjustments are systematically made at the third level of the concept, according to the overarching steering principles at the first level and the various attributes identified at the second.[15]

Above, I identified the logical structure of the first level of the democracy concept as conjunctural. The logical structure of the second level is more complex, and will be discussed thoroughly below. The third level, as mentioned, relates to the practical operationalization of democracy in terms of measurable characteristics, such as existence of institutions. On this level, Goertz (2005) argues, the logical relation between the indicators is often not one of necessity, but of family resemblance combined with a logical "or" structure. For example, there are several different types of electoral systems that can be designed to satisfy the second level principle of competitiveness, and there are several distinct ways to *de facto* guarantee alternative information to the public. When it comes to the practical design of institutions that enable democracy, there are thus multiple paths to the promised land. Consequently, operationalizing democracy properly is a difficult task, and as Munck and Verkuilen (2002) argue, there does not exist a fully satisfactory cross-country measure of democracy at present.

If one opts for a substantive definition of democracy, the strong case put forth by Przeworski et al. (2000) for a dichotomous definition vanishes. Dichotomous measures have been attacked on several grounds, also because they may be less reliable than continuous measures as they generate large measurement errors (Elkins 2000).[16] Vitally, many researchers react to a dichotomous definition because it seems

[15]Notice that such a definition also allows us to compare degree of democracy over historical periods, such as comparing the regime ancient Athens versus the regime present day Greece. It can easily be argued that the first is found wanting in terms of political equality and therefore is less democratic. One thus escapes relativism and the argument that different epochs were associated with different institutions, and thus hard to compare.

[16]The choice of dichotomous versus continuous measure is not innocuous either, as it impacts on empirical results regarding the causes and effects of democracy (see e.g. Hadenius and Teorell

implausible, and lacks face validity. Most democracy researchers probably have an intuition that Sweden is more democratic than Venezuela or Russia, but that these in turn are more democratic than North Korea. However, the logical defense of Przeworski et al. (2000) seems plausible, as they argue that contested elections is something you either have or not.

Nevertheless, if democracy is defined as popular control over politics under political equality, it is easy to argue that democracy is continuous; there are different degrees of popular control and there are also degrees of inequality. Dahl (1971) was right that democracy is an ideal concept, a yardstick for empirical regimes to be compared against. No "polyarchies" are very close to the ideal, but some are closer than others. Whether we use Dahl's or Beetham's underlying principles, the continuous model of democracy with the endpoints being ideal types, is a good starting point for understanding what democracy is.

2.5 Sketching the democracy concept's structure

Above, I discussed the underlying definition of democracy; the democracy concept's first level (Goertz 2005). As I focus on large, complex societies where political representation is necessary in practice (Dahl 1989, 1998), popular control over politics relates to the question: to what extent are citizens able to elect their preferred representative and, most importantly, affect the policies that are being decided upon by politicians?[17] Notice that logically, the populace can elect representatives without affecting policies and they can affect policies even if there is no election, although the interdependence is arguably strong.

When it comes to political equality, this is not a completely separate dimension from popular control, as it relates to the *distribution* of control over collective decision making within the broader populace. For analytical purposes, I will, however, sometimes discuss popular control and political equality separately. Then, popular control refers to the ability of, or degree to which, broad segments of the population to influence actual decision makers (the politicians). Political equality, when discussed distinctly from popular control, relates more specifically to the distribution of power to elect and affect political decision makers *within* the general population (non-politicians). Hence, the two first-level dimensions are not orthogonal, but can to a certain extent be meaningfully discussed separately when addressing their

2005).

[17]See Parry and Moyser (1994) for a discussion on direct democracy, representation and substantive democracy concepts.

relations to the second level dimensions.

Further, I need to list the second level dimensions (attributes) that enhance democracy, and explain *how* they enhance democracy. I also need to elaborate on interrelations between the different second level dimensions. In their discussion on dimensions of democratic quality, Diamond and Morlino (2005) are quite explicit about the systemic nature of democratic quality, and notice the strong interrelations between some of the dimensions. Many of these dimensions are here used as dimensions of democracy rather than democratic quality, although the distinction may be mostly semantic. Inglehart and Welzel (2006) provide the most explicitly modeled interrelation between second level dimensions in the democracy literature. They do so when discussing 'effective democracy', which is quite similar to the substantive democracy concept used here. Inglehart and Welzel (2006) argue that formal political and civil rights are rendered less effective when there is weak rule of law (which is assumed to lead to a high degree of political corruption). Despite the problematic, oversimplified actual specification of the relation between the dimensions (non-weighted multiplicative), and a host of measurement problems at the operational level (see Knutsen 2010*c*), their theoretical discussion is innovative and points to an important and overlooked aspect of democracy: the interrelatedness of different second-level dimensions. I will get back to what these interrelations may look like. First, however, let me list the relevant second-level dimensions and briefly discuss why they are relevant for democracy.

2.5.1 Seven dimensions

There are differences among theorists on what second-level dimensions to include in and exclude from the democracy concept (for different suggestions, see e.g. Dahl 1971, 1998; Beetham 1994, 1999; Diamond 1999*b*; Diamond and Morlino 2005; Inglehart and Welzel 2006; Karl and Schmitter 1991; Munck and Verkuilen 2002; Goertz 2005; Gates et al. 2006; Tilly 2007; Samadhi and Asgart 2009). To some extent, there is unavoidably some degree of arbitrariness in the choice of number of second-level dimensions (or attributes) and in the choice of what content is to be placed within each specific dimension. Nevertheless, I propose that the following dimensions should be included: Competition (C), Participation and Political Inclusiveness (P), Political and Civil Rights (R), Horizontal Accountability (H), Vertical Accountability (V), Rule of Law (L) and Political Effectiveness (E).

Hence, I consider democracy, D, as a function of these seven dimensions; that is $D \equiv D(C, P, R, H, V, L, E)$. Elaborating on the nature of this function is a nice,

precise way to discuss the concept's structure. All the first-order derivatives are arguably (at least mostly) positive, that is $\frac{\partial D}{\partial X} > 0$, where X refers to any of the seven dimensions. In words, degree of democracy increases when there is a positive change on any of the seven dimensions.[18] Let me explain briefly why these first-order derivatives are positive.

Competition

As discussed above, *Competition* (C), or contestation, is the key element in minimalist democracy definitions, and C is a vital ingredient in any democracy concept specification. C relates to multiple entities competing for the ability to formulate and implement various sets of policies. The system that arguably has proved best able to secure a high degree of C in large societies, is multi-party elections. Elections allow citizens to choose between alternative visions of how to organize society and to choose between alternative policy menus. Elections also have other important functions. Importantly, they are a disciplining devices for non-myopic politicians, when these consider taking actions where their interests and the electorate's interests diverge (see e.g. Ferejohn 1986). The existence of elections may more generally alter the policy platforms of parties towards positions that are favored by a larger part of the citizenry (Downs 1957). These two latter points will be treated separately under the vertical accountability dimension below. Here, I focus purely on the "direct effects" of elections, related to the citizenry selecting the representatives they want in charge of legislating and implementing policies.

C is directly related to popular control over collective decision making. If one accepts that representation is practically necessary in large-scale societies, then choosing between candidates or parties is perhaps citizens' most important device for controlling policies. Everything else equal, the introduction of one extra candidate weakly increases the value of the most preferred policy platform for any citizen. The institutionalized choice between multiple contending political elites thus separates democracy from dictatorship. For competition to function smoothly, elections should

[18] It can be discussed whether this is the case at very high initial levels on the R and E dimensions. Various chapters in Przeworski and Maravall (2003) discuss the relationship between democracy and rule of law, and there may be some problematic (democratic) aspects related to a strong judiciary and constitutional review rights. Moreover, assuming that $\frac{\partial D}{\partial L} > 0$ may actually be quite problematic when values on other dimensions are very low. That is, we have an empirical dictatorship which enforces its laws strictly. Whether consistent enforcement of laws generated by a dictatorial elite leads to more democracy is questionable, to say the least. Nevertheless, Inglehart and Welzel (2006) have made a strong case for the argument that improved rule of law increases effective democracy when there is a minimum level of political and civil rights, but that there is no effect when there are no formal rights.

be held relatively frequently with regular intervals. Competition is not ensured by an elected government occupying office for decades without being challenged. Citizens can change their minds, old citizens die and new citizens should gain the right to choose between policy alternatives. Plus, regular competition has a disciplining effect on politicians.

The nature and quality of implemented policies hinge not only upon proposed legislation (during campaigns), but also on the ability and willingness of politicians to work hard, pass legislation, and ultimately ensure implementation. These factors depend not so much upon the ideological character of the politician, as qualities such as willingness to work hard, honesty, intellectual abilities, practical abilities and negotiation skills. There is a large literature on how, and to what degree, voters can select "good" politicians and avoid selecting "bad" (see e.g. Fearon 1999; Besley 2006). Citizens may sometimes be able to screen politicians before they enter office. However, several of the above-mentioned relevant characteristics are a priori unobservable, and must be learned through observing politicians at work after they are elected, or more often be inferred from results.

Competitive elections then becomes important because citizens can decide whether to keep their politicians, after having observed performance, or throw them out. By using their votes, citizens can to a certain degree control future collective decision making through rewarding "good" politicians, and throwing "bad" politicians out. Such a mechanism is lacking in dictatorships. The histories of non-democratic monarchies, like for example Denmark-Norway and Bourbon France, indicate that heads of states come in different qualities. Some kings and queens are intelligent, effective and maybe even care about their populations. Others are stupid, lazy and extravagant, brutal and selfish to the bone. In democracies, such leaders can be tossed out of office if enough citizens want so. An additional benefit from competitive elections is that "bad" politicians aware of this mechanism may try to alter their behavior to resemble "good" politicians (e.g. Besley 2006).

When it comes to the more concrete structuring of competition for offices through elections, there are several available and quite distinct models. Electoral systems for the election of legislatures differ on several accounts (e.g. Cox 1997; Lijphart 1999; Lijphart and Grofman 2003; Powell 2000), with one important distinction being that between plural-majoritarian systems and proportional representation (PR) systems (see also Knutsen 2010*a*). I will not venture into a thorough discussion on whether plural-majoritarian systems or PR systems are more prone to score high on the C dimension. However, PR systems, which tend to increase the number of parties relative to plural-majoritarian systems (Duverger 1954), are argued to yield better

representation of different population groups, thus likely increasing political equality. PR also increases the propensity of parties to form broad coalition governments (e.g. Lijphart 1999). If democracy is thought of as government by as many people as possible, rather than by a majority (Lijphart 1999), this is a pro-democratic trait of PR systems. Moreover, PR systems empirically yield legislatures where the median legislator is politically closer to the median citizen than majoritarian systems (Huber and Powell 1994; Powell 2000). However, multi-party systems and coalition governments are argued to reduce vertical accountability, another second-level dimension of democracy, because of increased complexity in assigning political responsibility (e.g. Powell and Whitten 1993; Persson and Tabellini 2003, 2004).

There are also different ways of organizing executive-legislature relations, with a core distinction between parliamentary and presidential systems. There are differences also between various types of presidential and parliamentary systems (Shugart and Carey 1992; Cheibub 2007; Strøm 1990). The direct election of the executive under presidentialism can arguably be considered a democratic improvement in its own right, as it reduces the complexity of the chain between voters and the executive. However, there are several problems with presidential systems (e.g. Linz 1990), which may also affect such regimes' 'democraticness'. For example, if there is increased probability of political gridlock under presidentialism (Linz 1990), and decisions that a majority of the population wants does not get passed due to multiple institutional veto players (Tsebelis 1995, 2002), this may constitute a reduction in the population's control over political decision making.[19] Nevertheless, there are no arguments that are sufficiently convincing to lead me to *a priori* consider either plurality or PR electoral systems or either presidential or parliamentary systems as more competitive (or democratic). Hence, I conclude that multiple institutional systems may ensure a high value on the C dimension.

Participation

Dahl (1971) stressed the importance of adding a *Participation and Political Inclusiveness (P)* dimension to the democracy concept. The proposition that democracy requires broad participation rights seems intuitively obvious to most democracy theorists, and is for example often invoked as the main argument for why ancient Athens was not as democratic as many of today's nation states, why Apartheid South Africa was less democratic than today's South African regime, or why Sweden was more democratic after the introduction of universal female suffrage right after World War

[19] See Cheibub (2007) and Cheibub and Limongi (2002) for convincing criticisms of Linz' argument on this point.

I than it was before. However, the importance of P can be more rigidly justified than just by references to intuition. The democracy definition above referred explicitly to political equality, and political equality increases with the scope of participation and political inclusiveness

When it comes to formal restrictions on citizens' opportunity to participate in elections, these were more frequent before WWII than it has been after 1945 in countries that score high on other democracy dimensions. In the now well-established democracies of Western Europe and North America, restrictions in the right to voter were historically based on property, gender and ethnicity.[20] In these countries, the expansion of political participation rights was gradual and slow in some countries, like Britain, and rapid with several set-backs in others, like France.

However, although the exercise of formal-legal restrictions on participation rights has declined, there are informal barriers to participation in several countries. Intimidation by political thugs is a well-known tool used by political elites to reduce participation from groups with political preferences for other elite groups. Such practices also reduce de facto political competition. Political clientelism (e.g. Kitschelt and Wilkinson 2007) may also reduce effective participation (and competition), as clients are automatically induced to vote to the political benefit of the patron. However, I will mainly discuss this phenomenon under the political effectiveness (E) dimension.

Moreover, the formal denial of participation rights in countries with democratic aspirations still exists today. Rather than being based on gender or property requirement, modern-day restrictions are often based on ethnicity or nationality. These violations of political inclusiveness are however often disguised through using quite restrictive citizenship criteria, rather than denying citizens political participation. Several African countries have applied very restrictive citizenship criteria, requiring that families have lived within the country's borders for generations in order to be considered citizens (see e.g. Dorman, Hammett and Nugent 2007). Oftentimes, such criteria seem "conveniently" set to exclude specific ethnic groups with high support for the opposition. Manipulating citizenship requirements is thus one way of reducing participation (see also e.g. Dahl 1998).

Other subtle practices also impact on the P dimension. One is geographical weighting of votes, which reduces political equality by favoring some voters and disfavoring others. Designing electoral systems so that areas where one expects strong support are overrepresented in the legislature may be a rational political tactic. However, participation for all, and in extension similar effect from participation, is

[20] Still there exist some forms of legal restrictions on citizens' political participation. For example, in the US there is a large population of convicts without voting rights.

a crucial determinant of political equality. Therefore, a more "equal value for each vote" (Beetham 1994, 34) increases degree of democracy. There is large empirical variation on this latter issue. Consider for example the contrast between The Netherlands where all votes in legislative elections count equally, due to the country being one electoral district, and the US, where California has the same number of senate seats as Alaska despite the former's population being more than fifty times larger than the latter's.

Above I focused on participation in terms of voting, but the ability to participate in political decision making of course hinges on much more than the casting of the ballot. For example, (equal) rights to participate in public debate, use mass media, organize protests and demonstrations are among some of the factors that increase effective political participation for all citizens, and thus political equality (e.g. Beetham 1994). Several of these aspects are tied to political and civil rights being guaranteed and a well-functioning system of rule of law. These dimensions will be further discussed below.

Political and Civil Rights

Political and Civil Rights (R) constitute another second-level dimension. According to Beetham (1994, 29), "[t]he freedoms of speech, association, assembly and movement, the right to due legal process, and so on, are not something specific to a particular form of democracy called 'liberal democracy'; they are essential to democracy as such, since without them no effective popular control over government is possible". A high score on R is particularly important for the effective functioning of other democracy dimensions. Many political rights are often assumed to accompany high scores on the C and P dimensions (see e.g. Dahl 1971; Diamond and Morlino 2005). The right to stand for elected office and the right to vote involves the opportunity to compete and participate at the individual level. The fact that such rights are individual contribute strongly to enhancing political equality. Formal rights also contribute to increasing the certainty with which universal participation and open competition for office will occur in the future. These rights specify the rules of the game and provide clear yardsticks for legitimate political actions.

Civil rights are thus important for contributing to high values on C and P. However, they are also more generally tied with popular control over politics. Freedom of speech and media are important for citizens' ability to learn of different policy alternatives, and their ability to form and voice their own political opinions, thus affecting the political debate. These rights are important during campaigns, when

citizens decide who to vote for. They are particularly important for retrospective voters' ability to learn about incumbents' performance, and are thus also closely related to vertical accountability. However, these rights are also important between campaigns, as free and open criticism from citizens and media may alter politicians' behavior. Opinion polls may convey the sentiments of large groups of the population, and affect both democratically spirited politicians and self-interested forward looking politicians. Freedom of travel is another democracy-relevant civil liberty. Restricting domestic and international travel can be an effective way for the government to quell opposition, to reduce the flow of "dangerous" political ideas into and within the country, and to reduce the ability for domestic opposition to gather foreign support and resources.

Freedom of association is another important civil liberty that increases popular control over political decision making. Since parties are organizations, organizational freedom is of course important to C, but also to P, as citizens are able to found new parties and compete for political positions. However, freedom of association is also important for popular influence over politics because of citizens' ability to form non-party organizations. Non-governmental organizations, constituting "civil society", can influence politics in particular issue areas, provide information on politicians' performance, and provide organizational training for citizens (e.g. Beetham 1994; Beetham et al. 2002). Organizations allow citizens with converging interests to more effectively voice their concerns. Numbers count in politics, and debate and dialogue within an organization may also raise awareness of critical issues among members. Labor unions, for example, have been important historically in many countries for enabling workers to effectively voice their concerns and preferences, particularly on economic policies. Such organizations can be especially important in regimes with restricted competition, or even in one-party systems with little possibility of voicing once interests through electoral politics. However, many relatively dictatorial countries do not have freedom of association, and labor unions are often among the most highly regulated organizations in dictatorships (see e.g. Deyo 1998).

Horizontal Accountability

Horizontal Accountability (H) is another, perhaps less obvious, dimension that supports a high degree of democracy. There is much debate in the literature on whether the "republican" and "liberal" elements of for example today's US regime are distinct from its democratic elements. The republican elements are argued to be institutional arrangements that allow for separation of powers. Historically these elements have to some extent had separate origins and development trajectories from those of elec-

toral institutions tied to minimalist democracy (see e.g. Shapiro 2003; Zakaria 2003). Nevertheless, horizontal accountability, enhanced by such "republican-liberal institutions", arguably contribute to increasing popular control over political decision making in practice. This is because unchecked powers for any one entity is conducive to power absorption by politicians and abuse of power, rather than political control by the people.[21].

Generally, H is about institutionalized checks on office holders, even if they are democratically elected. One may contend that this is an undemocratic rather than a democratic trait, as it represents restrictions on elected representatives. There are definitively instances where this is the case, but as a general remark this misses the point. The reason is that democracy is ultimately about popular control over political decision making. Electing representatives and then leaving the political process to them, without any further control mechanisms, does not ensure democracy.

Accountability is about holding representatives responsible to the wishes of those they represent. As Montesquieu and Madison were acutely aware of, the tendency for those in office to seek even more power can be strong. This can ultimately reduce the populace's future control over collective decision making. Thus, H is vital for ensuring a high degree of democracy. There is no reason to expect all, or even most, elected representatives to legislate as a majority of their constituents would like, if they are left without any form of constraint or potential sanctions. Like other people, politicians often act on self-interest. Therefore, a high degree of democracy generally requires "that office-holders are answerable to other institutional actors that have the expertise and legal authority to control and sanction their behavior" (Diamond and Morlino 2005, xxi).

The most dramatic event that horizontal accountability-generating institutions help guard against is self-coup (*autogolpe*) by the government. H is more generally important for reducing the executive's opportunity to amass more power at among others the legislative branch's expense. Horizontal accountability-generating institutions can check the legality of measures such as rule by decree and the curbing of civil liberties because of "national security concerns". One particularly important function is controlling that elections are fairly and freely executed, thereby ensuring that the playing field of political competition is level. In the absence of an independent court system or an independent electoral commission, incumbents may be more tempted and better able to secure their own continuation in office by illegitimate means.

[21]For fascinating classical analyses of checks and balances and mitigation of power abuse, see Locke (1988); Montesquieu (1989); Hamilton, Madison and Jay (1992)

However, there are also lesser dangers than executive power concentration that imply a role for horizontal accountability-generating institutions in enhancing democracy. There are several situations where politicians' interests, also legislators, are pinned against the broader electorate's, for example when it comes to politicians' usage of public resources or the awarding of public works contracts. Without control institutions, like anti-corruption agencies or auditing services, politicians may be tempted to further their own personal interests. Agencies monitoring politicians' behavior, and ultimately punishing bad or illegal behavior, may deter politicians from acting against the electorate's interest, or alternatively relieve misbehaving politicians from their positions. It may even be necessary to have more than one control agency in place, to reduce possibilities of co-optation by governing politicians and ensure a high detection rate (Diamond and Morlino 2005, xxiii). When it comes to outright illegal actions from individual politicians, the most important horizontal accountability generating institution is a politically independent judiciary that does not place politicians above the law.

However, an increase in H from an already very high level may actually reduce degree of democracy, especially if the regime scores high on other dimensions. The role of judicial bodies that may overturn legislation from elected bodies, and the implications for democracy, is an important issue. Another important issue is the "democraticness" of an independent central bank. These are complex issues revolving around whether these institutions unnecessarily restrict the people's elected representatives from pursuing a policy also wanted by the populace, or whether these institutions only ensure *consistency* in decision making.[22] It may be that a majority of the populace approves of the principles underlying constitutional review and an independent central bank, and still disapprove of a particular decision from these agencies. It is, however, plausible that a very high degree of delegation to independent and non-elected "technocrats" reduce popular control over political decision making, especially if there is disagreement over the broader directions of policy on legal and monetary matters. This is particularly the case if these agencies have relatively broad powers, going beyond just securing consistency. Examples could be supreme courts getting involved in politicized judicial cases, like abortion or the design of the property rights system, and central banks setting the inflation target, rather than just employing the means to reach a target.

[22]More specifically, consistency is related to the legal consistency of new laws with for example constitutionally guaranteed rights, and time consistency when it comes to central banks and monetary policies (see Kydland and Prescott 1977).

Vertical Accountability

Vertical Accountability (V) is about the responsiveness of politicians to the electorate, which hinges upon the electorate's ability to reward and punish politicians. V is important for democracy, because popular control over collective decision making is not direct in large, complex societies; politicians are responsible for the actual decision making. Few enjoy losing their job or being punished, and this goes also for politicians. If the electorate, who "hires" the politicians, are able to make politicians' pay-offs depend on how they act and perform, this generates a powerful incentive for politicians to devise laws and policies desired by the electorate.[23]

Considering the path from citizen preferences to implementation of policies, there are two general links that need to function properly for the result in terms of policy to resemble the initial preferences.[24] First, elected representatives should generate laws that reflect at least a majority of the citizens' preferences. Second, the executive branch and ultimately the bureaucracy should implement laws in a manner that reflect the legislators' intentions. Principal-agent theory highlights some of the problems of transforming preferences to implemented policy: One crucial aspect is asymmetric information, which allows legislators to take actions that deviate from the preferences of the citizens, and bureaucrats to take actions that are not in politicians' interests (Przeworski 2000). I here focus on the first link in the chain, that between citizens and legislators.

Several institutional and other factors affect V, and thus also degree of democracy. First, as it is often difficult to identify and discern what actions are taken by what legislators, or cabinet members, a strong party system may enhance V. A party system puts responsibility for conducted policies at the party level and allows voters to reward or punish parties, which eases identification problems for voters with limited resources for gathering information. However, a strong party system may also reduce V through allowing relatively anonymous politicians to free ride on other party members' efforts. Second, the existence of a vigorous media that can channel trustworthy information to the electorate is important. With such media, the electorate are better able to form opinions on the performance of their representatives and act accordingly. Therefore, V depends positively on civil liberties like freedom of speech and freedom of the press. Third, V is also enhanced by freedom of association, as independent NGOs can play important roles in dissemi-

[23] Also more generally, even without elections, this indicates a higher V if (relatively large) winning coalitions are able to discipline political rulers into behaving as they like (see Besley and Kudamatsu 2007).

[24] I assume that preference aggregation is unproblematic here. See Przeworski (2000) for an excellent analysis of the different links in the chain from citizen preferences to implementation.

nating information, and maybe even sometimes pressure politicians to act according to campaign promises.

Fourth, political competition, discussed above, is also vital for V. If voters have few alternatives, threats of voting on another party may be less credible. This may indicate V is higher in party systems with $n > 2$ parties, furthered by PR (Duverger 1954). However, there is a large literature indicating that two-party systems increase accountability through reducing complexity and more frequently yielding one-party governments (e.g. Powell and Whitten 1993; Persson and Tabellini 2004). One-party governments make it easier for the electorate to figure out who is responsible for policies. As with C, V is affected by reasonable opportunities for entry by new parties or political elites into the political process. If there is broad dissatisfaction with most old politicians, for example if all old politicians are perceived as corrupt, politicians may not be punished for bad behavior if entry options are limited. Oligarchic parties that collude as if in a cartel, combined with barriers to entry, for example due to strict registration laws, thus reduce V.

Rule of law

Rule of Law (L) is mainly important for democracy because it either directly enhances scores on other democracy attributes discussed above, or enhances the effect of these other attributes on democracy. In technical language, L increases democracy scores mainly because the other dimensions are themselves functions of L or because L's cross-derivatives (on D) with other dimensions are large and positive. Take for example the relations between L and C. For a high degree of democracy to exist, there should be clear laws and rules that regulate elections, and these should be enforced in a non-particularistic manner. Governing parties may use their superior political resources to violate the "fair" component of free and fair elections, *if* there are either no clear impartial rules regulating elections, *if* the rules are not enforced or *if* they are selectively enforced. This is why de facto competition increases with a high score on L. By using loopholes in the law or acting besides the law, many governments have tilted electoral processes through intimidation of the opposition or voters, extra-legal violence, arbitrary arrests of opposition politicians or other means (see e.g. Schedler 2002*a*,*b*).[25]

The importance of L for transforming formal political and civil rights into actual rights for citizens is much discussed by Inglehart and Welzel (2006). Selective en-

[25]The number of case studies is overwhelming on this issue, and the various Freedom of the World Reports from Freedom House provide abundant empirical material. See also for example (Lindberg 2006).

forcement of the law, corruption and nepotism, rather than rule of law, increase the opportunities for the rich and powerful to subdue poorer and less powerful citizens' rights. Thus, if the legal system does not function properly, there is a real threat to political equality, even in "formal democracies" (Inglehart and Welzel 2006; Welzel and Inglehart 2006; Knutsen 2010*c*). One could perhaps specify the nature of this dimension further by adding explicitly that it is not only the "rule of law", in the sense that the law (independent of content) is strictly adhered to, but also the degree to which citizens are treated as equals in terms of protection of (universal) rights and liberties and whether they are considered "equal before the law" (e.g Samadhi and Asgart 2009) that matter for democracy.

Hence, through securing competition and broad participation, and through ensuring citizens' abilities to effectually use their political and civil rights, L is vital for popular control over collective decision making and not the least political equality. Formal rights and rules without enforcement are just texts on pieces of paper. Rule of law increases the chance that all parties abide by formal rules and rights. The freedom to vote, for example, carries little weight if one is intimidated and even threatened on ones life. Take for example the referendum in France in 1802 on whether to elect Napoleon Bonaparte Consul for life or not. As one officer told his soldiers: "You are free to hold your own opinion; nevertheless, I must warn you that the first man not to vote for the Consulate for life will be shot in front of the regiment" (Harvey 2006, 328).

Political Effectiveness

The last second-level dimension is *Political Effectiveness (E)*. With E, I here mean the ability of elected politicians and institutional bodies tied to the democratic process to actually implement their decision over the whole range of public decision making issues.[26] E thus relates to the absence of extra-democratic institutions' and actors' ability to control substantial parts of public decision making. As with R, E is a dimension that is important for democracy largely because it complements the other dimensions. If elected bodies act as rubber stamps that perform inconsequential task, this counts for little in terms of degree of democracy. Several dictatorships emulate democratic institutions (e.g. Przeworski et al. 2000; Hadenius and Teorell 2007*b*), for example through holding elections for parliaments and plebiscites. How-

[26]Important public and academic discussions have been conducted over what issues are to be considered public issues and what issues are to be considered within the private sphere. One example of such a debate is the debate over Muslim women's use of the hijab in Western countries. I will not discuss the delineation of the public and private spheres, and this delineations possible implications for degree of democracy here.

ever, as Dahl (1971) recognized, this is insufficient for being considered democratic if for example parliaments hold little sway over actual decision making.

In some regimes, certain important policy areas are left for democratically elected institutions, whereas others are determined by non-elected. Historically, the King determined foreign policy in some European monarchies, most importantly issues related to war and peace, whereas domestic policy was to a larger degree determined by elected bodies. However, there are also less clear-cut cases where E is reduced through the actions or influence of extra-democratic entities. Subtle threats from the army can for example constrain democratically elected politicians, as has been the case in Turkey and several Latin American countries (see e.g. Smith 2005); fear of a coup can constrain policy making, and pull it towards the interest of the military. If the military is aligned with other groups, such as the landed aristocracy, fear of a coup can for example lead to a majority restraining itself in issues of land redistribution and other redistributive policies (e.g. Acemoglu and Robinson 2006*b*; Boix 2003). Another important case is when a foreign country, or an international governmental organization, influences important areas of political decision making, thus rendering national citizens less effective in determining policies through their elected representatives. There has for example been heated discussions on the role of the International Monetary Fund (IMF) when it comes to it affecting, or, more specifically, imposing limits on, policy making in developing countries that apply for loans in times of crisis (for a very explicit exposition of the argument that the IMF "takes power from the people", see Jones and Hardstaff 2005).

Another important case, in terms of reduction of scores on the E dimension, is when formal institutions in a country carry little weight in actual decision making altogether. State institutions in several African countries have been considered more or less irrelevant in terms of actual policy making. For example, redistributive policies are, in some countries, conducted through informal, vertical patron-client networks (see e.g. Clapham 1996*a*; Chabal and Daloz 1999). Often, the government actors prefer operating through such informal channels because of self-interest. Consider for example the distribution of food aid in Zimbabwe, where Robert Mugabe has been accused of rewarding only Zanu-PF (Mugabe's party) supporters with aid. Such distributional politics, informal and selective, serve political purposes for the government. Formal political institutions thus become ineffective. Hence, clientelism can be argued to reduce E, and thereby actual popular control over decision making, through removing important issue areas away from formal institutions and to informal where the populace likely has less control and elites more.

Given the above identified threats to high scores on the E dimension, several

suggestions exist for which particular institutional structures may facilitate a high value on this dimension. One important suggestion is a politically controlled military, as strong, independent militaries have historically exercised substantial influence over politics, for example in Latin America. Another suggestion is the absence of a non-elected head of state with substantial political powers. The monarch was historically important in European countries, well after the invention of elected assemblies; the elected assemblies' fight to reduce kings' power over political matters was long and hard in many countries (see e.g. North 1981; North and Weingast 1989). Furthermore, a politically independent judiciary may impact on *E*. Some argue that a strong and independent judiciary with constitutional review rights may constitute an undemocratic feature, as elected legislators are restrained in their ability to legislate (see chapters in Przeworski and Maravall 2003). I will not discuss the relation between the judiciary and democracy here, but only note that there *is* a vital pro-democratic role for a strong, independent judiciary in securing individuals' political and civil rights against violations. The judiciary has a vital role in upholding democracy for example by securing liberties that are vital for the contestability of future elections (see e.g. Beetham 1994; Diamond and Morlino 2005).[27]

2.5.2 The interrelations between dimensions

I have now surveyed the seven different second-level dimensions separately, and discussed why they contribute to the underlying democratic principles of popular control over public decision making and political equality. Important institutional elements and other factors that impact on the dimensions were also identified and discussed.

I also briefly, and informally, discussed some of the interrelations between the second-level dimensions above. These relations are often implicitly assumed by many democracy theorists, or at least not presented in full account explicitly. First, the effect of one dimension on degree of democracy likely hinges upon the value on another dimension. These are interaction effects. Some relevant interaction effects were mentioned above, and they will be more thoroughly discussed below. Second, some of the dimensions were argued to affect democracy indirectly through increasing the value on other dimensions. Formally, this is captured by one dimension being a function of another. For example, it was argued above that competition is a function of participation, political and civil rights and rule of law. Thus $C = C(P, R, L)$,

[27] See Meredith (2007) for a nice historical description of how the Zimbabwean Supreme Court fought for Zimbabweans' democratic rights.

with positive first-order derivatives. We also have that $P = P(R, L)$, as effective participation requires political rights and rule of law. Moreover, $V = V(C, R, H, L)$, with positive first-order derivatives. A high V-score requires effective competition between multiple political elites (C), freedom of speech, press and association (R), the existence of monitoring and auditing agencies that establish trustworthy information (H), and requirements that politicians follow the law (L).

If one could perfectly observe the score on each dimension, one would not need to take these relationships into account when measuring democracy. However, in practice, being aware of these relationships can improve the validity of democracy scores. If some components of C, such as existence of multi-party elections, are observable, but the elections' fairness is not directly observable, knowledge of values on R and L improves our ability to score C, because R and L are related to the fairness of multi-party elections. High scores on R and L generally improve scores on C, P and V. But, more particularly, they improve elements that are difficult to observe, like fairness of competition and effectiveness of participation. Vertical accountability is generally difficult to observe. Therefore, an operational measure of democracy that puts weight on rule of law and civil liberties, like for example the Freedom House Index, is in principle congruent with a democracy concept that weighs competition and participation heavily. I will return to such measurement issues below. First, I will investigate some other relationships between the second-level dimensions and the underlying democracy concept.

I have already established that the likely sign, in general, for all first-order derivatives is positive. I discussed the possibility of $\frac{\partial D}{\partial H} < 0$ for some particular types of H-institutions, and when a regime has quite high values on other dimensions. It was also mentioned that $\frac{\partial D}{\partial L} = 0$ for very low levels on other dimensions, like C and P. Further, the effects of most second-level dimensions (X) are likely concave. Thus $\frac{\partial^2 D}{\partial X^2} < 0$. The intuition is that the effect from a "unit" increase in *for example* C on democracy decreases at higher levels of C. In other words, the effect of C on D is always positive, but an increase in C gives a higher boost in the democracy score for very low initial levels of C.

Are there any dimensions that are *generally* more important for democracy than others? If all dimensions are normalized, this is equivalent to asking whether any of the first-order derivatives generally have higher values. Several authors clearly think that C is very important, and, as discussed in Section 2.2.2, some authors use this as the only dimension of democracy (e.g. Przeworski et al. 2000). I also think that C is vital for democracy; with no competition for elected offices, popular control over public decision making suffers greatly. Another dimension that should

be weighted heavily is P, as it is vital for political equality.

Among the other dimensions, V carries some weight, particularly among countries that already score high on C and P. For regimes with high competition, it becomes vital to ensure that candidates not only compete for the population's votes, but also represent their interests and respond to their concerns. Thus, one may argue that $\frac{\partial^2 D}{\partial V \partial C} > 0$. Moreover, V does not contribute so much to democracy if only a selected elite participate in the political processes. Therefore, $\frac{\partial^2 D}{\partial V \partial P} > 0$. From Young's theorem, one therefore also has that $\frac{\partial^2 D}{\partial C \partial V} > 0$ and that $\frac{\partial^2 D}{\partial P \partial V} > 0$, which quite intuitively indicates that increases in competition and participation contribute more to popular control over political decision making if there is a high degree of vertical accountability.

Also R's effect on D seems contingent on other dimensions. R is important as a supporting dimension for other second-level dimensions, like C and P. As discussed, there are some direct effects of for example freedom of speech and media on democracy, but these liberties are particularly important because they render formal competition and participation effective. Thereby, the cross-derivatives, $\frac{\partial^2 D}{\partial P \partial R}$ and $\frac{\partial^2 D}{\partial C \partial R} > 0$ are positive. Also $\frac{\partial^2 D}{\partial R \partial L} > 0$, as argued convincingly by Inglehart and Welzel (2006). In words, rule of law increases the effectiveness of formal rights and liberties. L also increase the effectiveness of competition, as it becomes harder to cheat in elections when L is high. Thus, $\frac{\partial^2 D}{\partial C \partial L} > 0$. Moreover, all dimensions' effect on popular control over public decision making and even political equality depend positively on the level of E. Thereby, $\frac{\partial^2 D}{\partial X \partial E} > 0$, where X can be any of the six other dimensions; no matter how much competition and participation you have, these do not count for much if elected institutions are not the ones determining policy.

Are there any substitution-relations between dimensions? One may argue that $\frac{\partial^2 D}{\partial H \partial V} < 0$ and thereby that $\frac{\partial^2 D}{\partial V \partial H} < 0$. Accountability could perhaps have been treated as one dimension rather than being divided into a horizontal and vertical component. Such a single accountability dimension would measure whether elected representatives are held responsible for their actions and induced to act according to the general public's interest, rather than their own interest (not take bribes, work hard, resist narrow lobby groups, etc.). Accountability may however be generated either through different mechanisms and institutions that link citizens directly to their representatives (V), or through *independent* institutional structures that (presumably) look out for the voters interests (H). Hence, a high score on V may reduce the effect of H on democracy, and vice versa, if the overall effect of accountability on democracy is concave. For example, the worst excesses of political corruption and rule of law violations may be checked by an independent anti-corruption agency or

another auditing service, and a high V is thus less important for scoring relatively high on the L dimension.

It is common to consider certain dimensions necessary requisites for democracy (Goertz 2005). Political elites can reduce degree of democracy through a variety of options, and often either "X" or "Y" or "Z" are sufficient. This implies logically that the negation of X and Y and Z are necessary for democracy to be present, and thus that the second level of democracy concept is also one of conjunction. This is in line with most texts putting forth "lists" of democratic institutions, where authors argue that all need to be present to ensure democracy. Inglehart and Welzel (2006) put forth just such a conjunctural argument for the existence of formal rights AND the absence of political corruption being necessary for "effective democracy".

As Goertz (2005) shows, also continuous concepts, not only dichotomous, can be modeled as concepts with necessary dimensions. If a particular dimension is considered necessary, it must be given a relatively large weight in the aggregation procedure, and the cut-off point for considering a regime democratic must be set sufficiently high on the degree of democracy scale. The two dimensions that are the strongest candidates for being considered necessary are C and P. Hence, the "general" effects of these two attributes on D should be given a large weight in the scoring procedure. Moreover, many of the positive cross-derivatives considered above were between either P or C on the one hand and one of the other five dimensions on the other. Thus, a low level on the P and C dimensions will generate a relatively small effect on democracy from for example an increase in either R or E; the two latter are dimensions which can be assigned little independent effect. Thus, the structure of the democracy concept sketched out above is congruent with the notion that competition and participation are necessary for a minimum democracy level.

The functional specification above also has other appealing aspects: Although a perfect democracy may require a perfect score, or somewhere close, on all dimensions, there may be elements of substitution at the margin for non-ideal empirical regimes. Two semi-democracies may be judged as about equally democratic, although one has harsher restrictions on the media, implying a low R, and the other has harsher restrictions on party formation, implying a low C. Moreover, the concept's structure crucially allows us to distinguish between different degrees of democracy, even between countries that ensure formal participation rights and multi-party competition. This is due to the linear effects of dimensions like R and V, and particularly the interaction effects between several dimensions. Differentiating between relatively democratic countries has been a particularly pressing problem for sev-

eral democracy measures (Inglehart and Welzel 2006; Welzel and Inglehart 2006).[28] Such differentiation is inherently problematic for institutionally based democracy definitions, particularly minimalist ones with few dimensions.

Nevertheless, much remains in terms of fully specifying the democracy concept structure, for example in terms of assigning weights to the first derivatives and cross derivatives. Notice, however, that by using the more flexible functional framework, one can escape putting unnecessary restrictions on the concept structure by limiting oneself to "pure" multiplication or addition, or taking the maximum or minimum of one dimension (see Goertz 2005). Such flexible functional approaches have not been explored in the conceptual and measurement literature on democracy. I think they provide a great opportunity for understanding democracy better and measure it more validly in the future.

2.6 Measuring democracy

2.6.1 Outlining some general principles for measuring a broad and substantive democracy concept

There is no lack of suggestions for individual indicators to help measure different democracy attributes. The IDEAS project has for example generated several plausible suggestions for indicators (see Beetham 1994; Beetham and Democratic Audit UK 1997; Beetham et al. 2002). Unfortunately for quantitative scholarship, these researchers do not attempt generating comparable cross-country democracy scores, but rather use indicators only in more idiosyncratic case evaluations. Identifying indicators is an important *first step* for democracy measurement. What is lacking, however, is a rich multi-faceted democracy measure that is appropriately structured and aggregated (Munck and Verkuilen 2002; Goertz 2005).

AREG, from the ACLP data set (Alvarez et al. 1999; Przeworski et al. 2000), has an elaborate logical structure, which is coherent with the theoretical definition it is supposed to operationalize. But, the theoretical definition is a minimalist, one-dimensional one. Other measures, like the Freedom House Index (FHI) and the Polity Index (PI), are more extensive in terms of attributes covered, but they have a simple additive structure that does not resemble appropriate theoretical democracy definitions (Munck and Verkuilen 2002; Goertz 2005). Inglehart and Welzel

[28] Inglehart and Welzel's suggested measure runs into the exact opposite problem, being unable to differentiate sufficiently between harsh dictatorships and semi-authoritarian regimes (Knutsen 2010*c*).

(2006) tried to establish a somewhat more elaborate multi-dimensional democracy measure, but ran into several validity and reliability problems (Hadenius and Teorell 2005; Knutsen 2010*c*). Adding to the difficulty of constructing democracy measures is the ordinal character of democracy dimensions, and the subsequent problems with conducting mathematical operations that strictly require an interval- or cardinal measurement level (Knutsen 2010*c*). Constructing democracy measures must therefore be approached with great care, and perhaps inevitably be guided by inductive feedbacks from case evaluations in a reflective equilibrium approach (Knutsen 2010*c*).

If one agrees with the broad outlines of the democracy concept sketched up in Section 2.5, an appropriate democracy measure would need a list of indicators incorporating measures for all seven second-level dimensions identified above. Some indicators would be "objective" in nature, like existence of multi-party elections (C), and some more subjective, like degree of self-censorship in the media (R) or the military's or clergy's informal power over policy areas (E). Such subjective indicators might be framed as check questions, as in the FHI, but with the possibility for graded answers. I will not attempt to provide a full list of indicators here, but the lists in Beetham (1994) and Beetham and Democratic Audit UK (1997) contain plausible suggestions on all dimensions.

Important is also the democracy measure's aggregation procedure. Above, I provided rough outlines of relations between second-level dimensions, and between these dimensions and the underlying definition. These would need to be captured in the aggregation procedure. However, at the indicator level, *within* each dimension, there may be several and quite different aggregation procedures that ought to be used. As Goertz (2005) correctly notes, the indicators should oftentimes be structured according to a family resemblance concept structure at this level, thus being based on a requirement that m out of n (where $m < n$) characteristics need to be present in order to produce a high score. Hence, indicator-level characteristics may stand in a substitutability-relation rather than a complementarity-relation. For example, a well functioning anti-corruption agency may perform many of the same tasks as a differently structured auditing agency. However, some indicators are complementary. Think for example of the competition dimension, where any one of the tactics from the menu of election manipulation (Schedler 2002*a*,*b*) can generate inefficient competition. For dictators, stuffing ballot boxes is a substitute to manipulating electoral lists; often, doing one of the two is enough. Therefore the lack of electoral list manipulation and lack of ballot box-stuffing are required in conjunction for a high degree of competition.

Relations between indicators at the third concept-level thus vary between dimensions, and also probably for subgroups of indicators within dimensions. Moreover, the best *observable* indicator for a part of one dimension may be drawn from another dimension. This is the case when parts of one dimension are unobservable, but strongly affected by observable parts of another dimension. One example mentioned above was the effectiveness of participation, which was determined for example by factors related to rule of law. Another was the fairness of competition, which was related to certain civil liberties and rule of law. Because of this, indicators related to L and R may have a larger weight at the indicator level than at the second level of the concept, as they pick up variation related to P and C that is inherently difficult to observe.

As Goertz (2005) and Munck and Verkuilen (2002) recognize, no existing cross-country democracy indexes are without validity or reliability problems. The task of building decent democracy measures is quite difficult; many concerns have to be dealt with, and there are probably some inescapable trade-offs. For example, operationalizing democracy as popular control over political decision making under political equality requires that one includes some indicators of subjective character. Subjective scores may be contested, even among enlightened observers. If one chooses to include subjective indicators, one thus obtains measurement errors. However, if one only includes formal indicators, like constitutional guarantees of freedom of speech, the operationalization will suffer from low validity if one want to measure actual freedom of speech.

Another trade-off regards what type of broader factors should be included or excluded in the concept. Take for example rule of law and corruption. As argued above, there are strong arguments for why lacking rule of law and political corruption undermine citizens' abilities to practice their formally guaranteed political and civil rights and liberties (see also Welzel, Inglehart and Klingemann 2003; Inglehart and Welzel 2006; Welzel and Inglehart 2006; Knutsen 2010*c*). However, including corruption and elements of rule of law, like property rights protection, in the democracy measure leads to some grave problems. First, there is the real concern that including these elements leads to resolving interesting empirical problems by "definitional fiat" (Przeworski et al. 2000, 33). Political corruption probably reduces political equality and popular control over political decision making, but it is also legitimate to ask how democracy affects political corruption. Second, attempts to weigh corruption and rule of law heavily in measures of democracy has led to a host of other methodological problems, for example in terms of generating large systematic and unsystematic measurement errors (Knutsen 2010*c*). Moreover, there is no

clear consensus on whether and how elements such as rule of law logically enter the concept's second level (Hadenius and Teorell 2005; Welzel and Inglehart 2006), which again leads to confusion at the operational level.

2.6.2 Diverging conceptualizations and measures of democracy and empirical results

In the empirical analysis in Chapters 5 and 6, I choose to apply a relatively pragmatic approach to the selection of democracy measures. As I will argue below, in Section 2.7, the FHI is the most appropriate existing democracy indicator (with extensive data coverage) given the structure of the democracy concept sketched out above. However, the FHI is not without its validity and reliability problems, and it is therefore vital to test the robustness of the estimated empirical relationships by using other measures. Since none of the democracy measures are perfect, and are fraught with different problems related to extensiveness, reliability and validity, researchers should test their hypotheses using different measures. There is much better reason to believe in a result validated when using three different democracy measures, than a result based only on one of them. Since all existing measures are imperfect (in addition to the discussion in the next section, see Munck and Verkuilen 2002), one should guard against accepting results that may be driven by measure-specific factors rather than actual characteristics of democracy. Robustness checks with different democracy indexes are thus conducted throughout this thesis. One further reason for using other measures than the FHI is that for example the PI sometimes allows me to expand the data material used in regression models quite substantially. This issue is discussed in the next section and more in detail in Chapter 4.

Moreover, above I argued in favor of one particular, quite broad, substantive definition of democracy. This is *not* an uncontroversial choice, and there are legitimate sources of disagreement on the conceptualization of democracy. These sources stem partly from the difficult choices one must make on the four crucial issues listed in Section 2.1.1. Hence, using other, and narrower, democracy measures than the FHI is important in order for the empirical analysis to communicate with researchers that favor other types of conceptual definitions of democracy. To be more specific, the results in Chapter 6 based on the AREG measure from Alvarez et al. (1999), should be more tractable to those researchers favoring minimalist, election-based definitions of democracy. The PI may be considered, as will be indicated below, a more proper operationalization of an "intermediate" democracy concept, as it mostly includes in-

formation relevant for the competition, participation and horizontal accountability dimensions above.

As a result of the different measures covering different attributes of democracy, the usage of different democracy measures may also lead to quite interesting discussions on which democratic attributes and institutions that are relevant for particular economic outcomes. If there is divergence in results between models using different measures, this may be due to coincidence or measurement errors in one of the measures. However, the divergence may also be due to particular attributes having strong effects on an economic variable, whereas others do not. Hence, mixed results on democracy's effect on an economic variable, when using different measures, may therefore initiate a discussion on which elements of democracy that is important for the dependent variable. One example of such a discussion is provided in Section 6.2.[29]

Indeed, and as I will come back to particularly in Chapter 5, some of the most important theoretical arguments on why democracy may affect economic growth focus on the effects of particular dimensions of the democracy concept. For example, the literature on democracy's effect on the funding, quality and extensiveness of the education system presents arguments indicating that it is the extension of political participation rights that matters the most for the education system (see particularly Lindert 2005). Moreover, my theoretical argument in Section 5.4 focuses on the role of civil liberties for enhancing the diffusion of technologies. As both the education system and technological change are vital determinants of economic growth, one could predict that the estimated effect of AREG on growth would likely be smaller than the estimated effect of the FHI on growth; the FHI, in addition to including indicators tapping the C dimension, includes indicators that tap the P and R dimensions.

2.7 Existing democracy measures

How should empirical researchers respond to the problems and issues discussed above? First, they should ponder on how their chosen measure relates to their favored conceptual definition. Despite its many shortcomings, I consider the FHI the best available cross-country democracy measure with an extensive time series (see also Knutsen 2006, 2010*c*). The FHI is mainly based on presence or absence of different institutions, but it also takes into account how these *function*. Freedom

[29] See also Bueno de Mesquita et al. (2003) for exemplary discussions along these lines.

House allegedly attempts to measure "the real-world rights and freedoms enjoyed by individuals" (Freedom House 2004, 1). The FHI is thus suitable for operationalizing a substantive democracy concept.

The FHI has been attacked because it does not *sufficiently* incorporate the actual functioning of institutional structures (see also Knutsen 2006, 2010*c*; Inglehart and Welzel 2006; Welzel and Inglehart 2006), but also from the "opposite side", on the grounds of possible subjectivity bias and the incorporation of policy outcomes (Strand 2007). Strand (2007) also points out that there has been a change in the FHI's coding practice over the course of time. Nevertheless, among the existing available democracy indexes, I think the FHI is preferable because it balances the need to capture "the political reality behind the formal and observable structures of government" (Grugel 2002, 22) on the one hand, and the problems of subjectivity bias and outcome-centeredness on the other. Indeed, the latter problems are far graver for example for Inglehart and Welzel's Effective Democracy Index than for the FHI (Knutsen 2010*c*).

As mentioned in the previous section, I use two additional operationalizations of democracy in the empirical chapters' analysis. The first alternative measure is the PI from Polity IV (Marshall and Jaggers 2002). The PI is actually used as the main operationalization of democracy in several analyses below, despite my preference for FHI. The main reason is that the PI has far more extensive time series, going all the way back to 1800. In contrast, the FHI starts in 1972. This implies that analyses using the FHI leave out information from most of the modern world's history after the "dual revolutions", the industrial in Britain and the political in the US and France. Boix and Stokes (2003) showed that the result that development level does not affect democratization probability, from Przeworski and Limongi (1997), changed when expanding the time series back in time, to before 1950; there may be similar effects of sample size on the estimated effects of democracy on various economic outcomes. Indeed, the results presented in Doucouliagos and Ulubasoglu (2006, 2008) indicate that studies on democracy's economic growth effect using longer time series are more reliable than studies based on shorter time series.

The ACLP data set's dichotomous democracy measure, AREG (Alvarez et al. 1999), is the second alternative measure used in this study.[30] AREG has data going back to 1946. The operationalization of this measure, and its beneficial and problematic aspects, were discussed in detail in Section2.2.2. Therefore, I will here focus the structure of the PI and FHI, and elaborate on their benefits and drawbacks.[31]

[30]See also Przeworski et al. (2000).

[31]Other measures that could have been used for robustness checks in the empirical analysis below

2.7.1 The Freedom House Index

According to Freedom House, political rights "enable people to participate freely in the political process, including through the right to vote and stand for public office, and elect representatives who have a decisive impact on policies and are accountable to the electorate. Civil liberties allow for the freedom of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state" (Freedom House 2004, 1). Freedom House's Political Rights index (PR) and Civil Liberties index (CL) are both indexes constructed from large subsets of indicators. PR and CL do not, as their names suggest, tap only the R dimension above; rather, they tap all seven dimension. As seen in Tables 2.1 and 2.2, PR and CL together draw on 25 main check questions, 10 on PR and 15 on CL. PR and CL both range from 1 to 7. Here, the "FHI" refers to the (unweighed) average of these two indexes. FHI is thus simply $\frac{PR+CL}{2}$, where 1 is most democratic and 7 least democratic.[32]

The fact that the PR and CL, when combined, tap all the seven second-level dimensions identified above is the FHI's greatest advantage. A more problematic aspect with the FHI is the aggregation procedure, which is purely additive (for both the PR and CL). More specifically, the weighting of the different second-level dimensions may be viewed as problematic. The C and P dimensions are probably underemphasized, although as discussed above, these can to a certain extent also be captured by questions related to R and L. In this sense, the FHI is "lucky", as it unintentionally provides, in my view, a better weighting of the dimensions than the sheer number of C and P questions suggest.

There are, however, no interactive elements or more elaborate operations conducted to capture a complexly structured democracy concept. Even worse, Freedom House does not release indicator-level data, which makes it impossible to generate a better operationalization based on these indicators. Another problematic aspect with the FHI as a democracy measure (but perhaps not as freedom or rights measure), is the inclusion of elements that are conceptually distinct from democracy; the maximalist, inclusive nature of the FHI is thus not only associated with benefits, but also generates some problems. This goes particularly for question G2 on property rights. The inclusion of makes the FHI less suitable as democracy mea-

are measures from Vanhanen (2000) and the SIP-measure from Gates et al. (2006). The latter measure aggregates indicator-level data from Polity and Vanhanen, and is a scalar based on three explicitly identified dimensions: executive recruitment, executive constraints and participation. These dimensions correspond more or less with the C, H and P dimensions discussed above.

[32] See $http://www.freedomhouse.org/template.cfm?page = 351ana_page = 341year = 2008$ for a discussion and the more specific check questions underlying the main check questions.

sure when investigating democracy's effect on property rights; there is an a priori relation between the FHI and property rights protection, although question G2 only constitutes $\frac{1}{30}$ of the FHI's potential score.[33]

Political Rights Checklist
A. Electoral Process
1 Is the head of government or other chief national authority elected through free and fair elections?
2 Are the national legislative representatives elected through free and fair elections?
3 Are the electoral laws and framework fair?
B. Political Pluralism And Participation
1 Do the people have the right to organize in different political parties or other competitive political groupings of their choice, and is the system open to the rise and fall of these competing parties or groupings?
2 Is there a significant opposition vote and a realistic possibility for the opposition to increase its support or gain power through elections?
3 Are the peoples political choices free from domination by the military, foreign powers,totalitarian parties, religious hierarchies, economic oligarchies, or any other powerful group?
4 Do cultural, ethnic, religious, or other minority groups have full political rights and electoral opportunities?
C. Functioning Of Government
1 Do the freely elected head of government and national legislative representatives determine the policies of the government?
2 Is the government free from pervasive corruption?
3 Is the government accountable to the electorate between elections, and does it operate with openness and transparency?

Table 2.1: The main check questions of Freedom House's Political Rights index.

Since the criteria used for scoring the FHI are relatively subjective, the FHI may also contain specific biases and there are almost certainly unsystematic measurement errors. The presence of concrete institutions is easier to measure empirically than for example the equality of opportunity and free private discussions. One may thus expect the FHI to have larger measurement errors than the Polity and AREG have. However, systematic empirical studies indicate that the FHI's reliability problems are likely not as bad after all. Bollen (1993) uses factor analysis to investigate the unsystematic and systematic measurement errors of different democracy indexes, and finds that the FHI performs relatively well. Several other studies conclude similarly (e.g. Bollen and Paxton 2000; Knutsen 2010*c*). These studies are based on factor analysis and on an assumption that the indexes are measuring the same underlying concept. Høyland, Moene and Willumsen (2009) utilize a Bayesian

[33]Consequently, I mainly utilize the PI in Knutsen (2011*b*), which investigates democracy's effect on property rights.

Civil Liberties Checklist
D. Freedom Of Expression And Belief
1 Are there free and independent media and other forms of cultural expression?
(Note: In cases where the media are state controlled but offer pluralistic
points of view, the survey gives the system credit.)
2 Are religious institutions and communities free to
practice their faith and express themselves in public and private?
3 Is there academic freedom, and is the educational system
free of extensive political indoctrination?
4 Is there open and free private discussion?
E. Associational And Organizational Rights
1 Is there freedom of assembly, demonstration, and open public discussion?
2 Is there freedom for nongovernmental organizations?
(Note: This includes civic organizations, interest groups, foundations, etc.)
3 Are there free trade unions and peasant organizations or equivalents,
and is there effective collective bargaining?
Are there free professional and other private organizations?
F. Rule Of Law
1 Is there an independent judiciary?
2 Does the rule of law prevail in civil and criminal matters?
Are police under direct civilian control?
3 Is there protection from political terror, unjustified imprisonment, exile,
or torture, whether by groups that support or oppose the system?
Is there freedom from war and insurgencies?
4 Do laws, policies, and practices guarantee equal treatment
of various segments of the population?
G. Personal Autonomy And Individual Rights
1 Does the state control travel or choice of residence, employment,
or institution of higher education?
2 Do citizens have the right to own property and establish private businesses?
Is private business activity unduly influenced by government officials,
the security forces, political parties/organizations, or organized crime?
3 Are there personal social freedoms, including gender equality,
choice of marriage partners, and size of family?
4 Is there equality of opportunity and the absence of economic exploitation?

Table 2.2: The main check questions of Freedom House's Civil Liberties index.

approach, and although their analysis indicates measurement errors in the FHI, it passes with better grades than the United Nations' Human Development Index and the World Bank's Doing Business Index.

There is thus little quantitative evidence for the proposition that the FHI is very unreliable because of its subjective indicators. However, Munck and Verkuilen (2002) justly criticize Freedom House for not releasing data on the individual indicators, thereby reducing opportunities for replication and more specific discussions on validity and measurement errors (see also Høyland, Moene and Willumsen 2009). It has also been charged that the FHI overestimates the scores of US' allies and underestimates the scores of "enemies" of the US, but there is little systematic evidence

for this (Bollen 1993). However, it may be that countries with "good outcomes" on variables such as economic growth tend to be given an upward biased value on subjective indicators related to democracy. This phenomenon of scoring "by association" (Søreide 2006; Knutsen 2010*c*) is a potential source of systematic measurement error, which would also have the unfortunate effect of biasing estimates of the relationships studied in this thesis.

2.7.2 The Polity Index

In contrast with the FHI, the PI does regrettably not incorporate civil liberties. The PI also leaves out other elements relevant of a substantive democracy concept, such as rule of law. In general, the PI relies mostly on observable formal institutional structures. How these institutions function, and whether or not they are subverted in practice, is not sufficiently incorporated in the PI. This, of course, reduces different biases related to subjective judgement, but it generates other severe validity problems. One problematic example is Russia, which according to the PI has become more democratic under Vladimir Putin than it was under Boris Jeltsin. This goes contrary to the FHI's judgement, and the judgement of many Russia-observers (see e.g. McFaul and Stoner-Weiss 2008). Putin has used a variety of ingenious means to concentrate power and render democratic elections less competitive, not the least through curbing civil liberties. Such aspects are not picked up by Polity, whereas they are picked up by the FHI.

On a more positive note, Polity, in contrast with Freedom House, publishes its indicator scores, and has a more thought through and transparent weighting and aggregation procedure (e.g. Munck and Verkuilen 2002). Moreover, the Polity also conducts tests for inter-coder reliability and the PI has a comprehensive empirical scope (Munck and Verkuilen 2002, 28) .[34] However, Goertz (2005) argues convincingly that there is a lack of coherence between the theoretical concept promoted by the Polity authors and the PI measure.

The PI is constructed as the difference between two separate indexes, Democ and Autoc, from the Polity IV data set. The PI goes from -10 to 10 (most democratic). The principles for the scoring of Democ and Autoc are shown in Table 2.3. Competitiveness and openness of both political participation and executive recruitment, as well as constraints on the chief executive, are the main dimensions. The four first dimensions mainly relate to C and to some extent P, and checks on the executive is

[34]However, the PI does not have data for relatively small countries with a population below 500 000 people as of 2002 (Marshall and Jaggers 2002, 4). The FHI covers also such small countries.

vital for *H*. Thus, three of the seven dimensions discussed above are covered in the PI. Checks on the executive is heavily weighted, constituting about a third of the overall variation in the PI (see Gleditsch and Ward 1997).

One important difference between the FHI and PI is that countries that experience anarchy typically are scored very dictatorial on the FHI, but receive an intermediate score (0 by assumption) on the PI. The PI's scoring procedure could be defended by arguing there is no particular type of regime in a country that experiences anarchy; there is rather an absence of government. However, one could plausibly argue that popular control over public decision making is low, if not absent, under anarchy. This is particularly true because of low scores on the *E* and *L* dimensions. This indicates that the FHI scores anarchy more appropriately than the PI, if one takes the discussion in 2.5 as a point of departure. In the empirical analyses in Chapters 5 and 6, countries experiencing anarchy are often excluded, and they are always excluded when the PI is used.

2.7.3 Some problems with the democracy measures

Let me further discuss a range of specific problems with the FHI, PI and AREG. For this purpose, it is useful to draw on insights from Munck and Verkuilen (2002), who present a set of challenges to democracy measures. These are challenges related to 1) conceptualization, the choice of attributes and logical organization, 2) choice of indicators and level of measurement, and 3) levels and rules of aggregation. I have already discussed conceptualization and the choice and logical organization of attributes. These relate to what Goertz (2005) calls the first and second concept levels.

Both Munck and Verkuilen (2002) and Goertz (2005) call attention to how democratic attributes are interrelated. Is there a hierarchical structure between the attributes, are any of them substitutable, and are some necessary factors for a regime being democratic? These authors also show that there are discrepancies between how index constructors (and users) discuss democracy at the conceptual level, and the proposed indexes' logical structure. Generally, conceptual discussion often indicate several individually necessary attributes of democracy, whereas indexes are often additive. As Goertz (2005) reminds us, additive indexes do not resemble the necessary attributes–logical "and" structure. Additive indexes are rather congruent with a family resemblance classification structure, where several attributes are related and to a certain extent can substitute each other (logical "or" structure) and perform similar functions.

Democ
Competitiveness of Executive Recruitment (XRCOMP):
(3) Election +2
(2) Transitional +1
Openness of Executive Recruitment (XROPEN):
only if XRCOMP is Election (3) or Transitional (2)
(3) Dual/election +1
(4) Election +1
Constraint on Chief Executive (XCONST):
(7) Executive parity or subordination +4
(6) Intermediate category +3
(5) Substantial limitations +2
(4) Intermediate category +1
Competitiveness of Political Participation (PARCOMP):
(5) Competitive +3
(4) Transitional +2
(3) Factional +1

Autoc
Competitiveness of Executive Recruitment (XRCOMP):
(1) Selection +2
Openness of Executive Recruitment (XROPEN):
only if XRCOMP is coded Selection (1)
(1) Closed +1
(2) Dual/designation +1
Constraints on Chief Executive (XCONST):
(1) Unlimited authority +3
(2) Intermediate category +2
(3) Slight to moderate limitations +1
Regulation of participation (PARREG):
(4) Restricted +2
(3) Sectarian +1
Competitiveness of Participation (PARCOMP):
(1) Repressed +2
(2) Suppressed +1

Table 2.3: The coding of Polity's Democ and Autoc indexes, taken from Marshall and Jaggers (2002, 14–15).

Both the PI and FHI are additive.[35] Moreover, as mentioned above, the FHI's non-weighted aggregation procedure is problematic; C and P indicators should likely have entered with more weight. The PI, on the other hand, is a weighted index. But, Goertz (2005) convincingly criticizes the weighting procedure, and shows that

[35]However, these are continuous measures, and even if none of the attributes are necessary in providing a democracy score higher than zero, a full score on all is necessary to achieve the maximum score.

*	PI	FHI
AREG	-.86 (6522)	.83 (5249)
PI	1	-.91 (4677)

Table 2.4: The table shows the bivariate correlation coefficients between the three democracy indexes, ACLP, PI and FHI. The number of observations is provided in parenthesis (n). Notice that lower values on AREG and FHI imply more democratic regimes

the weighting has consequences for empirical results. Gleditsch and Ward (1997) also showed that PI scores to a large degree reflect the checks on the executive component, with other dimensions having little empirical relevance. Both the FHI and PI could therefore have been more carefully aggregated.[36]

In contrast, AREG is exemplary when it comes to correspondence between the logical concept structure and the aggregation rules used. As discussed in Section 2.2.2, the aggregation is based on a regime passing four rules that are set up as necessary requirements. Hence, the concept has an "and" structure, and this is followed through in the scoring. AREG's problems lie elsewhere. Particularly the dichotomous classification is problematic, because of validity reasons but also reliability reasons (Elkins 2000). Przeworski et al. argue that democracy is not a matter of degree, but rather something you either have or not (Przeworski et al. 2000, 14–18). This follows partly from their minimalist democracy concept, and partly from their focus on clear operational rules. However, the argument that democracy is a dichotomous concept is debatable; the conceptual definition discussed in the section above rested on continuous dimensions, which indicates that democracy should also be measured in degrees if one accepts the concept sketched out above.

Table 2.4 shows the bivariate correlations between AREG, PI and FHI. Despite the seemingly large differences between for example the FHI and AREG, there are relatively, but not very, high correlations between the different democracy indicators, suggesting that they are indeed tapping the same underlying concept. Przeworski et al. (2000, 57) thus argue that "[d]ifferent views of democracy, including those that entail highly subjective judgements, yield a robust classification". Diamond (1999*b*, 286), however, claims that due to the rise of a divergence between "the formal properties and liberal substance of democracy", the correlation between formal measures, like AREG, and measures like the FHI has decreased in the 1990's.

[36]Goertz (2005) provides a new aggregation formula for an index based on the Polity data (see also Gleditsch 2008). This is, unfortunately, impossible to do for the FHI, as its components are not published.

In conclusion, the FHI is my favored measure among the three measures discussed here. Several authors have criticized the FHI for being too maximalist. I concur that the FHI includes elements that should not be included in a democracy measure. But, other measures leave out indicators of relevant attributes that, according to my view, should be included in the democracy concept. Nevertheless, practical issues related to data availability and longevity of time series often induce me to use the PI rather than the FHI. The PI is in any case favorable to the AREG, because of it covering more than the competition attribute of democracy. Nevertheless, since there are no perfect measures of democracy, I run regression models using all these three democracy measures in the empirical analyses below to check the various results' robustness.

Chapter 3

Literature review

This chapter reviews the literature on the determinants of economic growth, on the economic requisites of democracy and on political institutions and economic performance. Thereafter it focuses more specifically on literature dealing with the economic effects of democracy. The chapter sums up the discussion by presenting a general framework for the likely relation between regime types and economic growth, and discusses its implications for empirical studies of the relationship.

3.1 Why are some countries rich and others poor?

This fascinating and important question was discussed already by Adam Smith in "The Wealth of Nations" (Smith 1999). The question spurred much interest in policy and scholarly communities after WWII, and particularly after decolonization in Asia and Africa. Social scientists from different fields and with different methodological and theoretical approaches introduced several alternative explanations for why some countries had grown rich, whereas others had not. Post-WWII development economists focused on the importance for economic growth of capital accumulation (e.g. Rostow 1962), and of the importance of reallocating resources from traditional, low-productivity sectors to "modern", high-productivity sectors (e.g. Lewis 1954). These scholars pointed to the many and severe market failures in developing countries, which were argued to slow the rate of capital accumulation and inhibit economic efficiency.

Also technological rigidities and poorly functioning national, political institutions were claimed to inhibit development processes (e.g. Rosenstein-Rodan 1943; Hirschmann 1958). Dependency theorists, on the other hand, focused on the nature of the international system (see e.g. the review in Hveem 2005). From the 1980s, scholars and practitioners turned increasingly to the importance of microeconomic structures and the importance of "getting the prices right" in developing countries (see e.g. World Bank 1986, 1987). Alongside the functioning of markets, there was a strong focus on prudent fiscal policies and more generally on following policies that contributed to macroeconomic stability. There was also a focus on free trade policies and participation in the international economy, and on promotion of efficient exporting sectors in particular (see e.g. the discussions in Rodrik 1999*b*, 2008). This view on development policy was famously summed up by the so-called "Washington Consensus" document (Williamson 1990, 2004).

As Adelman (2001) notes, the history of development economics can be read as a search for the "X-factor"; the one, crucial variable that generates economic development. However, several variables seem to affect economic development, and they often interact in complex ways.[1] Moreover, it is arguably important to theorize about and empirically investigate the relationships *between* the different variables that are presumably important for development.

Over the last two decades, there has been an increasing focus on the role of domestic institutional structures for economic development. However, a focus on

[1]For an interesting theoretical discussion of various, complex patterns of causality involving multiple variables, see Ragin (1987).

the importance of institutions for development does not imply that factors such as capital accumulation and macroeconomic stability are considered unimportant. It is rather the case that institutional factors arguably affect development through systematically affecting these, and other, economic variables. Hence, here are several issues that must be dealt with when analyzing the role of institutions for economic development.

First, there is the issue of identifying the relevant channels through which an institutional structure affects economic development, and estimating the relative importance of these channels. On this issue, economic growth theory is of help; there is a large literature on the more immediate determinants, or immediate sources, of economic growth (e.g. Solow 1956; Mankiw, Romer and Weil 1992; Romer 1990; Barro and Sala-i Martin 2004; Helpman 2004; Acemoglu 2008). We thus know quite a lot about how economic factors affect growth. The difficult issue is often clarifying how institutional aspects affect these more immediate determinants of growth.

Second, there is the practical question related to what Acemoglu and Johnson (2005) refer to as "the unbundling of institutions", the ability to separate aspects related to and the effects of institutional structures that are highly correlated (see also Acemoglu 2005). It can be quite difficult to distinguish institutional factors clearly at the conceptual level. It is often even more difficult to *empirically* distinguish between the effects of different institutions. Theorizing about the relations between different institutional aspects (see e.g. Rodrik 2000; Acemoglu and Robinson 2006*c*), theorizing about institutional complementarities (e.g. Hall and Soskice 2001; Pierson 2000), and applying clever identification strategies (e.g. Acemoglu and Johnson 2005) are vital in this regard.

The third issue relates to whether institutional aspects are indeed the most important of what Rodrik, Subramanian and Trebbi (2004) call the *deeper determinants* of development, or whether there are other factors correlated with institutional structures that are more relevant. Suggestions of classes of other deeper determinants, variables that are placed relatively early in the causal chains with growth as dependent variable and often affect growth through affecting other intervening variables, are cultural (e.g. Weber 2002; Landes 1998), geographical (e.g. Pomeranz 2000), demographic (e.g. North 1981; Kremer 1993*b*) and international economic factors (e.g. Sachs and Warner 1995). To a certain extent, theorizing about the relevance and relationships between deeper factors, like geography and institutions, can get us some way (e.g. Acemoglu, Johnson and Robinson 2001*b*; Engerman and Sokoloff 1994). However, in the end we may need clever empirical strategies to find out whether institutional factors are indeed vital for development, or whether the

many seemingly strong statistical results on institutions and development are driven by omitted variable bias. The few studies that have tried to take on this task generally find that institutions are extremely important for economic development (e.g. Acemoglu, Johnson and Robinson 2001*b*; Rodrik, Subramanian and Trebbi 2004).[2] Before I turn to the literature on institutions and economic development, let me first briefly review the literature on the immediate sources of economic growth.

3.2 The immediate sources of economic growth

The standard way to model economic growth processes in neo-classical economics is through a so-called macro-production function, which formalizes a relationship between broad classes of inputs in production processes and the produced output. The most common basic categories of inputs used in the literature are labor, L, physical capital, K, and human capital H. Moreover, *how* these inputs are combined into output is a vital determinant of income; that is, it matters which technology, T, is used in production processes. Thus production, Y, is a function of inputs and technology level, or $Y = Y(L, K, H, T)$, where all the first-order derivatives are strictly positive; adding more factor inputs or increasing the technology level always increases output.[3] One common assumption in economic growth models is that the second-order derivatives of the production function with respect to the various factor inputs are negative. This means that an increase in any of the factors yield a lower effect on production when the factor is already provided at a relatively high level.[4] The most utilized growth model is the model developed by Solow (1956), which has later been refined by other economists (see e.g. Mankiw, Romer and Weil 1992). The Solow model framework is also used and extended upon in Section 5.4.1. The broad categories of inputs included in the original Solow model were physical capital and labor. The model highlighted especially the dynamics of physical capital

[2]But, see the more skeptical analysis in Glaeser et al. (2004), which argues that human capital is the central determinant of both good institutional structures and economic development. However, various other tests and analyses of the relationship between human capital and institutional structures argue convincingly that institutions are mainly the cause rather than effect of human capital (e.g. Baum and Lake 2003; Lindert 2005), or that the relationship is quite complex and that human capital and institutions stand in a reciprocal relationship (e.g. Acemoglu and Robinson 2006*b*). Another possibility is that human capital and institutional structures are both to a large extent an outcome of country-specific historical processes (Acemoglu et al. 2005).

[3]Some growth models also incorporate other factor input categories, like land and natural resources (see e.g. Jones 2001). Particularly land is vital also in several neo-classical and political economic models of trade (see e.g. Feenstra 2003; Rogowski 1989; O'Rourke and Taylor 2007).

[4]See Barro and Sala-i Martin (2004) for more technical discussions on different growth models, for example related to cross-derivatives of the production function with respect to the factor inputs, and the homogeneity properties of different production functions.

accumulation, and its effects on income. Hence, much of the subsequent literature on economic growth focused on physical capital accumulation and the factors that determine it.

3.2.1 Physical capital

In a closed economy, total savings equal total investment, and the factors determining the savings rate are therefore important for capital accumulation. Whereas Solow's model assumed an exogenous savings rate, later models have sought to endogenize the savings rate, by letting it be an outcome of consumers' inter-temporal optimization behavior (see e.g. Cass 1965; Koopmans 1965; Barro and Sala-i Martin 2004; Obstfeld 1992). The more willing consumers are to postpone consumption into the future, the higher will the savings rate and thus income level be. If there is a change in exogenous factors that lead consumers to be more patient, there will be increased medium-term growth, as the economy will grow from one steady state to a higher one.[5] A high discount factor, which may for example be driven by cultural attributes related to prudence, is thus important for achieving a high level of investment.[6]

Moreover, the distribution of income within a population may impact upon aggregate savings rates, as richer individuals are presumably more likely to save a large share of their incomes.[7] The economic institutional environment may also impact on savings rates, as uncertain economic environments may induce actors to consume right away, rather than saving and risking losing their wealth. Moreover, different policy tools that encourage saving, and seek to impose costs on immediate consumption, likely generate higher savings rates and thus investment levels. Forward-looking consumers may behave differently from what policy makers intended them to do when the policy makers designed policies supposed to affect inter-temporal consumption allocation and hence savings behavior (e.g. Barro and Sala-i Martin 2004).[8] Hence, not all policies designed to increase private saving are likely to suc-

[5]See for example the discussions in Barro and Sala-i Martin (2004) on the concept of 'steady state'. Basically, a steady state is an equilibrium situation where different variables grow at constant rates, with 0 growth rate being one special case.

[6]'Discount factor' is a concept that relates to actors' evaluation of the utility obtained from various gains and costs in one (future) time period relative to that obtained from similar gains and costs in the preceding period; in other words, the discount factor shows how much an actor values future experiences relative to present ones (for further discussion, see e.g. Varian 2005).

[7]See the discussion of regime type and saving for more detailed discussion of this hypothesis, known as the Kaldor hypothesis.

[8]For example, the Ricardian equivalence theorem indicates that foresighted consumers may not increase/reduce their consumption as a result of expansive/contractive fiscal policies, if they expect such policies to be temporary and later reversed (Barro 1974).

ceed. Nevertheless, there are empirical examples of governments being able to push up national savings rates through a wide variety of policy instruments, like bans or restrictions on consumer loans, tariffs and taxes on consumption goods, artificially high interest rates on personal savings, and also high public savings levels (see e.g. Wade 1990; Chang 2006).

However, the national savings rate is not the only determinant of net investment flows and capital stocks. As Solow's model points out, the capital depreciation rate, the rate at which the value of capital decreases annually, is important. If the depreciation rate is high, much of the new investment goes into replacing old capital, rather than increasing the overall capital stock. The depreciation rate impacts both on economic growth, when an economy is off the steady state, and on the steady-state income level. Factors that affect capital depreciation, like for example theft, looting or war, are therefore important for at least medium-term economic growth.

Moreover, in an open economy savings do not necessarily equal investment at the national level. Because of foreign investment, some countries save more than the amount invested domestically, and some save less. Since investment, and not savings, affect the productive capital stock directly (although foreign investment abroad may lead to repatriated earnings that can in turn be invested domestically), a country's ability to attract foreign investment is relevant for medium-term growth rates and income level. There is a large body of empirical literature, both quantitative and qualitative, on the characteristics that affect allocation of FDI (for a review, see e.g. Blonigen 2005). In addition to several economic factors like market size, access to natural resources and transport costs (see e.g. Dunning 1993), various policies, economic institutions and political institutions affect FDI allocation. Although savings and investment at the national level are highly correlated (e.g. Feldstein and Horioka 1980), there is room for increasing the domestic capital stock without increasing the savings rate, at least over the medium run.

3.2.2 Labor

When it comes to labor as an input to productive activity, it is the number of labor hours that matters for production. This means that L can grow by increasing the amount of hours each worker works, or by increasing the size of the labor force. The latter can be achieved through increasing the number of young people (through increased fertility or immigration), or through increasing the share of the populace participating in the workforce (Barro and Sala-i Martin 2004). Although manipulating labor input at the macro level may be difficult, there exist policy instruments

that likely affect hours per worker and share of population in the workforce (e.g. Parsons 1980; Jomette 2003). Policies that affect fertility and immigration also exist (Przeworski et al. 2000).

Factors like workforce participation and fertility are also systematically related to more structural factors, like level of economic development and cultural factors. Notice that policy makers and others are often interested in income or income growth in *per capita* terms, and that an increase hours worked per worker may have a quite different effect on income per worker, than increased fertility. Increased fertility may in the short run reduce GDP per capita, as the younger cohorts do not enter the workforce right away. There has been lack of good cross-country data on worker hours, and researchers therefore often proxy L with other measures than labor hours in empirical studies. The most common proxies are population level and number of workers (see e.g. Barro and Sala-i Martin 2004; Baier, Dwyer and Tamura 2006).

3.2.3 Human capital

The last general factor input category is human capital, which is related to the productive skills and abilities of the workforce. One may say that whereas L measures the quantity of labor input, H measures the quality. There are several different ways to model, and to empirically test, the effects of human capital accumulation on economic growth. Some theoretical models indicate that human capital may increase income levels, but not long-term growth rates (e.g. Mankiw, Romer and Weil 1992), whereas others indicate that increased human capital accumulation may increase even long-term growth (Lucas 1988). Results from empirical studies also differ quite a lot when it comes to the estimated importance of H for economic growth. For example, human capital's estimated effect on growth seems to depend critically both on the choice of estimation technique (growth accounting versus variance decomposition of growth) and on operationalization choices (for example whether data on primary versus secondary schooling are used) (Mankiw, Romer and Weil 1992; Klenow and Rodriguez-Clare 1997). One study even indicates that economic growth may cause H, rather than the other way around (Bils and Klenow 2000).

Nevertheless, most scholars seem to believe that human capital is an important ingredient underlying economic growth, most likely also through interacting with technological change (Nelson and Phelps 1966; Kremer 1993*a*; Lucas 1988; Nelson 2005). The factors that increase human capital are among others schooling, improved health care and learning-by-doing processes (e.g. Klenow and Rodriguez-Clare 1997; Lake and Baum 2001; Barro and Sala-i Martin 2004; Arrow 1962).

Measuring the skills and abilities of workers directly is difficult, and most empirical studies have focused on factors such as school enrollment ratios, average years at school, work experience and different health measures (see e.g. Mankiw, Romer and Weil 1992; Barro and Lee 1993; Klenow and Rodriguez-Clare 1997; Barro and Sala-i Martin 2004; Lake and Baum 2001; Baier, Dwyer and Tamura 2006). Some have proposed that more direct tests of skills, such as student tests in different subjects like mathematics and language, are more valid (OECD 2006, 11), but there is a lack of extensive cross-national time-series data. As I will discuss further in Section 3.5.3 and in Chapter 5, several institutional and policy factors are very relevant for human capital accumulation, importantly including the allocation of public spending to education and health care.

3.2.4 Technological change

Historically, macroeconomists emphasized accumulation of inputs as determinants of income and growth (Helpman 2004, 9), probably because technology was modeled as exogenous in influential growth models such as the model in Solow (1956). However, the Solow model predicts that accumulation of capital, despite its importance for income levels, cannot increase long-term growth rates in income. The simplified reason is that there are (assumed) decreasing, marginal returns to capital; an increase in the stock of capital per worker generates a smaller and smaller effect on income per worker as the capital stock increases. When the capital stock is large enough, new investments are only sufficient to replacing old capital that is made obsolete. The factor that drives long-term economic growth rates in the Solow model is technological change, although technological change, as mentioned above, is an exogenous entity in the model.

Solow (1957) himself found that technological change contributed more than input accumulation to economic growth in the United States. This result was also established earlier by Abramowitz (1956) and was confirmed later by for example Denison (1962). Moreover, Denison (1968) found the same pattern for European countries. In later years, economists studying developing countries have argued that technological change is the key to growth also for poorer countries (e.g. Easterly 2001). Some empirical estimates indicate that differences in technological efficiency explain the main bulk (about $\frac{9}{10}$) of variation in income across countries globally (Klenow and Rodriguez-Clare 1997), whereas other estimates indicate a larger role for human capital (Mankiw, Romer and Weil 1992).

It is not straightforward to separate and identify the shares of economic growth

rates that are due to human and physical capital accumulation and technological change. For example, new technologies often come with new investments in machinery (Nelson 2005), and a high level of human capital may be conducive to the spread of more efficient technologies (Kremer 1993*a*). As will be described and discussed in Chapter 4, total factor productivity (TFP) growth, obtained from growth accounting calculations, is one proxy of technology-induced economic growth. TFP levels and growth are, as also discussed in Chapter 4, associated with a range of measurement problems. Nevertheless, "there is convincing evidence that total factor productivity plays a major role in accounting for the observed cross-country variation in income per worker and patterns of economic growth" (Helpman 2004, 33).

Schumpeter (1976) highlighted the role of "creative destruction" for economic dynamism, with new techniques, products and even industries out-competing older ones. Nelson and Winter (1982) developed models focusing on the roles of the variety of ideas and the selection of more efficient ideas for economic growth. After Nelson and Winter followed several other "evolutionary economic models" of technological change and economic growth (see e.g. Fagerberg 2003; Nelson 2005; Verspagen 2005). Also, Lucas (1988), Romer (1990), Aghion and Howitt (1992) and Grossman and Helpman (1991) modeled economic growth processes driven by knowledge and technological change. The models endogenized technological change, to show how technological change was determined by self-interested actors interacting within specific market structures and institutional environments. In Romer's model, profit-maximizing firms competing under imperfect competition put resources into research and development, thus contributing to technological change by providing a wider variety of new products. In the models developed by Grossman and Helpman (1991) and Aghion and Howitt (1992), technological change is generated by firms investing in R&D to make improved products, thus outcompeting older products of inferior quality. The above models generate economic policy implications that differ from those generated by traditional neo-classical growth models. For example, Romer's (1990) model implies a role for policies not only in increasing income levels, but also long-term income growth rates, through affecting the rate of innovation. The size of the economy also matters in Romer's model, with a large economy having better prospects for growth than a small economy, implying for example that integrating economies through trade would boost economic growth rates.

Also economic historians have analyzed the determinants of technological change and such change's impact on economic growth (see e.g. Mokyr 1990; Rosenberg 1982). Mokyr (2002) stressed the importance of structured, scientific knowledge for the frequency with which new, practical applications appear in the marketplace.

Others have focused on so-called technological paradigms and "radical" innovations (see e.g. Verspagen 2005), also called general purpose technologies (Bresnahan and Trajtenberg 1995), for the development of new spin-off products and techniques. Examples are the steam engine, electricity and the computer. Especially historians studying the advent and spread of the industrial revolution have focused on the creation and diffusion of technology, and the different factors contributing to innovation and technology diffusion (see e.g. Landes 2003; Floud and McCloskey 1994; Ashton 1997).

Romer (1993) discussed the importance of open idea flows for economic growth. Much of the literature on economic convergence and development in poorer countries has focused on capital accumulation (Easterly 2001), but the impact of flows of new ideas can be immense. Ideas are non-rivalrous entities (Romer 1993); an idea can be used by several actors without its value being diminished for others. This characteristic contributes to the importance of technological change for global economic growth, as ideas in principle can be used freely to enhance efficiency in several places at the same time.[9] Technological change thus not only contributes to growth in rich countries at the "technological frontier", but also in developing countries (Klenow and Rodriguez-Clare 1997; Helpman 2004; Easterly 2001), as poorer countries can adopt technological (and organizational) improvements developed elsewhere. Understanding why some countries are better at adopting techniques, both related to production and organization, and diffusing them throughout their economies, is therefore crucial for understanding differences in income levels and growth rates.

3.2.5 Summing up

Even if technological change is important for long-term growth, countries starting out with low levels of either physical or human capital can grow their economies over a substantial amount of time by increasing their stock of machinery and infrastructure, or by improving the skills and abilities of their workforces through improving the quality and quantity of education and health services (e.g. Barro and Sala-i Martin 2004). Young's (1995) empirical analysis indicates that a very large share of the East Asian Tigers' (Hong Kong, Singapore, South Korea and Taiwan) rapid growth from 1966 to 1990 was due to physical and human capital accumu-

[9]Romer's position on the conceptual nature of ideas may be debated, and the conceptual properties of ideas are discussed several places for example in Hveem and Iapadre (2011). See for example Spinesi's chapter and my chapter on open idea flows in this volume.

lation (Young 1995; Krugman 1994).[10] However, the separation of growth due to human and physical capital accumulation and technology is, as mentioned above, not straightforward; new technologies often come with new investments in machinery (Nelson 2005), perhaps particularly foreign capital goods (Hübler 2012), and a high level of human capital might also be conducive to the spread of more efficient technologies in the economy (Kremer 1993*a*).

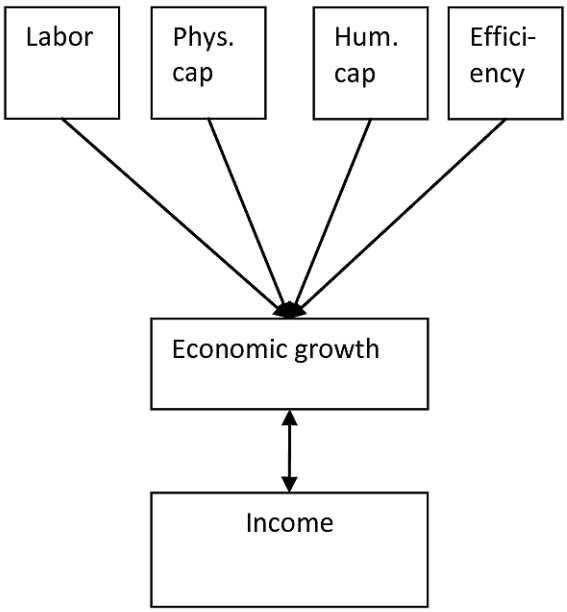

Figure 3.1: The immediate sources of economic growth

In any case, accumulation of physical and human capital, as well as the introduction of more efficient technologies and economic organizations, is expected to increase economic growth rates.[11] The somewhat simplified bottom line from economic growth theory is that economic growth comes about either when an economy experiences increases in the various inputs used in economic production, or when economic agents learn how to combine these inputs more efficiently. The latter can happen through actors adopting new production processes, either through new and more efficient economic organization forms or through the invention or adoption of more efficient production technologies. These relationships are summed up by Figure 3.1.

[10]However, these estimates may depend to some extent on the choice of estimation technique (see e.g. Hsieh 1999; Rodrik 1997*b*).

[11]But, there is disagreement about whether the different forms of capital accumulation affect only medium-term growth rates or also long-term growth rates.

The question is then which factors affect the accumulation of inputs and technological change (and other sources of efficiency-improvements)? For an answer, I turn to the literature on the "deeper determinants of economic growth", focusing particularly on the political economy literature that highlights the role of institutions for growth processes.

3.3 Institutions and other deep determinants of economic growth

After having studied the more immediate determinants (or sources) of economic growth, the natural follow-up question is: What are the deeper determinants that affect these immediate determinants? The main categories of variables suggested are demography, geography, culture, international economic factors and domestic institutions. In this section, I first review the literature on how demographic, geographic, cultural, and international economic factors affect economic development. Thereafter I review the literature on institutions and their economic effects more in depth. Finally, I focus more specifically on various relations between different institutional structures.

3.3.1 Alternative deep determinants of economic growth

Demography

Malthus (1798) famously put forth a theoretical argument predicting that subsequent population growth would outpace any temporary increase in aggregate productivity growth, thereby bringing income per capita towards it stable equilibrium at the level required for subsistence. Malthus has been proven wrong by history, as both global population and GDP per capita have soared over the last two centuries. Nevertheless, demographic factors may still systematically influence economic growth. Contributions from "New Growth Theory" have for example, in stark contrast with the direction of Malthus' argument, predicted that a high population *level* enhances GDP per capita and even economic growth rates, as a larger population likely generates more ideas, which in turn spurs technological change (see particularly Romer 1990, 1993).[12] Indeed, this hypothesis has found indirect support in a study of pop-

[12]The observant reader may note that also the *growth rate of the population*, which affects the *growth rate of the workforce*, were considered among the immediate sources of growth, following the economic growth literature. Hence, I will not discuss these two demographic variables here.

ulation level and population growth patterns from one million B.C. to 1990 A.D. (Kremer 1993*b*). Kremer (1993*b*) uses variation both over time and across regions and shows that population growth, which may be considered a decent proxy for economic growth at least before the last few centuries, is higher when population level is already high.

The size of the population also affects population density, which has been argued to affect not only economic growth but also inequality, property rights systems and political institutions (for analyses of Africa, Europe and the Americas, see respectively Herbst 1989; North 1981; Engerman and Sokoloff 1994). However, also the ethnic or linguistic composition of the population in a polity may affect various political and economic factors, including economic growth. As I will discuss further in Chapter 4, fractionalized societies may, among others because of fractionalization's effects on institutional structures and economic policies, experience slower economic growth (for reviews of different mechanisms, see e.g. Easterly and Levine 1997; Alesina, Baquir and Easterly 1999; Miquel 2007). However, ethnic and linguistic factors may be endogenous to economic and political processes, at least in the long run (e.g. Acemoglu 2005), and it may be argued plausibly that ethnicity is more a cultural than a demographic concept (see e.g. the conceptual discussion in Betancourt and Lòpez 1993). In any case, ethnic and linguistic factors are considered among the deep determinants of economic growth in some important contributions to the literature (see particularly Easterly and Levine 1997).

Geography

Jeffrey Sachs (e.g. Gallup, Mellinger and Sachs 1998; Sachs 2005) has been among the strongest proponents for the hypothesis that geographical variables, for example related to climate and disease environment, are crucial for economic development. Although Sachs' work has been much discussed and criticized by fellow academics (see e.g. Acemoglu, Johnson and Robinson 2001*b*), it has played a very important role in public debates on global poverty and for informing policy makers on poverty reduction strategies. However, climatic and disease environment factors are not the only proposed geographic determinants of economic development. Other geographical factors relevant for development relate to whether a country has access to transport-friendly waterways or not (e.g. Tvedt 2010), and whether a country has access to the coast or is landlocked. Other specific geographic variables that may impact on growth, either directly or indirectly, are type and quality of a country's soil (e.g. Engerman and Sokoloff 1994), precipitation patterns (e.g. Miguel, Satyanath and Serengeti 2004) and even the number of and variation in plant and

animal species (Diamond 1999*a*). Yet another type of variable relate to the existence (and volume) of specific natural resources (see e.g. Pomeranz 2000).

When it comes to natural resources, several analysts have explored the potential negative effect of an abundance of natural resources, like oil and diamonds, on economic development (e.g. Ross 2003; Sachs and Warner 2001; Mehlum, Moene and Torvik 2006*b*; Humphreys, Sachs and Stiglitz 2007). "The resource curse thesis" argues that abundance of natural resources, paradoxically, often has negative implications for economic development, through inducing specific types of economic and political behavior. An abundance of natural resources may for example lead actors to invest time, effort and money in taking control of the country's natural resources, rather than investing in productive ventures. Such behavior is often termed 'rent-seeking behavior' (Krueger 1974), which may be individually profitable, but is a waste for society. An empirical example of a society plagued by rent seeking, at the cost of production, is the Spanish economy and society after the discovery of the silver mines in South America, Potosí in particular, in the 16th century (see e.g. Kennedy 1988; Landes 1998). A special case of rent-seeking behavior is related to actors engaging in violence to gain control over resources. Such violence may even lead to civil war, which is generally bad (also) for the economy. The linkages between the existence of various types of natural resources and either risk of civil war initiation or the longevity of civil wars are strongly documented (see e.g. the review and discussion in Ross 2004)

Culture

When it comes to cultural factors and economic development, Weber (2002) famously invoked the hypothesis that Protestant (and Reformed-Calvinist) culture was conducive to capitalism. Landes (1998) presents the perhaps most eloquent defence of the thesis that cultural aspects were vital for initiating the historically unprecedented economic development that took place in Northwestern Europe from about the middle of the eighteenth century, or even earlier according to some indicators. Landes (1998) argues that cultural aspects, such as Western values related to "work, thrift, honesty, patience, tenacity" (Landes 1998, 523) contributed strongly to Northwestern Europe achieving rapid economic development, whereas for example China and the Middle East did not.

Cultural arguments have also been put forward to explain the more recent rapid development of East Asian countries after the 1960s, with scholars discussing the positive economic effects of so-called "Asian values" (Lee 2003; Sen 1999; Kim

1994).[13] Cultural factors have also been put forth to explain economic development, or lack of such, on the African continent (see e.g. Chabal and Daloz 1999; Lumumba-Kasongo 2005), and also for explaining political institutional structures, for example related to the predominance of presidential systems, and lack of economic dynamism in Latin America (see e.g. Lipset and Lakin 2004).

International economic factors

International economic factors may also strongly impact on the economic growth rates of specific countries. Dependency theory, for example, invoked structural international economic and political factors as the main explanatory variables for national growth rates (see e.g. the review in Hveem 2005). The explanatory schemes of dependency theory, for example related to various center-periphery relations, have lost their popularity in later decades, but international economic factors are still considered to affect national economic growth rates through multiple channels.[14]

As standard macroeconomic theory predicts (e.g. Blanchard 2000), global business cycles, or even business cycles in major trading partner countries, may have a substantial impact on short-term growth rates. Over the longer run, as is specified in the theoretical model in Section 5.4.1, the growth of the global technology frontier generates an upper limit for the economic growth rates of already rich countries (see also e.g. Romer 1990).

Moreover, the international regulatory system related to international financial transactions, and relevant technology for across-distance financial transactions, may impact strongly on economic growth rates, at least in the short term. However, as Gilpin indicates, the sign of the impact is not always clear and may be context dependent:

> Removal of capital controls of leading economies and the consequent freedom of capital movement resulted in increased integration of national capital markets and creation of a global financial system. Emergence of an international financial market has greatly facilitated efficient use of the world's scare capital resources ... on the other hand, international capital flows have increased the instability of the international economy (Gilpin 2001, 261).

Thus, several international economic factors may impact on prospects for do-

[13] For my own skeptical evaluation of this argument, see Knutsen (2010*b*).

[14] In Knutsen (2011*a*), I discuss various international economic factors that may not only impact on economic growth rates, but also on the relationship between democracy and economic growth.

mestic economic development. Trade and economic openness, in particular, have been highlighted by different scholars as crucial for economic development, although scholars have disagreed on the nature of the relationship. The most common position among economists today is that, generally, more openness to trade increases opportunities for economic development. But, there are some who question the strength of this effect, and who argue that the benefits of trade at least depend on a host of other factors, not the least institutional factors (e.g. Rodrik 1999*b*; Rodrik and Subramanian 2004). One of the hottest academic policy-debates over several decades has been whether free trade policies are conducive to economic development for poor countries. Few contemporary analysts seem to believe in the benefits of complete autarchy, but there is still intense debate between those who argue that free trade policies are better for development (e.g. Sachs and Warner 1995; Bhagwati 2003) and those that argue for selective protectionism, especially for manufacturing industries (e.g. Chang 2002; Reinert 2007).

Below, I will discuss domestic institutions as a potential deep determinant of economic growth. When this relationship is added, the discussion above may very simplistically be represented by Figure 3.2, which includes the main categories of deep determinants of economic growth discussed in this section.

3.3.2 Institutions as deep determinants of economic growth

Although there is no consensus among academics on what the most important deeper determinants of economic growth are, the prevailing (general) answer in the social sciences today is neither related to geography, culture nor trade, but to *institutions*. There is disagreement on how to conceptualize "institutions" (Greif 1993, 2006), but one of the most used definitions is that of Douglass North. According to North, "[i]nstitutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" (North 1990, 3). As North further suggests, institutions can be both formal and informal, meaning that they encompass written rules and regulations as well as prevalent social norms.

Selected contributions from the literature on institutions

There is an enormous political science (and institutional economics) literature on how institutions work, and on the political, cultural, social and economic causes and consequences of particular institutional structures (see for example the collection of essays in Rhodes, Binder and Rockman 2006). I will not survey this vast literature here, but only mention a couple of important contributions. For example, North

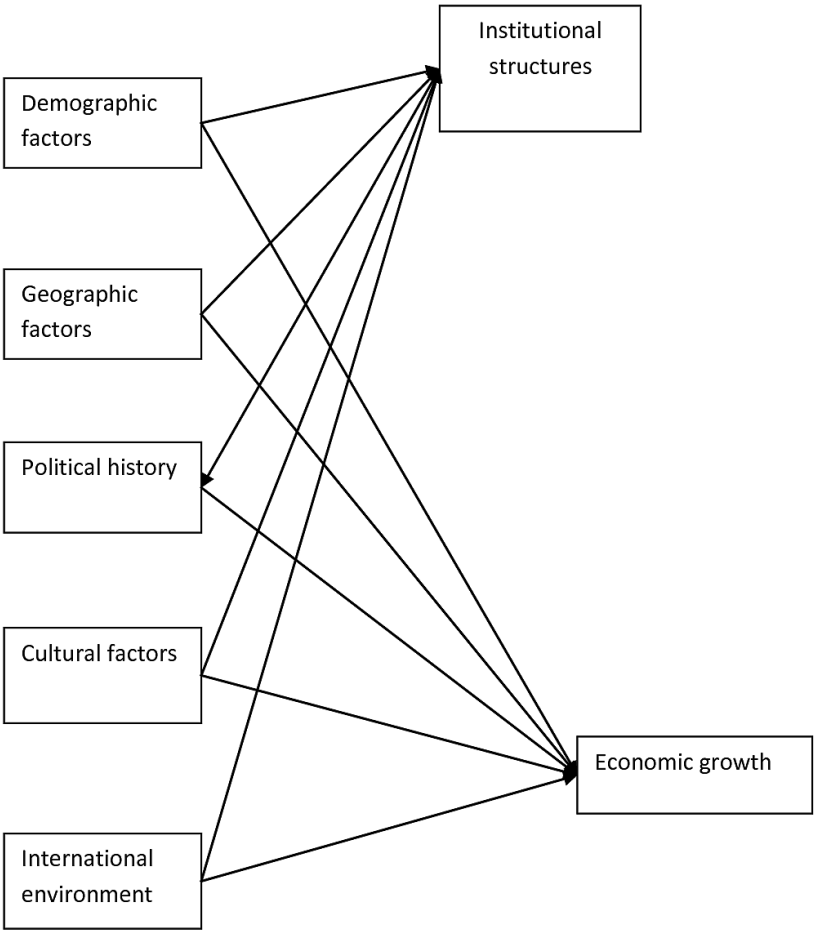

Figure 3.2: Selected categories of deep determinants of economic growth

(1990) presents an abstract, but excellent, discussion on the general functions of institutions. Institutions, following the definition above, structure the political, social and economic costs of various forms of interaction or exchange. Somewhat more concretely, institutions define and limit the set of choices for actors, and thereby reduce uncertainty and transaction costs related to the different types of interactions. Importantly, institutions alleviate both coordination and free-rider problems among others because other actors' actions become more predictable, and because institutions are often associated with various monitoring and enforcement characteristics. North (1990) describes and highlights the importance of such monitoring and enforcement characteristics, both of which may be more or less centralized, for making institutions work, in the sense of making various actors comply with "the rules of the

game". North (1990) also analyzes how the complexity of modern economies, with high degrees of specialization, impersonal exchange and weak communities, generates an impetus for formalizing various institutions, including their enforcement and monitoring characteristics.

Pierson (2000) discusses another very important aspect of institutions, namely their persistence. As North (1990) argues, particularly informal institutions have a high degree of persistence, but also formal institutions are often associated with a high degree of inertia. Drawing on concepts and theoretical insights from economics, Pierson specifies and discusses the concept of "path dependence", much used in the "historical institutionalist approach" (see e.g. different chapters in Mahoney and Dietrich 2003). Pierson ties path dependence, a concept that is often only vaguely defined in the literature, to the existence of "increasing returns of scale" that stem from various self-reinforcing or feedback processes (see also Pierson 2004; North 1990). Pierson lists three aspects related to political institutions, and indeed political life more generally, that should make them even more susceptible to increasing returns of scale mechanisms than economic processes are. These are the weakness of competition and learning enhancing mechanisms in politics because of the opacity of political processes and lack of equivalents to market prices for distributing information; the short time horizons of political actors; and, status quo biases that are (often explicitly) built into political institutions, with constitutions being the prime example.

Another important, but somewhat vague, concept is that of "institutional capacity". There is a large literature on the capacity of state institutions in particular (see e.g. Skocpol 1985; Migdal 1988; Caporaso and Levine 1992; Fukuyama 2005). This literature has focused on the historical, social and economic determinants of "state capacity", but also on the various effects of state capacity.[15] In Knutsen (2009), I discuss the concept of state capacity, and tie it more particularly to the independence and quality of the bureaucracy (on this issue, see also e.g. Evans 1995; Evans and Rauch 1999; Chabal and Daloz 1999). In that paper, I also discuss the economic effects of state capacity. Although there is large theoretical literature and a large empirical case study literature arguing for a strong effect of state capacity on economic growth (e.g. Evans 1995; Leftwich 2000; Fukuyama 2005), I find no

[15] Various definitions of state capacity have been proposed in the literature. For example, Skocpol (1985, 9) relates state capacity to a state's "ability to implement official goals, especially over the actual or potential opposition of powerful social groups". State capacity thus defined is closely related to, and perhaps preconditioned on, "state autonomy", which relates to the state's (as an organization) ability to formulate and implement policies "that are not simply reflective of powerful social groups" (Skocpol 1985, 9)

positive and significant direct effect on economic growth when using various econometric models on a large global panel data set. However, as will be discussed further below, I find a very robust interaction effect between state capacity and regime type on growth; state capacity seems to mitigate the negative effect of dictatorship on growth.

When it comes to the determinants of institutional capacity more generally, Fukuyama (2005) lists up some general factors that likely affect the supply of institutional capacity, and these include organizational design factors, political systems design factors, the basis of legitimization for institutions and cultural and structural factors.

"Institutions rule!"

For the purpose of this study, the literature on the economic effects of institutions is particularly interesting. One general underlying idea in the literature on the economic effects of institutions is that institutions affect the behavior of economic actors because they generate incentive structures that affect the costs and benefits of different economic activities like accumulation of physical capital, production of goods and services, market exchange, education and innovation. Institutions also, as indicated above, affect information flows and uncertainty related to economic activities. Some of the most clear-cut examples are related to property rights institutions. If property is duly protected, citizens can be certain to reap the benefits from investments in productive capacity or education, and will thus invest accordingly. However, if property is not protected the expected benefits from investment are far lower, and several projects will not be undertaken. It may under such circumstances be wiser for citizens, and also foreign actors involved in these economies, to invest time and effort in becoming good thieves, as this is more profitable for the actor in isolation. However, the latter investments would have severe negative effects for the overall economy (North 1990).

What is particularly interesting when it comes to the deeper determinants of economic growth, is that there seems to be good empirical evidence backing up the notion that "institutions rule" as a determinant of long-term growth (Rodrik and Subramanian 2004). Rodrik and Subramanian (2004) estimated the indirect and direct effects of institutions, trade and geographical factors on economic development, and found that institutional factors were very influential in shaping economic development. Trade was not found to have a strong, independent effect, and geography was found to matter for development only because it has affected the types

of institutions adopted in different countries.

Also Acemoglu, Johnson and Robinson (2005) make a very strong case for the proposition that institutional structures are the main fundamental determinant of long-run economic performance. Similarly, Acemoglu, Johnson and Robinson (2001*b*) show that geographic factors, also those related to disease environment, have no robust and *direct* effect on economic growth when controlling for institutional structures, especially related to protection of property rights, in different countries. Disease environment has, however, been important for the types of institutions adopted in former colonies, which in turn affect the type of institutions that exist today in these countries (Acemoglu, Johnson and Robinson 2001*b*). Hall and Jones' study (1999) indicates that factors related to cultural influence from Europe are important for economic growth, mainly because of the related tendency to adopt specific institutions that are beneficial for growth. Hall and Jones (1999) find that institutional structures affect both the accumulation of physical and human capital, as well as technological change.

Important interaction effects

There are, however, important interaction effects between the proposed deeper determinants of growth. For example, the resource curse literature has indicated that institutional factors affect the relationship between resource abundance and economic development (e.g. Mehlum, Moene and Torvik 2006*b*,*a*; Karl 1997). More specifically, a democratic regime is important in order for countries to avoid conflict over resources, and to ensure that resources are used for productive public investment rather than as a basis for keeping dictators in power (e.g. Robinson 2001). When it comes to trade, Rodrik (1999*b*) has convincingly argued that democracies, particularly because of these countries' institutional apparatuses for easing or solving social and political conflicts, and countries with well-developed social policies are those that are able to reap the largest economic development benefits from opening up their economies. Thus, according to for example Rodrik (1999*b*) and Rodrik, Subramanian and Trebbi (2004) trade policies may matter for economic development, but their effect is most likely strongly contingent on institutional factors.

3.3.3 Relations between institutional structures

So far, I have not been very specific on which institutional structures matter for growth. A particular empirical problem in this regard is to unbundle the effects of institutions that tend to appear together in clusters. The fact that institutional

structures are systematically correlated may be due to one particular institution tending to produce another, but there are also likely more complex processes that tend to drive such correlations (see e.g. North, Wallis and Weingast 2009; Acemoglu 2005; Hall and Soskice 2001; Pierson 2000).[16] However, Acemoglu and Robinson (2006*c*) make a first crude distinction when separating between political and economic institutions. They further argue that political institutions are likely to affect the nature of economic institutions. Several authors also argue for the opposite effect, namely that economic institutional factors related to market structures and property rights systems affect political institutions. I discuss this issue extensively in Knutsen (2011*b*). In the article, I analyze the relationship between political institutional structures related to regime type on the one hand and economic institutional structures related to property rights systems on the other hand. The empirical analysis in Knutsen (2011*b*) indicates that the effect of democracy on property rights systems is more important than the effect in the opposite direction (see also Feng 2005).

Political institutions determine who are represented in decision-making processes, and which constraints are placed on the decision makers. Economic institutions, for example related to the structuring of markets, the economic bureaucracy and institutions related to property and contract rights, are not exogenously given. These economic institutions are rather affected by *who* are in power, and under *what constraints* these actors are operating. The political structure of a society affects the optimal strategies of political rulers, and determines whether single actors can alter economic institutions to their own advantage. For example, Engerman and Sokoloff (1994) shows how the the political elites in several Latin American countries during previous centuries were able to affect education systems, access to the financial system, various market structures and distribution of property to their own interest.

As I will discuss further below, for example in Section 3.5.2 and in Chapters 5 and 7, economic and political institutional structures systematically affect also the selection of economic policies. The discussions below will naturally focus on how various democratic and dictatorial institutional structures impact on policy selection, often through affecting the relative political and economic costs and benefits of decisions makers. Thus, Figure 3.3 sums up the proposed relationship between political institutional structures, economic institutional structures and economic policies.

After having reviewed some of the general literature on institutions and their

[16]See Acemoglu and Johnson (2005) for an interesting empirical study that seeks to unbundle the effects of property rights institutions from those of contract rights institutions. These authors find that only the former seem to affect economic growth.

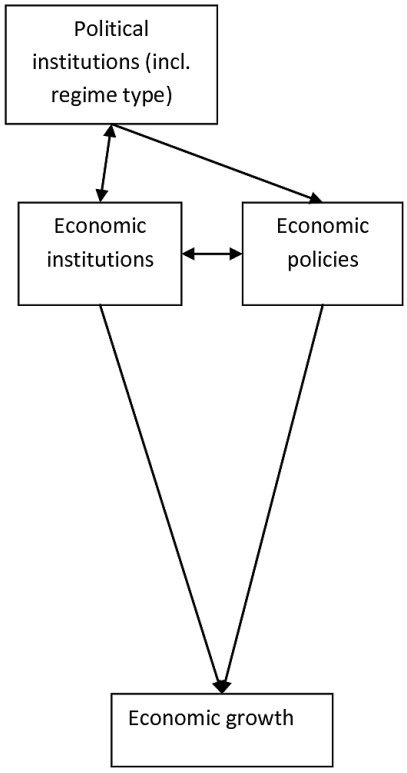

Figure 3.3: Relations between political institutions, economic institutions and economic policies

economic effects, I turn more specifically to the relations between democracy and economic factors. First, I briefly go through some of the literature on how economic factors affect the probability of democratization and democratic stability. Thereafter, I consider studies on how democracy and dictatorship affect different economic outcomes.

3.4 The economic prerequisites for democracy

Most studies on how economic factors affect the probability of democratization or democratic stability recognize their debts to Lipset's (1959) seminal contribution. But, also Moore (1966) has been an important inspiration for later work on how socioeconomic structures affect regime type (see e.g. Acemoglu and Robinson 2006*b*). However, the literature on economic conditions and the propensity for different regime changes to happen and for regime stability is even older. Aristotle (2000), for example, noticed the link between "class" structure and the likelihood of city states having democratic, oligarchic or monarchic regime forms. Marx wrote exten-

sively on the economic preconditions for different political organizational forms, and considered economic development as the prime mover of regime change, at least in the longer run (see e.g. Marx 1994).

3.4.1 Economic crises and short-term growth

Tocqueville (1955) argued that regime change was often a result of economic crisis. Davies (1962) integrated the Marxian and Tocquevillian arguments in his J-curve theory of revolutions. Davies argued that the probability of revolution was at its highest when a period of crisis followed a longer period of growth in prosperity. This was due to the fact that expectations of continued growing prosperity, generated by growing prosperity in the past, were not met in times of crisis; this gap between expectations and materialized income gave birth to strong dissatisfaction with the government or even with the existing political system.[17] This is an interesting argument, and although there has not been much empirical research along these lines, for example Saunders (2009) argues that J-curve mechanisms were important for the fall of the Soviet Union.

Przeworski and Limongi (1997) corroborate the (less complex) hypothesis that economic *crises* increase the probability of regime breakdown. Regimes that experience a decreasing GDP per capita in the previous year are according to the results in Przeworski and Limongi (1997) much more likely to fall than those experiencing positive economic growth, particularly if the growth is above 5%. This is true for both democracies and dictatorships. However, especially poor democracies are, according to these results, vulnerable to economic crises. The annual probability of a democracy with GDP per capita below 2000 (1985 PPP) dollars being terminated after negative GDP growth was estimated to be around 0.11 (Przeworski and Limongi 1997, 167–169). Richer democracies, however, are extremely resistant to crises. When it comes to poor and rich dictatorships, there were smaller differences in the regimes' life expectancy; both rich and poor dictatorships are threatened by economic crises. There have also been conducted studies addressing more specific issues, like the negative effect of food price hikes on regime stability (Hendrix, Haggard and Magaloni 2009).

[17] When it comes to revolutions, several case studies and small-n comparative studies have focused on the importance of different structural economic factors, also other than those treated in this literature review (economic growth, income level, income inequality). Most well-known, perhaps, is Skocpol's study, which argues that a set of variables tied to state structures, domestic social structures and class relations, as well as international events like wars and revolutions in other countries, affect the likelihood of a revolution (Skocpol 1979).

3.4.2 Income inequality

Before I turn to how income *level* affects regime type, let me look into how income *inequality* affects regime change and stability. One of the most active areas of political economic research in the last decade has dealt with the question: "Is a high degree of economic inequality a barrier to democracy?" Many researchers believe so. Already Lipset (1959), for example, argued that democracy was less tenable in societies with high levels of social conflict, and economic inequality is widely assumed to increase social conflict. Even experimental studies have shown that people with different social backgrounds are less likely to achieve cooperation (see e.g. Bowles 2004).

As economic psychology indicates, people tend to score their subjective well being on the basis of relative wealth; indeed, relative wealth *may* be more important than absolute wealth for subjective well being (Layard 2005). Inequality thus matters for people, and inequality-related social grievances may lead to demands for revolution and left-wing dictatorship (Boix 2003; Acemoglu and Robinson 2006*b*). Moreover, the well-off in unequal societies may show disdain for the poor and fear democracy where the (poor) majority might overrun their interests (Boix 2003; Acemoglu and Robinson 2006*b*). Therefore, it may be that the relatively rich in unequal societies favor a right-wing dictatorship or a military dictatorship over democracy. This has been the case in many Latin American countries (e.g. Smith 2005; Wiarda and Kline 2007), but also in for example Thailand.

These issues have been thoroughly investigated in some recent influential political economic models, such as those in Boix (2003), Acemoglu and Robinson (2000) and Acemoglu and Robinson (2006*b*). The baseline versions of these models divide the citizenry into two groups, the rich and the poor. The models focus on the role of regime types when it comes to taxation and redistributive policies. Democracy is the regime type where the poor median voter sets economic policy, and this voter prefers higher tax rates and more redistribution than rich voters. In right-wing dictatorships, the rich control government, and such governments tax and redistribute less than democratic governments. The question is then, how does economic inequality affect the probability of democratization from a right-wing dictatorship?

Boix (2003) finds a complex and non-linear relationship, based on a model with asymmetric information related to whether the rich elite has the ability to suppress the poor. The rich can either acquiesce to the poor's demand for democracy or fight. If they lose, there will be a Marxist dictatorship with full expropriation of the rich's assets. Crudely summed up, however, this model generally finds that a decrease in

economic inequality leads to a higher probability of democratization, since the rich will have less to lose from high rates of taxation in relatively equal societies. They will thus more easily agree to the poor's demands without risking a fight.

This is the opposite prediction from the one stemming from Acemoglu and Robinson's (2000) dynamic model. Here, a low degree of inequality reduces the likelihood of democratization, as the poor are less eager to fight for democracy if they are already relatively well-off, and therefore have little to gain economically from democratization. Moreover, in times of discontent, the rich can relatively cheaply buy off the poor with "bread and circus". In unequal societies, on the other hand, the poor have much to gain from democratization, and the rich are not able to credibly commit to redistribution in the future under dictatorship. Large inequality therefore goes together with democratization, whereafter there is increased redistribution.

As discussions in Acemoglu and Robinson (2000) and Acemoglu and Robinson (2006*b*) indicate, redistribution does not have to take the form of lump sum handovers from rich to poor. Historically in Western societies, redistribution has often taken the form of taxation and spending through investment in public goods, universal education and more or less universal social welfare arrangements (see also Lindert 2005). Also North, Wallis and Weingast (2009) describe how these rich societies have mainly redistributed through such "broad" policies, rather than pursuing targeted transfers from rich to poor.[18] North, Wallis and Weingast (2009) also discuss these policies' effect on the legitimacy of redistribution (positive) and their effect on economic development (positive).

Acemoglu and Robinson (2000) link their model's implications to the Kuznets curve (Kusnetz 1959), where inequality is first rising and then decreasing with the level of development. Their story is that inequality increases with industrialization and early modernization, up until a point where the franchise is expanded because the rich fear a revolution. Thereafter, democratic politics generates redistribution of wealth, and thus decreasing inequality.

Acemoglu and Robinson (2006*b*) arrive at a kind of synthesis of the two arguments from Boix (2003) and Acemoglu and Robinson (2000) on inequality and probability of democratization. The combination of lower demand for and higher supply of democracy in egalitarian societies, and the opposite in unequal societies, generate a hump-shaped relationship between inequality and democratization probability.

[18] When it comes to the targeting of public spending and redistribution, there are, however, systematic differences between different democratic regimes. For example, regimes with proportional representation electoral rules and parliamentary regimes tend to allocate a larger share of their public spending to 'universal' programs than plural-majoritarian and presidential systems do (see e.g. Persson and Tabellini 2004).

The probability of democratization is thus presumably the highest for modestly unequal countries. Notice that these models mainly look at the participation dimension of democracy, with democratization being equivalent to franchise expansion.

There have been few large-n empirical studies on how inequality affects democratization and democratic stability, which is probably due to the lack of extensive cross section – time series data on inequality.[19] One exception is Houle (2009), who uses labor's and capital's share of income (from Rodrik (1999*a*)) as a proxy for inequality. This thorough study finds that income inequality does not significantly affect the probability of democratization, but that high income inequality destabilizes democracy. Regarding the finding on democratization probability, one interpretation is that the effects highlighted in Boix (2003) and Acemoglu and Robinson (2000) cancel each other out, but this proposition has not been strictly tested. Nevertheless, the data suggest that democracies *survive* longer in egalitarian settings.

3.4.3 Level of income and economic development

Let me now consider the effect of level of economic development on democracy. 'Economic development' is a problematic concept, and I have yet to encounter a satisfactory definition of it. Even the better suggestions (see Sen 1999; UNDP 1990) are fraught with problems, and economic development does not seem to be a coherent (at least coherent, one-dimensional) concept (see e.g. Høyland, Moene and Willumsen 2009). However, when discussing economic development, most scholars seem to agree that average level of income and production, most often measured by GDP per capita, are key ingredients.

Lipset (1959) noted that countries with higher GDP per capita were more likely to be democratic, both among European and Latin American countries. Several later studies corroborated this finding (e.g. Diamond 1992; Arat 1991; Hadenius 1992), and the hypothesis that the richer a country is, the more likely it is to be democratic has been considered relatively well established. Also later, and often more advanced, statistical studies reproduced this relationship (e.g. Przeworski and Limongi 1997; Przeworski et al. 2000; Boix and Stokes 2003; Hadenius and Teorell 2005; Inglehart and Welzel 2006). However, this result may very well be a consequence of omitted variable bias (Acemoglu et al. 2008). Nevertheless, *if* there is a positive relation between income and democracy, this relationship can be elaborated on along two lines: *First*, which causal effect(-s) generates this relationship? *Second*, what are the more specific mechanisms underlying the effect(-s)?

[19] See Lambert (2001) for an excellent introduction to different measures of inequality.

Regarding the first question, the relationship between democracy and income level can be due to richer countries having a higher probability of democratizing. However, it can also be due to democracies becoming increasingly more stable than dictatorships as countries get richer. If only the latter effect is present, the relationship between income and probability of being a democracy is only due to the fact that rich democracies survive longer than rich dictatorships. This is exactly what Przeworski and Limongi (1997) find. Up until 1990, no democracy with a GDP per capita level above 6055 dollars (1985 PPP dollars) had terminated (Przeworski and Limongi 1997, 165), whereas poorer democracies terminated with a relatively high probability. Among dictatorships, there were smaller discrepancies between rich and poor countries regarding termination rate, but richer dictatorships did not die more frequently than poor, with dictatorships having an income level between 4000 and 6000 dollars being the most unstable (Przeworski and Limongi 1997, 159–160). The bottom-line from this study was that democracy is not related with income because of rich countries being more prone to democratization, but rather because rich democracies are exceptionally stable.

Thus, according to Przeworski and Limongi (1997), democracies may emerge because of a wide variety of reasons, but they stabilize because of economic development (see also Przeworski et al. 2000). This result has been contested by later studies. Boix and Stokes (2003), for example, find that the probability of democratization significantly increases with income, when the sample is extended back into the 19th century, when one controls for oil-rich countries, and when one accounts for Soviet Union's role in keeping the relatively rich and industrialized Warsaw Pact countries authoritarian.[20] Hadenius and Teorell (2005) show that the relationship between income and democratization probability changes when one substitutes the dichotomous AREG measure from the ACLP data set (discussed in Chapter 2), which is used by Przeworski and Limongi (1997), with the FHI.

Despite the broad consensus among political scientists that income enhances the probability of a country being democratic, the issue is not completely settled. There are alternative causal structures that may generate the positive correlation between income and democracy. The first of these is, as noted above, put forth by Acemoglu et al. (2008), who find no effect of income on democracy when using fixed effects models (see also Robinson 2006). The correlation is according to this analysis most likely due to prior variables that are country or history specific; there are factors that enhance both income and the probability of a country being democratic. North,

[20] When it comes to countries with large oil resources, these are often rich, but score low on other aspects of development identified by for example Lipset (1959) and Inglehart and Welzel (2006).

Wallis and Weingast (2009) put some more historical and theoretical meat to this bone when describing the broad historical processes that enhance so-called open access societies with a democratic political regime and a rich capitalist, market-based economy. However, North, Wallis and Weingast (2009) do not exclude effects between income and political regime type.

The last type of causal effect that may generate the correlation between democracy and income, is the one focused on in this study, namely the effect *of democracy on economic growth*. This effect is, I think, surprisingly underestimated in the literature as a plausible explanation of the democracy–income correlation (for illustrations taken from prominent political science contributions, see e.g. Inglehart 1997; Leftwich 2000; Tsebelis 2002; Diamond 2008). Although dictatorships vary a lot more in growth performance than democracies, democracies grow much more on average even when controlling for a multitude of other factors, including country and time-fixed effects. The estimates reported in chapter 6 indicate that very democratic countries have about 1% extra annual growth in GDP per capita when compared to very dictatorial countries. As noted in Chapter 1, such a difference in growth rates lead to large differences in income level over time, and may therefore generate a high correlation between democracy and income.

The second question posed above was related to *why* growing income generates either a higher probability of democratization or increased democratic stability (what are the mechanisms?). I will focus on democratization probability. However, as Boix and Stokes (2003) note, some arguments are relevant for democratic stability if they are relevant for democratization probability, because of symmetry. This goes for example for the argument that decreasing marginal utility of income would make actual, or possible future, dictators less eager to fight for dictatorship, if they are already relatively rich (see Przeworski and Limongi 1997; Boix and Stokes 2003). [21]

Lipset (1959) focused on at least three crucial variables that tie democracy to wealth. The first was the propensity of rich countries to have better educated citizens, which is argued to increase both their desire and capacity to establish a democracy and participate in democratic processes (see also Almond and Verba 1963; Diamond 1992). Second, industrialization, with the complementary transformation of a society from an agrarian one to a manufacturing and trading one, generates social

[21] The problem with this argument is that there seems to be no clear correlation between a country's GDP and the dictatorial elite's income (see also Bueno de Mesquita et al. 2003). An extreme example is Mobutu Sese Seko, who was the third richest man in the world, coming from one of the world's poorest countries (Sørensen 1998, 80). Examples of wealthy Big Men or Monarchs from poor countries are inexhaustible. I am, however, not aware of any *systematic* evidence on the relationship between a country's wealth and a dictator's personal wealth.

differentiation. Lipset (1959) highlighted the important role of the middle class for establishing and stabilizing a democracy. Moore (1966), with a somewhat different argument, also points to the importance of the bourgeoisie dominating society, economy and politics for the probability of democratization. Rueschemeyer, Stephens and Stephens (1992) also argue that industrialization is conducive to democratization, but claim that this is rather due to the emergence of an organized industrial working class. O'Donnell (1973) even argues that the middle class can be detrimental to democratization, drawing on evidence from Latin America. Nevertheless, there seems to be an agreement in the literature that poor, agrarian societies are not as conducive to democracy as rich, industrialized societies, although there may be important qualifications to this argument (O'Donnell 1973; Moore 1966).

Lipset also mentions, partly in relation to the growth of the middle class, that particular values are conducive to democracy. However, for this to generate a link from income to democracy, democratic/civic/liberal values must be established as an effect of income. Inglehart (1997) and Inglehart and Welzel (2006) do this, relying on time series and cross sectional survey data. These data indicate that liberal, freedom-oriented values (or 'self-expression' values as Inglehart and Welzel call them) become more preponderant in richer and more developed societies. Furthermore, Inglehart and Welzel (2006, 4) argue that "[t]hese values bring increasing emphasis on the civil and political liberties that constitute democracy". Hence, according to Inglehart and Welzel, as values are transformed by economic development, citizens become more interested in and more willing to fight for obtaining and maintaining a democratic regime. Moreover, these authors argue that the political elites' values are also similarly affected by economic changes, and elites in richer countries are therefore more likely to "supply" democracy to their citizens than elites in poorer countries.

There are also other proposed mechanisms that aim at showing *how* higher income is conducive to democracy. The literature on potential mechanisms is quite large (see e.g. Lipset 1959; Arat 1988; Burkhart and Lewis-Beck 1994; Przeworski et al. 2000; Acemoglu and Robinson 2000; Boix 2003; Boix and Stokes 2003; Chan 2003), and there is widespread disagreement on the relative importance of the mechanisms through which income generates a high probability of democracy.

To sum up the above discussion, several economic variables may affect the likelihood of a country being democratic. Short-term economic growth, economic inequality and income level are all plausible candidates for factors that affect political regime type. The implication for the empirical analysis in this thesis, which investigates the economic effects of regime types, is that one should not mistake correlation

between democracy and economic performance for causation. Methodical strategies related to control variable identification, lagging of variables, and more elaborate strategies like instrumental variable regressions, are needed to obtain inferences with a high degree of validity. Figure 3.4 sums up some of the proposed causal relationships from the literature review above that are directly relevant, because of methodical concerns, for the empirical analyses in Chapters 5 and 6.

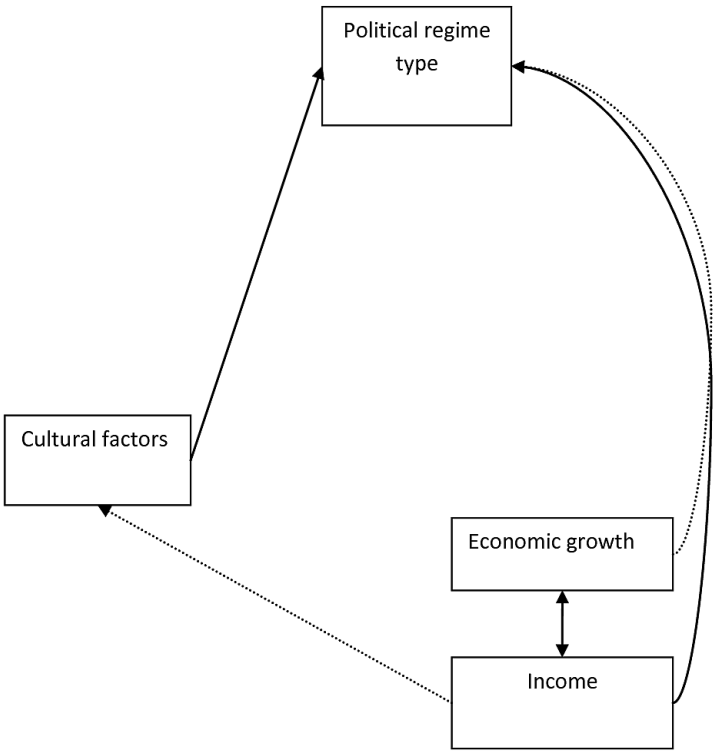

Figure 3.4: Some proposed economic determinants of regime type

3.5 Studies on regime type and economic outcomes

As seen above, economic growth theory points to labor, human capital and physical capital as the key broad input categories for productive activity. Moreover, production is determined by how efficiently these inputs are combined. This is in turn a function of static allocation efficiency, for example related to the properties of markets and other allocation mechanisms, and more importantly level of technology. Increased amounts of inputs and increased efficiency are thus the more immediate

sources of economic growth. Input accumulation, static efficiency and technological change may all be affected by policies and economic institutions, for example those related to the property rights system. Policies and economic institutions are determined partly by who runs government, the structure of the regime and political power relations (see e.g. Acemoglu and Robinson 2006*c*).

Rodrik (2008) calls democracy a 'meta-institution', as it affects different economic institutions and economic policies systematically. Therefore, several different empirical results are relevant for this study: studies that indicate how regimes affect economic policy and economic institutions, studies on how regimes affect different inputs or efficiency, or studies on the aggregate relationship between regimes and economic growth. I start with the latter, and focus predominantly on the democracy–dictatorship distinction.

3.5.1 Regime types and economic growth

Revisiting the issues of case selection and the varying economic performances of dictatorships

The relationship between democracy and economic growth has been studied quite intensively. This is true also if we restrict our attention to statistical analysis only. Of course, also several qualitative studies, both small-n comparative studies and case studies, have investigated the effect of regime type on growth. Among the better studies that at least consider regime type as one of many factors that affect growth are Huntington (1968); North (1990, 2005); North, Wallis and Weingast (2009); Haggard (1990); Evans (1995); Wade (1990); Leftwich (2000); Sørensen (1998); Chan (2003); Haber, Razo and Maurer (2003).[22] These studies reach different conclusions on the relation between democracy and growth, but many of them recognize the broad differences in performance between different types of dictatorships. In this sense, the results resemble those of statistical studies. As noted in Chapter 1, there are tremendous differences in growth performances within the regime categories, particularly for dictatorships (see e.g. Rodrik 2000; Besley and Kudamatsu 2007). This implies that one has to be very careful when selecting cases for studying the regime type–economic growth relationship. Geddes (2003*a*) actually considers the qualitative literature on labor rights, an integral part of a broad democracy concept, and economic outcomes as a prime example of how case selection influences results (on this issue, see also King, Keohane and Verba 1994).

[22] I will not review the main arguments of these studies here, but many of them are presented and discussed more in detail elsewhere in this thesis.

If there are well-performing and poorly performing dictatorships, inferences on how democracy affects growth will be strongly affected by which dictatorship is chosen as a contrasting case, and perhaps also by which time period is considered (Rodrik 1999*b*; Przeworski and Limongi 1993; Doucouliagos and Ulubasoglu 2006; Knutsen 2011*a*). Therefore, one should apply strict rules for case selection, for example adhering to the Most Similar Systems Design (see eg. Frendreis 1983). One particularly well-suited comparison is the comparison of democratic and dictatorial time periods for the same country, although global economic trends are not held constant. Nevertheless, also such comparisons yield very different results across nations (Papaioannou and Siourounis 2008; Rodrik and Wacziarg 2004; Shen 2002; Knutsen 2006).

In general, however, most democratization episodes seem to have yielded an increase in growth rates, particularly after a short period of time has passed (Papaioannou and Siourounis 2008; Rodrik and Wacziarg 2004). In other words, the economic benefits of democratization seem to come with a time lag (Papaioannou and Siourounis 2008; Rock 2009*a*; Clague et al. 2003), but they do not necessarily materialize for all countries. Some examples were mentioned in Chapter 1, and the countries with no growth-boost after democratization were mainly those with very high prior growth rates under dictatorship, such as South Korea, Greece and Spain. Therefore, even if a proper case design or a conscious comparative design can alleviate some inference problems, and can generate better insights into mechanisms and dynamics, a broad statistical study is more appropriate if one wants to *generalize* about the effect of democracy on economic growth. Nevertheless, (even) different statistical studies on democracy and growth yield very different results, at least when considering the effect of democracy on average growth rates.

As mentioned several times already and as will be further discussed in Chapter 7, it is fairly well-established that dictatorships vary a lot more in their economic growth performances (Rodrik 2000, 2008; Knutsen 2006; Besley and Kudamatsu 2007). This is not only true when considering cross-country performances, but also when it comes to the variation within countries over time. In other words, dictatorships have much more violent business cycles, with deeper economic crises (Rodrik 2000, 2008). Moreover, economic growth in democracies is distributed more equally within the population (Rodrik 2000, 2008), and wages are higher in democracies (Rodrik 1999*a*). These results lead Rodrik (2000) to conclude that democracies have growth of "higher quality" than dictatorships. Moreover, democracies seem to manage external economic shocks better (Rodrik 1999*b*), and it can thus be argued that they are better adapted to a globalized economic environment with a high level

of economic openness (see also Knutsen 2011*a*).

Early evidence and methodological criticisms

Most of the early (before ca 1995) statistical studies on the aggregate relationship between democracy and economic growth were based on cross-country ordinary least squares (OLS) regressions. These studies mostly based their inferences on the effect of democracy on growth from comparisons of countries over a twenty to thirty year time period (see Sirowy and Inkeles 1990; Przeworski and Limongi 1993). Many of these studies found a negative effect of democracy on growth, a result that has not been replicated in many studies since (see the reviews and meta analyses in Przeworski and Limongi 1993; Brunetti 1997; Doucouliagos and Ulubasoglu 2008). However, among the 18 early studies surveyed by Przeworski and Limongi (1993), there were an equal amount of studies finding a positive significant effect of democracy as there were studies finding a negative effect. Moreover, several of the surveyed studies reported no significant effect.

Przeworski and Limongi's (1993) article highlighted the many problematic aspects of using cross-country OLS regressions for investigating the relationship (see also Brunetti 1997, 164–166).[23] This contributed to raising the awareness of how important proper modeling of the relationship is. Przeworski and Limongi (1993) for example show that a significant relationship between democracy and growth could very well be due to selection effects, related to democracies and dictatorships dying more or less frequently dependent on the growth rate. These authors therefore suggest utilizing Heckman selection models (Heckman 1978), despite the sensitivity problems related to these models.

Sirowy and Inkeles (1990) also review 13 studies of the relationship, and present the different theoretical debates. On the basis of their review, Sirowy and Inkeles are skeptical of any positive effect of democracy on growth. Brunetti (1997) surveys the cross-country regression evidence for five categories of political variables (democracy, government stability, political violence, policy volatility, and subjective perception of politics), and finds that democracy is the "least successful" explanatory political variable. Brunetti surveys 17 studies and finds that the "result of these 17 studies can be summarized as follows. 9 studies report no, 1 study a positive, 1 study a negative, 3 studies a fragile negative and 3 studies a fragile positive relationship between democracy and economic growth" (Brunetti 1997, 167).

[23]Other studies have also highlighted various problems with using cross-country regressions for studying the economic effects of regime type, like for example Shen (2002).

Many researchers seemingly drew the implication from the above-mentioned influential review articles on the early diverging findings that there is no strong, or even no, relationship between political regime type and economic growth. Another related implication that was drawn by some researchers was that more research in this field is superfluous. However, these are not necessarily valid implications. Different control variables, different statistical methods, different samples of countries and different time-periods under study could contribute to the varying results. Indeed, the meta analysis in Doucouliagos and Ulubasoglu (2008) finds that differences in model specifications explain a large share of the varying results on democracy's effect on economic growth.[24]

Several of the early studies can with the benefit of hindsight be argued to have relied on inadequate statistical methods and short samples, at least by today's standard. With new computer software, more data, and a better understanding of the relationship due to a "standing on shoulders" effect, there was still much to be said about the relationship between democracy and growth after the 20th century ended, and there still is today. Sensitive results in cross-country growth regressions are not restricted to the effect of political regime type. As Sala-i Martin (1997) and Levine and Renelt (1992) argue, only a moderate set of variables are very robust determinants of economic growth in cross-country growth regressions, one being capital investment. This does not lead to the conclusion that only capital investment and a few other variables are important for growth. Indeed, the analysis in Sala-i Martin (1997) shows that political and civil rights, along with rule of law, are among the variables that *have* a quite robust, significant effect on economic growth, and these effects are positive.

Moreover, one should also ask the question of what generates physical capital investment, and also for example human capital investment, and thus investigate which factors that have *indirect* impacts on growth rates. Empirical studies on democracy and growth have to a large extent focused on the direct effects of democracy, ignoring that most sound theoretical arguments indicate that a possible effect is most likely indirect. Democracy may affect growth to a large extent through affecting physical and human capital accumulation. Indeed, studies investigating the channels through which democracy affects growth have indicated that this may be the case; for example Tavares and Wacziarg (e.g. 2001) find that the most important positive indirect effect of democracy on growth goes via human capital and the

[24] An interesting observation, when combined with the trends shown in Figure 1.4, is that most of the older studies drew heavily on data from the 1960s and early 1970s. This is one of the few time periods from after 1850 when democracies on average have not outpaced dictatorships in terms of economic growth (see also Rodrik 1999*b*; Doucouliagos and Ulubasoglu 2008; Knutsen 2011*a*).

most important negative indirect effect via physical capital. Hence, controlling for these factors in a cross-country regression will lead to the throwing away of much relevant information concerning democracy's effect on economic growth. This is a straightforward methodological point (see e.g. the discussion in Hellevik 1988), but has nevertheless been missed by many researchers studying the regime type–growth relationship.

There are several other potential methodological pit-falls for studies of democracy's effect on growth. De Haan (2007) argues that the following four problems have characterized research on democracy and economic growth: arbitrary models, sample heterogeneity, problematic measurement of democracy and improper treatment of the time dimension. I will come back to these points, for example in Chapter 4. Among the most cited cross-country regression studies, were Robert Barro's studies on the determinants of economic growth (e.g. Barro 1991, 1996, 1997). Barro's work is methodologically of high quality in many ways (but, see De Haan 2007). However, also Barro investigated only the direct effects of independent variables such as democracy, through controlling for an extensive list of variables, including variables that are more plausible as channels through which democracy affects growth. The result from Barro's studies was thus that there is no linear effect of democracy on economic growth (Barro 1996, 1997). But, Barro did find a hump-shaped relationship. According to Barro's results, semi-democratic regimes have higher economic growth than both more dictatorial and more democratic regimes. However, this result is contested in Chapter 6.

More recent evidence

From the mid-1990s and onwards, several researchers have tried out more well-suited research designs to elucidate a possible effect of democracy on growth. These studies have mainly reached two conclusions, either that there is no significant effect of democracy on growth, or that there is a significant positive effect. Leblang (1997, 463) criticizes many earlier studies for having neglected the temporal dimension when studying the effect of democracy on growth. He uses a Pooled Cross Section Time Series approach, and lags the dependent variable to reduce the possibility of reverse causation driving the results. Leblang finds a positive and significant effect of democracy on growth.

Helliwell (1994) uses an instrumental variable approach, and utilizes historical democracy values as an instrument for present values. He thereby reduces the possibility of endogeneity bias driving the results, for example because of growth

influencing regime type.[25] The study explicitly tries to deal with one of the most problematic methodical issues in this field, and was thus a very important contribution to the literature. Helliwell does not find a significant effect of democracy on economic growth.

However, there may be problems with the appropriateness of the instrument used in Helliwell (1994). To be more specific, the instrument could violate the exclusion restriction, which states that the instrument should not have an independent relation with the dependent variable (after having controlled for all other variables in the model), except through its effect on the endogenous independent variable.[26] If democracy influences growth positively, it is also likely that a history of democratic governance may impact on growth (see Gerring et al. 2005). This is perhaps particularly likely because several of the potential economic benefits of democracy come with a time lag (see e.g. Clague et al. 2003; Rock 2009*a*; Papaioannou and Siourounis 2008). Thus, according to Gerring et al. (2005, 324), "[i]f democracy matters for growth today, it is reasonable to assume that this effect stems from a countrys regime history as well as its current status. The distant past may have contemporary effects. Democracy is thus best considered as a stock, rather than level, variable". Gerring et al. (2005) find a relatively robust and positive effect of "democratic stock" on economic growth. However, the empirical tests applied in Chapter 4 are a bit mixed when it comes to the validity of a lagged democracy instrument, and I find that the instrument can be applied in some models without generating any dramatic bias in the estimates of democracy's effect on growth.

The perhaps most cited study on the relationship between democracy and economic growth is Przeworski et al. (2000). This very thorough empirical study investigated the effect of democracy on growth in a sample of more than 4000 country-years from 1950 to 1990, with the dichotomous AREG measure discussed in Chapter 2 as an operationalization of regime type. Their main conclusion is that "[i]n the end total output grows at the same rate under the two regimes" (Przeworski et al. 2000, 179), and this result is relatively consistent when using different estimation methods. Note, however, that this is total output, and not output per capita; the study does find some evidence that democracies are associated with slightly higher GDP per capita growth. The study also establishes the result that was mentioned

[25] Also other studies use instrumental variable techniques, however often without considering the contextual appropriateness of the instruments explicitly (see e.g. Tavares and Wacziarg 2001, 1351–1352). The meta study by Doucouliagos and Ulubasoglu (2008) does not find any robust effect on the relationship between democracy and economic growth from incorporating endogeneity explicitly in the analysis.

[26] For a more precise and detailed explanation of the exclusion restriction in instrumental variable models, see Chapter 4.

above and will be discussed further in Section 3.5.4, namely that there are much more dramatic variations in growth between different dictatorships than between democracies; there are both more economic miracles and more economic disasters among dictatorships. I will return to some of the more nuanced results from this study regarding democracy's effect on factor inputs and efficiency among rich and poor countries below in Section 3.5.3.

Despite the convincing evidence presented by Przeworski et al. (2000), which has been interpreted as evidence that there is no effect of democracy on growth in much of the research community (despite the fact that there was a relation between democracy and the growth measure most researchers care about, GDP per capita), there have been several subsequent analyses of the democracy-growth relationship. These analyses have been using new data as well as different measures and models from those used in Przeworski et al. (2000). For example, Halperin, Siegle and Weinstein (2005) found that "low-income democracies consistently outpace their autocratic counterparts on a wide range of development indicators" (Halperin, Siegle and Weinstein 2005, 63), including economic growth. One of their main arguments is that when excluding the four East Asian Tigers, whose inclusion in the sample "skews the overall growth rate of authoritarian countries" (Halperin, Siegle and Weinstein 2005, 32), democracies have much higher growth rates than dictatorships, especially between 1960 and 2000. However, systematically excluding countries from the sample is methodologically problematic and the study also relies on OLS cross section methods, which are problematic. More convincing methodologically are the studies by Baum and Lake (2003) and Tavares and Wacziarg (2001). These studies find no *direct* effect of democracy, but still find that democracy increases growth through specific channels. Both studies indicate that democracy increases growth mainly by enhancing human capital accumulation. Baum and Lake (2003) find a positive *net* effect of democracy on growth, whereas Tavares and Wacziarg (2001) do not.

Doucouliagos and Ulubasoglu (2008) conduct a methodologically impressive meta analysis of 483 estimates from 84 published studies (prior to December 2005) on democracy and growth, the decidedly most extensive meta study conducted. Summing up their results, the authors note that "the distribution of results that we have compiled from 483 regression estimates from 84 published democracy-growth studies shows that 15% of the estimates are negative and statistically significant, 21% of the estimates are negative and statistically insignificant, 37% of the estimates are positive and statistically insignificant, and 27% of the estimates are positive and

statistically significant" (Doucouliagos and Ulubasoglu 2008, 63).[27] Hence, there is a quite large spread in the literature when it comes to conclusions on the sign of the net effect of democracy on economic growth. However, this divergence in results does not *imply* that there is no effect of democracy on growth. As Doucouliagos and Ulubasoglu (2008, 78) point out, "most of the differences in results are due to either sampling error or differences in the research process". This should lead to the conclusion that new studies, constructing appropriate models, using extensive samples and proper estimation techniques *could* uncover an effect of democracy on growth. The results in Chapter 6, based on the most extensive sample in the literature and quite stringent econometric estimation techniques, indicate a quite substantial positive effect of democracy on economic growth.

One important point, discussed in detail below, is not to control for variables that are likely channels through which democracy affects economic growth in regression models. Much of the literature has done exactly this, and Doucouliagos and Ulubasoglu uses this fact to tease out the likely indirect effects of democracy on economic growth. To be more precise, the study investigates the effect of various regressors included in different models on the partial correlation between democracy and economic growth. Let me here briefly review the main results: Doucouliagos and Ulubasoglu (2008) find that democracy has no "direct" effect on growth, but rather affects growth positively through *increasing human capital and economic freedom, and through reducing political instability and inflation.* These results are quite robust to various specifications. Doucouliagos and Ulubasoglu also find that democracy may affect economic growth through affecting income inequality, but the sign of the effect is unclear. Moreover, there is some evidence that democracy reduces economic growth through expanding the size of the public sector and through reducing economic openness, but these results are not as robust as the positive indirect effects of democracy listed above.

Moreover, Doucouliagos and Ulubasoglu (2008) find that region-specific and time-specific effects are important for the democracy–growth relationship. Democracy increases growth less in Asia than in other regions, Latin America in particular. However, this does not mean that democracy is detrimental to growth in Asia (Rock 2009*b*; Knutsen 2010*b*). The effect of democracy also seems to be stronger in the 1990s than in previous decades (see also the empirical analysis in Knutsen 2011*a*).

Doucouliagos and Ulubasoglu's result that the effect of democracy on growth depends on the time period studied, should lead researchers to be wary of generalizing

[27] See the appendix table on page 79 of the article for a list of the studies from which estimates are included.

from short samples (see also the discussion in Doucouliagos and Ulubasoglu 2006). However, empirical research in this area, likely because of data availability issues, has very often relied on quite short samples. One exception is the study conducted by Persson and Tabellini (2006), which includes data back to 1860. These authors study the effect of regime transitions, and find that transitions into democracy increase growth, and the effect is quite substantial. This is equivalent to the result from Papaioannou and Siourounis (2008), who draw on less extensive time series.[28] However, Papaioannou and Siourounis (2008) find that the effect is first observable after a time lag, and that the effect peaks and flattens out after about three years time. Hence, there may be substantial economic benefits coming from having a democratic regime, but they likely require time to be harvested.

Evidence based on data from before 1800

Going even further back in history than Persson and Tabellini, De Long and Shleifer (1993) show that European cities in polities with more extensive political and civil liberties grew faster economically than those with less extensive liberties during the period from 1050 to 1800.[29] Although perhaps none of these cities' polities would reach a modestly high democracy threshold according to today's standards, some of them scored systematically higher than others on several of the seven dimensions of democracy described in Chapter 2, for example on civil liberties, competition for public offices, participation and horizontal accountability (see De Long and Shleifer 1993, 679–684). As De Long and Shleifer (1993) note, both Adam Smith and Montesquieu pointed out the differences in regime types as a main explanation for why Western Europe in general was economically more dynamic than "Despotic" Asia (see Smith 1999; Montesquieu 1989).

However, regime characteristics also explain the lion's share of variation in economic dynamism among Western European cities and regions. The more democratic polities also incorporated the economically most dynamic cities. The Northern Italian city-states in the Renaissance, Britain after the Glorious Revolution, the city states in the Low countries before Habsburg rule, and the Dutch cities again after having revoked the Spanish were the most dynamic economic centers in their respective time periods (see also e.g. North 1981; Maddison 2006). Spanish cities, even previously dynamic Catalan cities, slowly declined under Habsburg absolutist rule.

[28] See also Rodrik and Wacziarg (2004).

[29] Population growth is used as a proxy for economic dynamism in this study. The convincing argument that this is a proper proxy in that particular historical period and the data material are presented on pages 675 to 679.

Catalan, Belgian and Dutch cities are especially interesting to observe, as they experienced large variation in the regime variable over time, and the effect on growth followed the trajectory described above. However, several other examples also exist:

> The Norman d'Hauteville dynasty, for example, conquered Sicily and southern Italy in the eleventh century when it was the most prosperous and urbanized region in Europe. The government the D'Hautevilles founded was the most centralized and powerful in Europe. But, after its Norman conquest, southern Italy's prosperity declined, especially when measured relative to the prosperity of the city-states of norther Italy (De Long and Shleifer 1993, 672).

The various regression results in De Long and Shleifer (1993) back up the case-histories: Both when it comes to the number of large cities in regions and when it comes to the population growth in large cities, the existence or non-existence of absolutist rule explains the main share of variation. De Long and Shleifer (1993) point to the positive effect of having more liberal regimes on the security of property and contract rights as the main explanatory factor for these results (see also North and Thomas 1973; North 1981). Relatively liberal polities induced a more benevolent economic institutional environment for production, investment and trade, which again lead to economic development. As described in the next section, this explanation is corroborated by studies on modern data that find a positive effect of democracy on property rights protection in conjunction with studies that find a positive effect of property rights protection on economic growth.

3.5.2 Regime types and economic policies and institutions

Let me now present some studies that investigate how political regimes affect economic policies and economic institutional structures, which again are important for economic outcomes. As already noted, the property rights system is likely one of the most important economic institutional structures when it comes to affecting economic growth. Several empirical studies have found a robust and sizeable positive effect of strong property rights protection on economic growth (see e.g. Knack and Keefer 1995; Hall and Jones 1999; Acemoglu, Johnson and Robinson 2001*b*; Torstensson 1994). Douglass North has forcefully argued that, historically, relatively democratic regimes have protected property and contract rights far better than more dictatorial regimes (e.g. North 1981, 1990, 2000). In relatively democratic societies, this has contributed not only to security of capital investments, but also to reduced

transaction costs related to complex exchange, with increased division of labor and more differentiated market structures as a result. Economic certainty and division of labor again contribute strongly to innovation and technological dynamism.

Democracy and property rights

There are several good, in-depth qualitative empirical studies and theoretical arguments on how democracy affects institutions related to property rights protection, but also other economic institutions related to product market regulation, financial markets and contracting institutions (see e.g. North, Wallis and Weingast 2009; Haber, Razo and Maurer 2003).[30] However, let me consider more specifically empirical studies on how democracy affects property rights. The main theoretical arguments on why and how regime type may affect property rights protection were reviewed in Section 1.3, and I have treated these arguments more in depth Knutsen (2007) and Knutsen (2011*b*). Furthermore, I will return to discussions on how various types of dictatorships may affect property rights protection in Section 7.3. Hence, I will here only briefly present some important *empirical* results from the literature-

One important study of regime types effects on property and contract rights institutions is North and Weingast (1989). These authors showed that the imposed limits on the English King's powers by parliament after the Glorious Revolution helped that country's financial and further economic development, notably through England developing specific financial institutions and property and contract rights institutions. Although England at the time was no perfect democracy, larger parts of the citizenry were represented in political decision making there than in absolutist France before the revolution or in Spain during the 18th century. In these absolute monarchies, the concentration of power in the monarchs' hands resulted in thinner financial markets and slower growth of these states' economic capacities, when compared to the UK (North and Thomas 1973; North 1981; North and Weingast 1989). The reason, very simplified, was that few private actors dared loan money to the French and Spanish states, at least to reasonable interest rates, because absolute monarchs could easily (and did!) refuse to pay back the loans. It was also much easier for these monarchs than for the English to expropriate the needed resources and tax heavily. This again hurt the citizens' incentives to produce and crippled the French and, particularly, Spanish economies.

[30]It is also interesting to read economic historians' analysis of the genesis of banking and contract rights institutions in some of the politically (relatively) liberal North Italian city states: see for example Maddison (2006); North (1981, 1990).

Some statistical studies have also been conducted on the effect of democracy on property rights protection: According to Goldsmith (1995), Cheibub (1994) uses level and change in taxation as a proxy for property rights and finds no significant effect of democracy on these proxies. Leblang (1996) uses two different proxies, namely "exchange rate controls" and "credit allocated to private enterprises as percentage of GDP" for measuring property rights security. As is the case for the proxies used in Cheibub (1994), Leblang's proxies lack face validity. In any case, Leblang finds "a far from perfect relationship" between democracy and property rights, although "democratic nations tend to protect private property rights to a greater extent than non-democratic" (Leblang 1996, 6).

Later literature has used more direct measures of property rights, for example expropriation risk measures drawn from the International Country Risk Guide data set presented in Chapter 4: Boix (2003) finds that democracies, and especially democracies with high newspaper circulation, which indicates higher political accountability, on average have lower expropriation risks than dictatorships have. Adzera, Boix and Payne (2003) also find that democracy significantly reduces expropriation risk, and in contrast with Boix (2003) this study controls for other relevant variables.

Clague et al. (2003) conducted thorough analyses on the effects of regime type on the protection of property and contract rights. They find that democracy in general protect such rights better. One important nuance is that strong protection is only likely to occur in relatively consolidated democracies. Moreover, they find that dictators with long time horizons tend to protect property and contracts better. Another nuance discovered in the literature is that democracies with certain types of constitutional structures, like parliamentary forms of government and PR electoral rules, likely protect property rights better than other democracies (Persson and Tabellini 2003; Persson 2005; Gerring, Thacker and Moreno 2009).[31]

Many of the studies above thus find a positive effect of democracy on property rights protection. However, these studies do not sufficiently solve the endogeneity problem generated by the plausible effect of property rights on regime type. Moreover, few of these studies incorporate country fixed effects to control for unobservable factors affecting both regime type and property rights. In Knutsen (2011*b*), I discuss these issues in depth and try to solve the endogeneity and omitted variable problems, thereby obtaining more credible estimates of the effect of democracy on property rights. The analysis in Knutsen (2011*b*) draws on the instrument, called WAVE, de-

[31] See Knutsen (2011*b*) for a more extensive discussion of the studies on the democracy–dictatorship distinction and property rights, and see Knutsen (2011*c*) for a discussion of studies on democratic constitutional rules and property rights.

scribed more thoroughly in Chapter 4, and employs panel data 2SLS models. The very robust result from this study is that democracy indeed seems to enhance property rights protection, even when taking into account unobserved country-specific factors and the endogeneity of democracy. This result triangulates well with the analysis in Feng (2005), which also takes endogeneity of regime type into account, albeit using a different methodology from that used in Knutsen (2011*b*). Feng finds that democracy tends to enhance a wider array of economic institutions related to the concept of 'economic freedom', and that this accounts for a large share of the correlation between democracy and economic freedom.

Democracy and corruption

As noted above, there are also other economic policies and institutions than those related to property rights that might be affected by democracy. This goes for example for policies and institutional structures that are related to control of corruption. Chowdhury (2004) and Goel and Nelson (2005) find that different aspects of democracy, like high degree of political participation and protection of civil liberties, reduce corruption. However, the econometric literature on the effect of democracy on corruption has produced quite diverging results (see Rock 2009*a*, 55). In a relatively recent study, Rock (2009*a*) finds that mature democracies have lower corruption than dictatorships but that younger democracies do not, and argues that the positive effect of democracy on corruption thus likely comes with a substantial time lag. Fjelde and Hegre (2007) find that democracy reduces corruption among relatively rich, but not among relatively poor countries. *Even if* democracy reduces corruption, however, Shleifer and Vishny (1993) argue that dispersion of power, for example through democratization and decentralization of an earlier centralized dictatorial state, is likely to contribute to more decentralized corruption. Shleifer and Vishny present very convincing theoretical arguments for why decentralized corruption is far more damaging to economic efficiency than centralized corruption.

Democracy and trade policies

Democracies may also pursue different trade policies than dictatorships. However, there may also be large differences when it comes to trade policies also within these general regime type categories. For example, there are very good theoretical and empirical reasons to believe that, for democracies, the structure of the electoral system matters a lot for trade policy. More specifically, there are strong theoretical arguments, and also empirical evidence, indicating that plural-majoritarian systems

follow more protectionist trade policies than proportional representation systems (Rogowski 1987; Persson 2005; Persson and Tabellini 2006).

Protectionism, which benefits import-competing industries, can be considered a special case of policies that benefit narrow special interest groups. As noted in Section 1.3, Olson (1982) argued that established democracies would be prone to narrow lobby groups influencing national policy at the expense of broader interests. These lobby groups could represent pivotal electoral groups or business groups that are willing to finance election campaigns in return for the promise of protectionist policies (see Grossman and Helpman 1994).

However, as O'Rourke and Taylor (2007) show, the relationship between democracy and protectionism depends strongly on the factor intensities of a country's economy, and particularly on the relative intensity of land to labor (see also Rogowski 1989). Moreover, and in stark contrast with the argument above, Bueno de Mesquita et al. (2003) provide convincing arguments and evidence that the smaller the winning coalition of the ruler is, the more narrow and group-specific is the policy implemented. Democratic politicians rely on broader segments of the citizenry than dictators for their political survival, and are thus more likely support policies that have widely dispersed benefits (see also Bueno de Mesquita et al. 2002). As for example both Bueno de Mesquita et al. (2003) and Persson (2005) argue, open trade policies is one important type of such policies.

Historically, several dictatorships have pursued harshly protectionist policies, and even sealed off their borders completely for trade in several types of goods and services. Some examples of the latter are China under the Quing-dynasty, and present-day Cuba, North Korea and Myanmar. Moreover, Rodrik (1999*b*) finds that democracies are better at providing the institutions needed to manage problems related to participation in an integrated global economy. More particularly, Rodrik finds that democracies are much better than dictatorships at managing external shocks, for example related to decreasing terms of trade.

Democracy and redistribution policies

Various redistribution policies could also affect not only the distribution but also the aggregate growth rate of income. Doucouliagos and Ulubasoglu (2008) find that democracy likely affects growth through affecting economic inequality, although it is not certain in which direction this effect goes. Theoretically, as discussed above, democracy is expected to reduce economic inequality through providing more political clout to the relatively poor (e.g. Acemoglu and Robinson 2000, 2006*b*; Boix

2003), and empirical studies find evidence of such an effect (e.g. Muller 1988; Rodrik 1999*a*; Gradstein and Milanovic 2004). However, the recent study by Timmons (2010) finds no robust effect of democracy on income inequality, although the lack of reliable inequality measures with long time series that are directly comparable across countries *may* contribute to this result (for a good discussion on this issue, see Houle 2009).[32]

The effects of redistribution policies and economic inequality on economic growth are perhaps even more controversial than the effect of democracy on inequality. The traditional view on this issue was that of an inherent "Big Tradeoff" (Okun 1975) between economic equality on the one hand and economic efficiency and economic growth on the other. As discussed in Section 1.3, this could for example be relevant in the case of property redistribution, which may generate an uncertain investment climate and other economic costs. However, empirical tests have failed to identify the "Big Tradeoff"; rather, some studies have found a negative effect of various types of economic inequality on economic growth (see particularly Alesina and Rodrik 1994). This is partly due to the fact that redistribution policies have historically often not followed the patterns of "property-grabbing" (or very high taxation) and subsequent targeted redistribution from rich to poor, which has been argued to have such a negative effect for growth. Rather, redistribution policies have often, for example in Western European countries, been conducted through extensive provision of public goods (e.g. North, Wallis and Weingast 2009), which arguably has several positive effects on economic growth (Bueno de Mesquita et al. 2003). For example, the provision of an extensive public schooling system may be considered a kind of redistribution policy, with very positive effects on growth through enhancing human capital (see Saint-Paul and Verdier 1993; Lindert 2005).

Development economists have also identified a positive effect of economic equality on growth through the relaxing of credit constraints (because of increased collateral) for the relatively poor, given that there are credit market imperfections (see Ray 1998, 226–237). Very simplistically stated, when redistribution policies lift the income of the relatively poor, the potential entrepreneurs among them may become sufficiently wealthy to gain access to the capital market. This leads to more new and efficient projects being implemented than if only a few initially rich people were to have access to loans and thus be able to, for example, start up businesses.[33]

[32]For a more general discussion of inequality measures, see Lambert (2001).

[33]For a more elaborate story on the role of inequality and credit constraints for production, see Ghatak and Jiang (2002).

Democracy and civil war

Several other types of policies and economic institutions could be discussed as potential mediating factors between regime type and economic growth. Moreover, some plausible mediating factors between regime type and growth are not easily categorized as economic policies or economic institutions. The probability of a country experiencing a civil war is one such example. Political regime type may systematically affect the probability of civil war, and Hegre et al. (2001) find evidence indicating a hump-shaped relationship between degree of democracy and probability of civil war onset (see also Hegre and Sambanis 2006). Moreover, civil wars are estimated to have a quite strong negative effect on GDP growth (Collier 1999). This is because civil wars likely affect more than one of the more immediate sources of economic growth. For example, civil wars may lead to the destruction of the physical capital stock and capital flight and may deter investors from investing in new capital (Collier 1999). Moreover, civil wars may reduce the level of human capital through death, emigration, and because of allocation of talent and energy to investment in combat-related skills rather than in productive activity.

I will now turn to empirical studies of the effects of democracy on the immediate sources of economic growth.

3.5.3 Regime types and the immediate sources of growth

In Chapter 5, I will present theoretical insights and previous empirical studies on how democracy and dictatorship affect three of the "immediate sources of growth" (Hall and Jones 1999), physical capital accumulation, human capital accumulation and technological change. However, I will already here briefly present some of the most important empirical studies on these relationships.

Democracy and efficiency

Although several studies argue that democracy may enhance efficiency, both static and dynamic, (see e.g. Przeworski and Limongi 1993; Przeworski et al. 2000; Halperin, Siegle and Weinstein 2005; North 2005; North, Wallis and Weingast 2009), there is little statistical evidence on this issue. One of the few studies on the effect of democracy on technological change, Przeworski et al. (2000), found that rich democracies, but not poorer democracies, benefited from more technological progress than their dictatorial counterparts (p. 178). Przeworski et al. (2000) used Total Factor Productivity (TFP) as an operationalization of technology level, and drew on data from

1950 to 1990. TFP as an operationalization of technology level will be discussed more thoroughly in Chapter 4. Pinto and Timmons (2005) also investigated the relationship between democracy and technological change. These authors found a positive effect of democracy, but they relied on problematic proxies of technological change, like foreign direct investment and trade.

Even a small effect on technological change can be very important for long run income levels, as technological change is the prime mover of perpetual growth (e.g. Solow 1956; Romer 1990). The relationship between democracy and technological change will be closely scrutinized in Section 5.4. There, I argue that one particularly interesting mechanism is the tendency for democracies to increase the flow of information in a society because of more extensive civil liberties than in dictatorships. A free flow of information is again conducive to adaptation of foreign technologies and the diffusion of efficient technologies throughout the economy.

Democracy and human capital

When it comes to the effects of democracy on the different factor inputs, the literature is particularly rich on human capital accumulation. Studies of global samples (e.g. Lake and Baum 2001; Baum and Lake 2003) and studies of specific regions and country histories (e.g. Lindert 2000; Acemoglu and Robinson 2006*b*; Stasavage 2005; Engerman, Mariscal and Sokoloff 1998) find that democracy increases school attendance rates, improves the education system's quality, increases literacy rates, increases education spending, improves health care spending and the quality of health care systems, fights diseases better and even improves average life expectancy. A population with a higher share of educated people, and higher education quality, is a more productive population. So is a more healthy population.

Some studies even indicate that human capital accumulation is one of the main, and perhaps *the main*, channels through which democracy enhances economic growth (Baum and Lake 2003; Tavares and Wacziarg 2001; Doucouliagos and Ulubasoglu 2008). The seminal study by Baum and Lake (2003) finds that democracy enhances growth in particular through increasing life expectancy in relatively poor countries, and through increasing secondary education enrollment ratios in rich countries.

There are some dictatorships that do not conform with this general picture and conduct policies that enhance human capital accumulation. Historically, Prussia boosted one of the most extensive and highest quality education systems in the 19th century (Lindert 2005; Clarke 2006). Many Communist dictatorships also built up well-functioning education and health-care systems in the 20th century.

Young (1995) finds that increased education was an important factor underlying the rapid economic growth of the East Asian Tigers. In Knutsen (2010*b*), I find that dictatorship does not reduce primary school enrollment ratios in Asia, rather to the contrary. This stands in contrast to the effect of democracy on primary education in Africa; at least when primary education spending as shares of public spending and GDP per capita are used as dependent variables (Stasavage 2005). However, democracy likely increases secondary and tertiary enrollment ratios, also in Asia (Knutsen 2010*b*).

Democracy and physical capital

There are fewer studies on democracy and physical capital accumulation than on democracy and human capital accumulation, although, as discussed in Section 1.3.2, there are strong theoretical arguments indicating that dictatorship increases physical capital investment through inducing higher savings rates (e.g. Przeworski and Limongi 1993; Przeworski et al. 2000; Knutsen 2010*b*). This hypothesis is reinforced by some convincing case studies that show how *some* dictatorships have been able to push up savings rates, which have yielded high domestic investment rates (see particularly Wade 1990; Young 1995). However, property rights protection is important for investors, and in an open economy a high savings rate does not necessarily imply a high investment rate.[34]

In Knutsen (2010*b*) I find that although Asian dictatorships do not grow faster on average than Asian democracies, they invest significantly more in physical capital, about 2% more of their GDP. But, Rock (2009*b*) does not find such an effect among Asian countries. Based on a global data sample, Przeworski et al. (2000) found that for poorer countries, regime type did not affect capital accumulation, but that rich dictatorships invested somewhat, but not much, more than rich democracies (Przeworski et al. 2000, 150–151). Tavares and Wacziarg (2001) found that democracy decreased growth rates through slowing physical capital accumulation. Actually, their results indicate that this is the most important channel through which regime type affects growth, with the estimated effect hovering around one percentage point reduced economic growth for democracies through this channel. This is about twice as large as the estimated positive indirect effect of democracy on growth via human capital accumulation. Despite being methodologically sophisticated, Tavares and Wacziarg (2001) base their inferences on a relatively small data sample. Indeed, the comprehensive meta-study in Doucouliagos and Ulubasoglu (2008) does not find

[34]But, see Feldstein and Horioka (1980).

the physical capital channel to be robust, and it is thus perhaps premature to conclude that democracy reduces economic growth through reducing physical capital investment. The results on democracy's effect on physical capital, based on very large global samples, in Chapter 5 are also mixed. Yet, some models yield a significant negative, and quite large, effect of democracy on savings rates and physical capital-induced growth.

One reason for why the hypothesis that dictatorship enhances investment finds only mixed empirical support, may be related to democracies being more attractive investment locations for foreign investors. Foreign investors may be particularly sensitive to insecure business environments (Asiedu, Jin and Nandwa 2009). Since dictatorships have more frequent property violations, one should observe less foreign direct investment (FDI) in dictatorial countries. Empirically, dictatorships tend to expropriate FDI more often than democracies, at least among developing countries (Li 2009), and this is likely one of the more important channels through which political regime type affects FDI (see e.g. Blonigen 2005; Knutsen, Rygh and Hveem 2011). There are also several other reasons why dictatorship may deter FDI, and several studies indeed find that democracy increases FDI (see e.g. Hveem, Knutsen and Rygh 2009; Li and Resnick 2003; Jensen 2003; Busse and Hefeker 2007).[35] However, Busse (2004) find that the positive effect of democracy on FDI is only significant in the 1990s and not in the 1970s and 1980s, and Ponce (2010) finds that the marginal effect of increasing civil liberties, although positive, is declining in level of civil liberties.[36]

Democracy and labor

The last general factor input category considered here is labor. As mentioned in Section 3.2.2, the relevant metric of labor input is labor hours. But, also as mentioned above, extensive comparative data on this variable are lacking (at least outside the OECD). Therefore, economists have often resorted to measures like labor force growth, or even population growth to measure growth in labor input. As a consequence there are, to my knowledge, no general studies on how democracy affects labor hours. However, data from Taiwan and South Korea under their previous dictatorial regimes suggest extreme average working hours (Shin 1998, 13). This may be due to the lack of rights for workers, for example lacking freedom of association

[35] Noorbakhsh, Paloni and Youssef (2001) find no robust effect of democracy on FDI, however, using data from 36 developing countries.

[36] For a review article on the effects of political and economic institutions on FDI, see Blonigen (2005). See also Table 1 in Ali, Fiess and MacDonald (2008, 30–31).

(Deyo 1998), which are important aspects of what I in Chapter 2 called the Rights and Liberties dimension of democracy.

Moreover, citizens in dictatorship are paid lower wages (Rodrik 1999*b*; Przeworski et al. 2000), and this may affect labor supply. However, it is not given that labor supply is decreasing in wage level (e.g. Stiglitz 1997, 200–207). For example poor workers may work more when wages are reduced, despite their reduced utility from working an extra hour, simply because they need to work more hours to earn enough money for covering their basic needs.[37] Democracy could, however, increase the labor pool, by increasing the opportunity for women to join the work force. If women's rights and interests are better protected under democracy, women in democracies might be better able to take part in the labor market (Beer 2009). This also implies an increase in the total supply of human capital, especially when combined with increasing female school enrollment ratios and longer female life expectancy under democracy (Baum and Lake 2003; Beer 2009).

Przeworski et al. (2000) is one of the few studies that have systematically estimated the effect of democracy on labor force growth. They report estimates indicating that the labor force grows faster under dictatorship, but only in rich countries. However, the quicker population growth under dictatorship also means that the share of capital per worker increases more slowly, thus contributing to slower GDP per capita growth in dictatorships than in democracies. As noted above, if GDP per capita is to grow because of increases in labor input, the number of labor hours per capita must grow, which implies either that an increasing share of the population must be employed, or that those employed work longer hours.

The indirect effects of democracy on the immediate sources of growth

When taken together, the discussions in Sections 3.5.2 and 3.5.3 can be summed up, very simplistically, in Figure 3.5. As noted in Section 3.5.2, many of democracy's effects on economic outcomes go indirectly via the systematic selection of specific economic policies and via effects on the structure and functioning of economic institutions. The review of the literature on democracy's effects on the immediate sources of growth in Section 3.5.3 more implicitly strengthens this assertion. *For example*, contributions to this literature argue that democracy affects human capital through systematically affecting policies on for example education funding; that democracy affects physical capital investment through affecting policies regulating luxury consumption and property rights institutions; and, that democracy affects

[37] The first effect is often called a 'substitution effect' and the latter an 'income effect'.

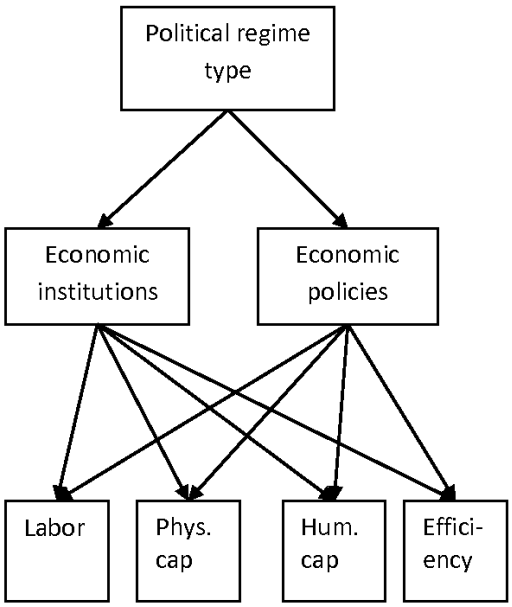

Figure 3.5: Regime type's effect on the immediate sources of economic growth

technological change through policies that regulate the use of information technologies. Hence, Figure 3.5 shows the indirect effects of regime type on the four main categories of immediate determinants of economic growth, going via economic policies and economic institutions.

3.5.4 Multi-dimensional regime classifications and interaction effects

Above, I presented some empirical studies that showed the wide dispersion in economic performance among dictatorships. In extension of this observation, it has been established that democracies do not experience the severe economic crises that some dictatorships do. Amartya Sen's observation that democracies do not experience hunger catastrophes is one extreme example of democracy's ability to avoid large crises (e.g. Sen 1982; Drèze and Sen 1989; Sen 1999). Democracies do not, for example, experience the politically induced extreme economic and humanitarian catastrophes that China witnessed under Mao's Great Leap Forward or that Cambodia experienced under Pol Pot and the Khmer Rouge. However, several dictatorships, particularly in East and Southeast Asia, have seen astonishing economic growth rates after WWII (Wade 1990; Evans 1995; Young 1995; Sen 1999; Rock 2009*b*; Knutsen 2010*b*).

The large variation in economic outcomes among dictatorships will be discussed

and analyzed intensively in Chapter 7, but let me already here provide a brief discussion of existing literature on this issue. One argument is that the higher degree of concentration of power within dictatorships open up for the possibility that personal preferences and psychological characteristics strongly affect economic policy making, and that they do so to a much larger degree in dictatorships than in democracies (see Knutsen 2006, 133–136). As Fukuyama (2005, 37) notes, dictatorships "as a group might do well if they could all be run by Lee Kwan Yew; given that they are as often run by a Mobutu or a Marcos, it is not surprising that [dictatorial regimes] show much greater variance than democratic ones in terms of development outcomes". Indeed, (Jones and Olken 2005) show, through using an elaborate quasi-experimental design investigating cases where leaders die a natural death, that personal characteristics matter a great deal for variations in economic growth in dictatorships, but not in democracies.

Classifications of dictatorships

However, there are also other important factors than individual-psychological characteristics of leaders that contribute to the variation in growth rates between dictatorships. Dictatorships can be classified into different types, for example according to specific institutional structures. Hadenius and Teorell (2007*b*) utilize an interesting and logically well-structured categorization scheme. They end up with 27 potential dictatorship categories, stemming from a three dimensional categorization structure. These three dimensions are "1) hereditary succession, or lineage; 2) the actual or threatened use of military force; and 3) popular election" (Hadenius and Teorell 2007*b*, 146). Hadenius and Teorell further show that these distinctions matter for the subsequent probability of democratization. However, they likely also matter for economic outcomes. In Chapter 7, I show that different types of dictatorships, drawing on Hadenius and Teorell (2007*b*) categorizations and data, affect property rights protection differently.

Another interesting classification scheme of dictatorships, which may also contribute to explaining different economic policies followed by dictators, is Ronald Wintrobe's (Wintrobe 1990, 1998, 2001). Wintrobe divides dictatorships after the main motivations of the dictator, with different policy mixes of repression instruments and loyalty-generating instruments in the various dictatorships as a consequence.[38]

Several other researchers have also categorized dictatorships into different sets

[38] Wintrobe ends up with a classification scheme that differentiates between tinpots, timocrats, totalitarians and tyrants (Wintrobe 1998).

of regimes, on the basis of institutional structure or the policies the regimes tend to pursue (see e.g. Linz and Stepan 1996; Geddes 2004; Przeworski et al. 2000; Gandhi and Przeworski 2007; Leftwich 2000; Evans 1995). Some of these, like Przeworski et al. (2000), have a clear, logically structured categorization scheme, relying on the existence or absence of specific institutional criteria. Przeworski et al. (2000) show that "bureaucratic" dictatorships, where there is existence of legislatures and political parties, tend to produce better economic outcomes, than dictatorships without such institutional structures. This result is corroborated in Gandhi (2008). Gandhi (2008) points out that such institutions, also in dictatorships, facilitate economic growth-enhancing cooperation between the regime and other social groups.

Other categorizations of dictatorships are based on mixes of institutional characteristics, the policies a regime pursues and even economic outcomes. Ideal types like the "developmentalist regime" (or state) (see e.g. Wade 1990; Johnson 1982, 1995; Chang 2006) and the "neopatrimonial regime" (or state) (see e.g. Médard 1996; Chabal and Daloz 1999; Bach 2011) are widely used in the more area-specific development literature on for example Africa and Asia. There is often at least an implicit association between such ideal types and degree of democracy; the developmentalist regime is for example associated with authoritarianism (Johnson 1982, 1995; Wade 1990). To a large extent, these ideal types are also often *a priori* related to economic development outcomes, often linking regimes to outcomes via particular policies (for example industrial, trade or redistribution). However, the underlying logic of categorization is not always spelled out clearly in the "ideal type regime" literature. This is a consequence of ideal types often being produced through induction from particular empirical cases, or sets of cases.

Neopatrimonialism

Let me briefly expand on the somewhat involved relationship between the democracy–dictatorship dimension and the "neopatrimonial regime" concept. "Neopatrimonialism" has largely been invoked in the study of African politics and African political economy, although the concept has also been used in studies of particular countries in other regions and in more general political economic studies (e.g. Bach 2011; Moene 2011). According to Daniel Bach,

> [n]eopatrimonialism in Africa is still classically viewed as the outcome of a confusion between office and officeholder within a state endowed, at least formally, with modern institutions and bureaucratic procedures ... The introduction of "neo" as a prefix, as originally suggested by S.

> Eisenstadt still means that neopatrimonialism is freed from the historical configurations to which patrimonialism had been previously associated. Unlike patrimonialism, conceived by Weber as a traditional type of authority, neopatrimonialism combines the display of legal-bureaucratic norms and structures with relations of authority based on interpersonal rather than impersonal interactions (Bach 2011, 153).

Distributional and redistributional politics along neopatrimonial lines may benefit the ruler, in terms of for example increased probability of political survival, and the key supporters of the ruler. However, it may also generate at least short-term material benefits for larger groups of people lower down in the patron–client network structure (see particularly Chabal and Daloz 1999). But, the literature generally argues, and finds evidence of, a strong negative effect of such neopatrimonial structures and politics on macroeconomic outcomes (e.g. Goldsmith 1999; Chabal and Daloz 1999; Clapham 1996*b*; Baland, Moene and Robinson 2010; Miquel 2007).[39]

In Chapter 2, I discussed the various dimensions of democracy. The E dimension (Effectiveness) is arguably strongly linked to the degree to which political decision making is formalized. The types of processes linked to neopatrimonialism arguably reduce the importance of formal, representative institutions in the area of economic policy making, particularly in the area of redistribution policies. Thus, as was also discussed in Chapter 2, one may plausibly argue that the informalization of politics associated with neopatrimonialism directly reduces degree of democracy through reducing scores on the E dimension. Moreover, neopatrimonial practices may reduce score on the P dimension (Participation) and C dimension (Competition), as poor voters may either trade or be forced to cast their votes according to a particular patron's wishes, thus reducing de facto political participation and political competition (as winning chances are largely a function of access to material goods).

An interesting question is, however, whether a modest degree of democracy, or even more specifically certain formal democratic institutions like multi-party elections, may impact on the degree or nature of neopatrimonial practices. As Chabal and Daloz (1999) recognize, these relations are not always completely asymmetric. A vote, and other political and civil rights, may provide clients with an extra tool that allows them to somewhat more successfully contest the patron's wishes. Take Africa as an example: Lindberg (2006) convincingly argues that African elections to some extent discipline the democratic behavior even of old dictators. Even if many

[39]This hypothesis is also validated for example by the excellent works of (Bates 1981) and (Bueno de Mesquita et al. 2003), even though other, but resembling, concepts are often used than 'patrimonialism' or 'neopatrimonialism'.

African elections after 1990 sometimes have reinstated former dictators (e.g. Joseph 1997), and thus perhaps not functioned well when it comes to politician-type selection (see e.g. Fearon 1999), (for example) Ferejohn (1986) points to another effect of democratic elections, the disciplining effect. The same actor does not pursue the same policies in different systems. Although elections can and have been manipulated, especially in many poorer countries, even a small to medium probability of losing office through elections may induce leaders to promote policies that are more in line with the interests of large groups of the populace.

A brief note on dictatorship and state capacity

One may not need to develop multi-dimensional regime concepts to capture the varying economic policies of dictatorships. Rather, one can analyze the interactions between regime type and other variables, both of political and non-political nature. In Knutsen (2009), I argue that the incentives and opportunities for dictators to follow development-enhancing policies depend critically on the degree of state capacity. Thus, also the effect of dictatorship on growth should be contingent on a country's level of state capacity. I test this hypothesis in Knutsen (2009) and find that dictatorship is particularly detrimental to growth when state institutions are weak. However, dictatorship does not seem to reduce growth when state institutions are strong.

This argument and analysis, however, assume that state capacity and strength of state institutions are exogenous to regime type. In a dictatorship, as will be discussed further in chapter 7, institutional structures may be endogenous to the ruling elite's interests. More specifically, formal state institutional structures may be weakened by the policies of rulers who wield strong powers. Thus, dictators may over time, because of personal motives for example related to political survival, informalize and personalize politics (see e.g. Chabal and Daloz 1999). One good example of a ruler building down institutional structures, both political, economic and judicial, is Robert Mugabe in Zimbabwe (see e.g. Meredith 2007).

Political economic models on self-interested dictators and economic outcomes

Below, I survey some of the more general and abstract models of dictatorship and economic outcomes from the political economic literature.[40] More particularly, I

[40]For brief surveys of the more specific ideal-typical models used to explain the economic performances of Asian and African dictatorships, see Knutsen (2009, 2010*b*).

briefly present some of the theoretical models that seek to explain the highly diverging performances of less democratic regimes. This literature will also be discussed in Chapters 5 and 7 to contextualize the formal models developed in these chapters.

A rapidly growing literature in economics and political science has investigated the role of self-interested dictators or ruling elites for economic stagnation. The general argument from this literature is that dictators often have incentives to take actions that have negative consequences for their national economies, because of their desire for personal consumption or their desire for staying in power. Several of the most influential models from the literature have already been mentioned above. To quickly summarize, Olson (1993, 2003) shows that especially impatient dictators or dictators who are not part of a ruling dynasty will expropriate property and tax heavily to obtain immediate personal consumption (see also McGuire and Olson 1996). Citizens will then have few incentives to work or invest, and the economy suffers. However, under certain circumstances, dictators might see it in their long-term interest to grow their economies. Olson (1993, 2003) argues that rulers with relatively long time horizons will conduct development-friendly policies to increase the size of the future tax base. Acemoglu and Robinson (2006*a*) and Robinson (2001) show how economic growth strengthens opposition groups and reduce leaders' probability of survival in office. Leaders therefore sometimes, but not always, have direct incentives to slow down economic growth, among other things through reducing public investment.

As already discussed several times above, Bueno de Mesquita et al. (2003) develops a model framework that shows how dictators who rely on only a few supporters, for example within the dominant party or the military, are more likely to tax or confiscate resources from the wider population and redistribute them to their narrow winning coalitions as a political survival strategy (see also Bueno de Mesquita et al. 2002). Dictators with broader winning coalitions (and particularly when these are drawn from narrow selectorates) are expected to provide more public goods and generate better macroeconomic outcomes.

Another argument put forth to explain the variation in economic performance among dictatorships is provided in Besley and Kudamatsu (2007). These authors draw on concepts such as 'winning coalition' used by Bueno de Mesquita and his co-authors. But, rather than focusing on the sizes of the winning coalition and selectorate, Besley and Kudamatsu (2007) focus on the autonomy of the winning coalition from the dictator. If the winning coalition has little autonomy, the dictator can more easily pursue policies that are to his own benefit but that are hurtful to economic development. The autonomy of the winning coalition depends negatively

on how easy it is for the dictator to replace members of the coalition, and positively on the probability of members staying in the coalition if the particular dictator is ousted from power. Hence, political supporters of the dictator who can retain their positions as important political players if the dictator falls from power, *can* discipline the dictator into generating development friendly policies.

Another, and somewhat related, argument comes from Miquel (2007), who finds that dictators in ethnically heterogeneous countries may pursue "worse" economic policies without being ousted. This is because members of the winning coalition fear a take-over by a leader from a different ethnic group. Dictators motivated by staying in power, or by achieving maximum control over society, may also invest excessively in repressive capacity, for example armed political thugs, the police or the military (see e.g. Wintrobe 1990, 1998). Such investment drains public funds and distorts resources away from more productive projects (e.g. Acemoglu and Robinson 2006*b*). To sum up the discussion, political survival motives or personal consumption motives may lead dictators to intentionally pursue policies that are detrimental to overall economic development. But, in certain instances, dictators may see it in their self-interest to pursue "good" economic policies.

In chapter 7 of this thesis, I argue that dictators who face external security threats will have incentives to modernize the economy in order to have enough resources to deter or fight the foreign army in question. This may explain, for example, the modernization of Japan under the Meiji-period and Taiwan under Kuomintang. A similar argument was used by Tilly (e.g 1975) to explain the modernization and development of European states, and here the fragmented state system on the continent is argued to have played an important role. China, on the other hand, was for long periods without a very dangerous foreign adversary, and Chinese rulers did thus not face the same incentives for modernizing the economy (see e.g. Murphey 2000). Moreover, if a dictator believes his survival probability is largely tied up with his popularity and legitimacy in broader segments of the populace, development enhancing policies may be preferred (Overland, Simmons and Spagat 2000).

Variation in economic outcomes among democracies

Even if there is considerably more variation between dictatorships in terms of economic outcomes, there is also systematic variation between democracies. For example, I noted above that empirical analysis suggest that younger democracies have worse property rights protection (Clague et al. 2003) and control of corruption (Rock 2009*a*) than older and more consolidated democracies. Let me here briefly mention

the literature on how constitutional rules matter for economic outcomes, for democracies.

Two main types of constitutional rules are electoral rules, often divided into proportional representation (PR) and plural-majoritarian rules, and form of government, often divided into presidential and parliamentary regimes.[41] This literature has grown fast over the last decade, mainly thanks to the large amount of theoretical and empirical work conducted by Torsten Persson and Guido Tabellini. I review this literature in Knutsen (2011*c*), and will only provide some of the empirical results here.[42]

One of the main results from this literature is that PR electoral rules seem to enhance property rights protection and open trade policies (see e.g. Persson and Tabellini 2003; Persson 2005). There are also consistent results on the tendency of PR to increase public spending and public debt and to increase the share of public spending going to universal (as opposed to targeted) programs (see e.g. Persson and Tabellini 2003, 2004), although these proposed finding have been questioned on methodological grounds (Acemoglu 2005; Gabel and Hix 2005).

The results on the effects of electoral rule on income, productivity and economic growth are somewhat more ambiguous, but some empirical results seem to indicate a positive effect of PR (Persson and Tabellini 2003, 2006; Persson 2005). In Knutsen (2011*c*), I use the most extensive data set in this literature (with data going back to the 19th century) to study the effect of electoral rules on growth. Here, I find a significant, positive effect on growth of PR (and semi-PR) systems. I attribute this result to several factors, such as policy stability and pursuit of broad, rather than narrow, interest policies under PR.

In Knutsen (2011*c*), I also investigate the effect of form of government on economic growth. I find no effect of presidentialism on growth, except when analyzing samples with data only from the time period after 1980. In contrast Gerring, Thacker and Moreno (2009) find that presidentialism reduces income level. These authors use GDP per capita level data from 1961–2000 for their dependent variable (holding among others income level in 1960 constant). Persson and Tabellini (2003) finds that presidentialism only reduces productivity and income among "low-quality" democracies, which may contribute to explaining the diverging results between my study (Knutsen 2011*c*) and Gerring, Thacker and Moreno (2009) who draw on shorter time series; the last decades have seen several dictatorial regimes transforming into

[41] There is also a large literature on the economic effects of federalism (see e.g. Weingast 1995).

[42] For more thorough reviews of the literature, see Persson and Tabellini (2004) and Acemoglu (2005). Persson and Tabellini (2003) is the main empirical contribution to the literature.

low-quality, presidential democracies, for example in Africa, the former Soviet Union and Latin America.

3.6 A proposed general model on the economic effects of regime types

Given the results from the literatures on economic development and growth and from the comparative political economy literature, what would plausible *general* models used for determining the effects of regime type on economic outcomes look like? I have presented at least three lessons of relevance for empirical model specification:

1) The broader literature on deeper determinants of development indicate that one should control for certain geographical, cultural and political historical factors.[43] These factors affect economic outcomes, like long-term growth rates, and they are also often correlated with political regime type. It is also known, as I will come back to in later chapters, that the international economic and political environment is likely to affect both democratization and democratic stability, as well as economic growth. Several of these international factors, like global business cycles and security environment, are correlated with the time dimension or with geographical region of the world.

2) Since it is known that economic factors could affect the probability of being a democracy, one should take into account endogeneity of regime type. At least, one should control for other economic factors affecting both the probability of being a democracy and the economic outcomes one is interested in. If one studies democracy's effect on economic growth, for example, one should control for initial level of GDP.

3) Democracy may affect certain economic outcomes, like growth, through affecting a set of "intermediate" variables. Let me expand on this point:

First, regime type systematically affects type of economic policy and the structure of economic institutions. Second, policies and economic institutions affect economic growth through affecting different factor inputs (labor, physical capital and human capital) and efficiency. If one is aware of this causal hierarchy, one should not control for these economic policies and institutions or the "immediate determinants of growth", *given* that one wants to estimate the total, and not only the direct,

[43]The latter is important to control for because political historical factors affect other political institutional structures than those related to regime type, like state capacity (see e.g. Englebert 2000), which may again impact on economic outcomes.

effect of regime type on growth. Tavares and Wacziarg (2001, 1342–1343) note that many "previous studies focus on the *direct* effect of democracy on economic growth, conditional on other growth-determining factors. This procedure should be questioned: In theory, if a comprehensive institution such as democracy matters, it should matter *indirectly* through its effect on variables that in turn determine economic growth".

Doucouliagos and Ulubasoglu (2008) and Baum and Lake (2003) also provide very good discussions on this topic, and argue along similar lines. Drawing on (Leblang 1997), Baum and Lake (2003) point out the problems with the approach of many previous studies: "Democracy is intimately bound up with the economic sources of growth. The causal roots are tangled and difficult to unravel . . . but democracy is not simply an added measure of efficiency or inefficiency in an otherwise economic story" (Baum and Lake 2003, 335). As Baum and Lake (2003) suggest, this fact is often taken into account in various theoretical arguments, both arguments pointing in favor and disfavor of democracy's effect on growth, but is not captured in empirical studies. The "generic" model specification (Baum and Lake 2003, 335) often takes the form $Growth_i = \alpha + \beta Economic + \gamma Political + \mu_i$, where "political" refers to a set of regime characteristics, often including measures of democracy (see also Leblang 1997), and this is a rather naive specification.

It may of course be that, for example, some of the economic institutional structures, like property rights systems, or human capital accumulation affect democracy as well, and that one therefore risks omitted variable bias by not controlling for such factors. However, despite the many theoretical arguments presented in political science and economics indicating that democracy is mainly an effect of education (e.g. Lipset 1959) or property rights structures (see the review in Knutsen 2011*b*), the few *empirical* studies that have explicitly tested the causal direction tend to find that democracy is mainly the cause, and not the effect, of human capital (e.g. Baum and Lake 2003) and economic institutions (e.g. Feng 2005; Knutsen 2011*b*).

I will come back to the more specific model structures used in this thesis in the next chapter, which deals with methodological issues, and in the different empirical chapters. The discussion above only provides broad guidelines on what a model investigating the effect of regime type on economic outcomes should look like. There are some inevitable trade-offs related to model choice, particularly regarding the likelihood of making Type I and II errors when choosing model specification. In any case, Figure 3.6 illustrates how one on a very abstract level could consider the relationships between regime type, economic outcomes and clusters of other relevant

variables discussed in this chapter.[44] The observant reader will notice that Figure 3.6 is constructed on the basis of the "partial models" in Figures 3.1, 3.2, 3.3, 3.4 and 3.5, which were constructed to in a very simplified manner capture some of the relationships discussed in this chapter's various sections.

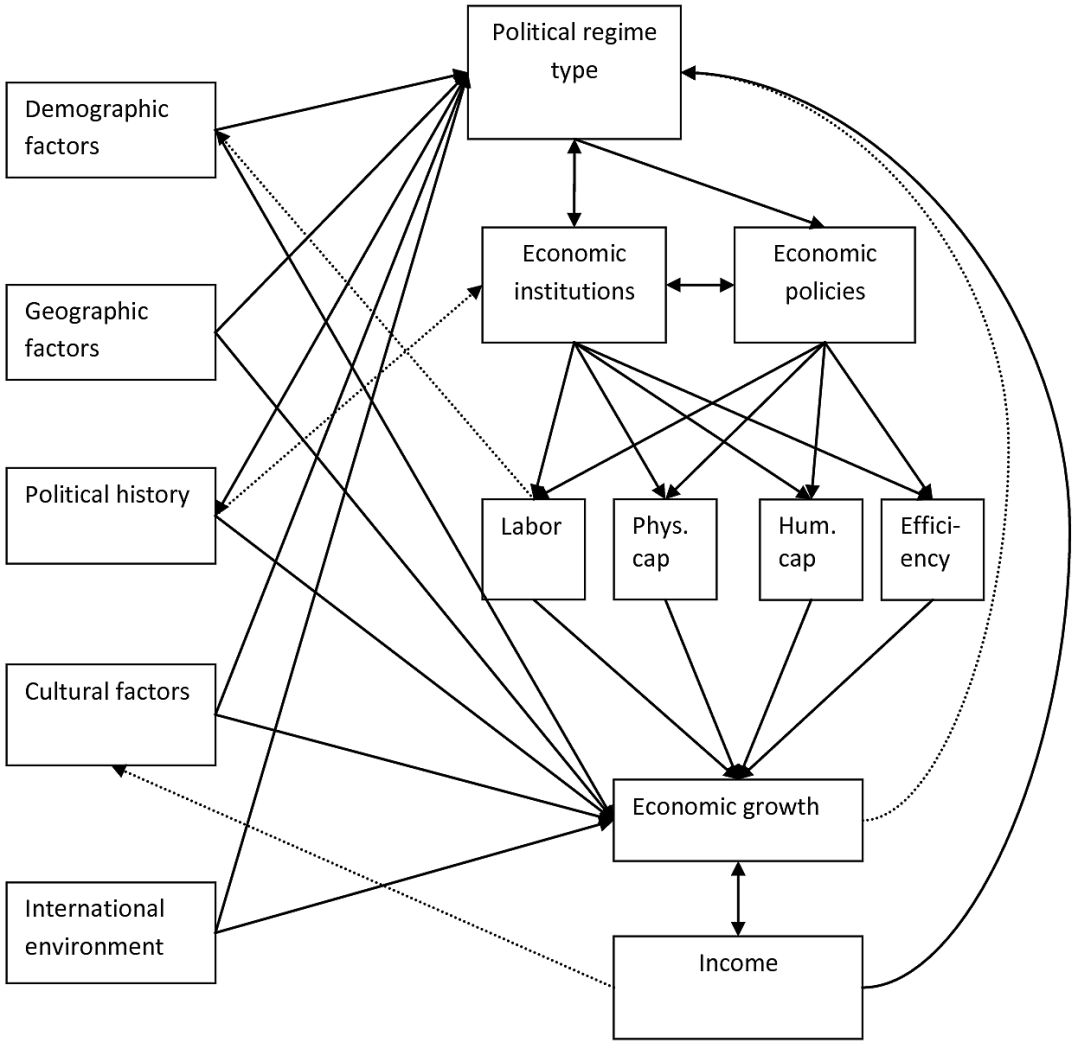

Figure 3.6: A somewhat simplified picture of the causal relations between regime type, economic outcomes and other selected factors

[44]Please note that the effects of the "alternative" deeper determinants of economic growth are shown to affect growth directly in Figure 3.6. This is a simplification made in order to not complicate the visualization of the relationships too much. Presumably, as is the case for institutional structures' effects on growth, the effects of these other deep determinants (on growth) also go via the "immediate sources of growth", which are labor, physical capital, human capital and technological change.

Chapter 4

Data and methodology

This chapter presents, in a non-technical and intuitive language, the different estimation techniques used in Chapters 5, 6 and 7, before it discusses some general methodical problems that may affect studies investigating the effect of democracy on economic outcomes. Further, it presents the operationalizations, data and some of the regression models used in this thesis. The chapter thereafter discusses the endogeneity of democracy more in detail, and presents plausible solutions to the endogeneity problem when investigating the economic effects of democracy. These solutions include the utilization of a new instrument for democracy based on Huntington's observation that there have been global "waves of democratization". This instrument is discussed theoretically and validated empirically.

4.1 Overview of the chapter

This chapter presents the estimation techniques and data used in this thesis, and discusses some specific methodological issues related to the analyses in the following chapters. In Section 4.2, I give a cursory and non-technical introduction to the underlying logic of the main estimation techniques used in this study. Then, in Section 4.3, I go on to look at three methodological problems that are particularly important for the research questions treated in this thesis. These are selection biases generated by the fact that particular countries lack data, attenuation biases generated by unsystematic measurement errors, and the endogeneity of regime type to growth. Thereafter, in Section 4.4 I present the different operationalizations and data sources for the dependent and control variables that enter the models in Chapters 5, 6 and 7. Some of the regression models used in these chapters are presented. At last, in Section 4.6, I present, discuss and test an instrument for democracy, which is used in Knutsen (2007, 2011*b*) and in the analysis on regime type and economic growth in Chapter 6.

4.2 A short non-technical presentation of the methods used in this book

This section gives a very brief introduction to the underlying logic of the estimation techniques used in the following chapters. More particularly, ordinary least squares with panel corrected standard errors (OLS with PCSE), random effects, fixed effects, matching and two-stage least squares (2SLS) analysis are discussed. Since several thorough and good accounts already exist on the technical properties of the various estimators, I will not go in technical detail here (for more technical presentations of the various methods, see e.g. Beck and Katz 1995; Sayrs 1989; Kennedy 2003; Greene 2003; Gujarati and Porter 2009; Hsiao 2003; Wooldridge 2002; Abadie and Imbens 2002). Those already familiar with these estimation techniques *may very well skip this section*. However, for those not familiar with them, I will give a very brief and non-technical introduction. The purpose of this section is simply to provide the necessary background for interpreting the empirical analyses in Chapters 5, 6 and 7.

I start out with discussing the properties of the ordinary least squares (OLS) estimator, as this estimator was used in much previous research on how regime type affects economic outcomes (see e.g. the review in Przeworski and Limongi 1993).

Moreover, the discussion of the OLS estimator serves the purpose of illustrating the main properties of the estimators used in this study, as these estimators build on, but refine, various aspects of the OLS estimator.

4.2.1 OLS

For a long time, and perhaps still, the workhorse method in quantitative social science was OLS. Its popularity is due to several reasons. The first is that given a set of assumptions, discussed below, OLS yields the best, linear, unbiased estimators (BLUE), where "best" refers to the estimator with the lowest standard errors. Second, OLS estimators are relatively easy to compute. Third, they are straightforward to interpret.

With the advent of powerful statistical software packages, the second argument is no longer as crucial as it once was. Therefore, with the recognition that the restrictive assumptions necessary for OLS estimators to be BLUE often do not hold, social scientists are increasingly using more complicated techniques when analyzing data. Below, I will first review the crucial assumptions underlying the "OLS-as-BLUE" result. Then, I will present some more advanced techniques used in this study, in a non-technical jargon, and explain why they are superior to OLS when analyzing among others the economic effects of democracy.

4.2.2 When is OLS BLUE?

Kennedy (2003, 48–49) lists up the five main assumptions underlying the so-called Classical Linear Regression model, under which OLS estimators are BLUE. Let me re-list these assumptions and the possible violations, as identified by Kennedy:

A1) The dependent variable can be calculated as a linear function of a set of specific independent variables and an error term.

Violations of assumption A1) lead to what is generally known as "specification errors". One central question is thus: "is the regression equation correctly specified?"

One particular type of specification error is to exclude relevant regressors. This is crucial when investigating the effect of one particular independent variable, let's say democracy, on a dependent variable, let's say economic growth. If one important variable, let's say level of income, is missing from the regression equation, one risks omitted variable bias in the democracy coefficient, because income level affects both democracy and economic growth. In other words, the democracy coefficient will pick

up some of the effect that is really due to income, on economic growth. Identifying and including all relevant control variables are therefore crucial operations.

As discussed in Chapter 3, a related specification error is including irrelevant control variables. If one for example wants to estimate the total, and not only the "direct", effect of democracy on growth, one should not include variables that are theoretically expected to be intermediate variables. That is, one should not include variables through which democracy affects growth.

Another possible specification error is assuming a linear relationship when the relationship really is non-linear. In many instances, variables are not related in a linear, or close to linear, fashion. Transformations of variables can however often be made that allows an analyst to stay within an OLS-based framework. If one suspects a U-shaped or inversely U-shaped relationship between two variables, one may square the independent variable and enter both the linear and squared variables in the regression model. If one suspects that the effect of a marginal increase in the independent variable is larger at lower levels of the independent variable, one can for example log-transform the independent variable. This is one of the reasons for why for example income level, population level and regime duration are log transformed (natural logarithm is used) in the empirical analysis in Chapters 5, 6 and 7. The effect of an independent variable may also be dependent upon the specific values taken by other variables, or be different in different parts of the sample. Entering multiplicative interaction terms or splitting the sample are solutions to these issues.

A2) The expected value of the disturbance term is zero.

If this property is violated, the intercept will be biased, because OLS forces the average of the error terms to be equal to zero. Note that the assumption is about the underlying structure of the world, and the OLS procedure follows this assumption and forces the error terms into a certain structure.

A3) The disturbance terms have the same variance and are not correlated.

Violations of the two properties mentioned in A3) result in two quite common problems, namely heteroskedasticity and autocorrelation. Heteroskedasticity implies that the disturbances do not have the same variances, and the variances are often a function of specific independent variables. To take one example, there may be higher variances for the disturbance terms for poor countries in a given model on economic growth than for rich countries. Autocorrelation implies that the disturbance terms are systematically correlated in one way or another. Economic growth in year t for a country may for example be positively correlated with growth in year $t + 1$, even when controlling for a plausible model's independent variables. In these cases OLS

is not BLUE, and more efficient techniques should be utilized.

A4) Observations on the independent variable can be considered fixed in repeated samples.

The strictest interpretation of this assumption is that values on the independent variables are manipulated by the researcher, as in experiments. However, a less strict form of exogeneity of the independent variables is sufficient for OLS to function properly: the independent variables should not be affected by the dependent variable. In many cases, two variables can be both causes and effects of each other. If so, OLS regressions will give biased results. For example, if high GDP levels increase average investment rates and high investment rates increase GDP levels, an OLS equation where investment rate is the independent variable and GDP the dependent variable will systematically overestimate the effect of investment rates on GDP.

Another problem related to assumption A4) is measurement error. If there is an unsystematic measurement error in the dependent variable, OLS estimates will be unbiased, although they will have larger standard errors. However, if there are unsystematic measurement errors in the independent variable, the estimates will be biased. In a bivariate regression, such measurement errors will tend to draw the coefficients towards zero; this bias is known as the attenuation bias, and will be discussed more in depth in Section 4.3.2.

A5) There are more observations than independent variables and there are no exact linear relationships between independent variables.

A violation of the first part of the assumption points to the "degree of freedom" problem, and a violation of the second to the "perfect multicolinearity" problem.[1]

Let me give one hypothetical example of the degree of freedom problem, where there are more independent variables than observations: Let us assume that it is a priori known that income level, prior political institutional structures and cultural characteristics are the relevant variables for explaining the existence or non-existence of a revolution. Furthermore, there are two countries, where one experienced revolution and the other did not, and these countries differ in income level, institutional structure and cultural background. In this example, it is impossible, without additional information, to discern which of these three variables those were crucial to the existence of revolution in one country and non-existence in the other.

If one faces negative degrees of freedom or perfect multicolinearity in statistical

[1] I will not dig deep into these important issues here, but for a general treatment on how these problems might affect not only quantitative, but also qualitative, social science research, see King, Keohane and Verba (1994).

studies, a software-package will refuse to calculate results. However, one should note that also approximations to such situations will create problems for inference. Few degrees of freedom or high multicolinearity will tend to give high standard errors for coefficient estimates, thereby reducing the chance of obtaining significant coefficients. Regarding multicolinearity, if for example a high level of literacy and a high urbanization degree are strongly correlated with each other and with the probability of democratization, it is hard to discern what particular effects the two variables have on democratization, even with a modest number of observations. See Kennedy (2003) for a nice treatment of these issues.

4.2.3 Pooled data: Combining cross section and time series information

It is often unnecessary to restrict the information one uses when drawing inferences to cross-sectional data drawn from a particular year or to cross-sectional averages over long time periods. Analysis of cross-sectional data is therefore often substituted by analysis of data with a pooled cross section–time series (PCSTS) structure, as is the case in this thesis. In the latter data structure, the different cross-sectional units have observations on several time periods, which vastly increases the amount of information available for inference.

However, when the data has a temporal structure, the problem of autocorrelation of disturbance terms becomes more severe. OLS is therefore inappropriate, and one should switch to PCSTS (or panel data) methods. However, even with a pure cross-sectional data structure, OLS analysis often encounters the other problem related to A2), namely heteroskedasticity. Fortunately, PCSTS methods can deal also with heteroskedasticity.

4.2.4 Incorporating cross-sectional and inter-temporal variation: OLS with panel corrected standard errors

There are several varieties of PCSTS methods. I will focus only on one, namely OLS with panel corrected standard errors (PCSE). As Beck and Katz (1995) quite convincingly show, OLS with PCSE is the most proper PCSTS method for data sets with relatively many cross-sectional units and relatively short time series (see also Beck 2001). This is the situation for most data sets used in political economic research, and also in this study. Moreover, OLS with PCSE allows the estimation of coefficients even when, as in this study, there are unbalanced panels (time series

are not equally long for all cross-section units).

OLS with PCSE, as the name indicates, builds on the familiar OLS framework. The interpretation of OLS with PCSE coefficients is identical to the interpretation of OLS coefficients. Essentially, the calculation of estimates is based on an OLS procedure, but the technique takes into account that disturbance terms in period t can be autocorrelated (within panels or generally) with disturbance terms in period $t-1$. It can also take into account that disturbance terms may have different variances (heteroskedasticity) for different panels. Moreover, it can deal with the problem of a disturbance term in one cross-section unit at time t being correlated with the disturbance terms in other cross-section units at time t (contemporaneous correlation). All OLS with PCSE regressions run in this dissertation take into account autocorrelation within panels, assuming so-called AR1 autocorrelation (see e.g. Greene 2003, 257–259), contemporaneous correlation and heteroskedastic panels.

Let me provide one example to illustrate why OLS with PCSE may be useful. Consider a model with economic growth as the dependent variable. The OLS with PCSE estimation procedure then takes into account that the disturbance term for Germany in year t (unexplained growth; maybe extraordinary low growth because of a recession) is correlated with the unexplained growth in Germany in year $t-1$ and with unexplained growth in France in t (which is relevant for example because these countries trade, and, hence, demand in France affects German GDP). The procedure also incorporates the possibility that Germany might have a higher or lower variation in its disturbance term than France. These features of OLS with PCSE mitigate the problems related to assumption A2) presented above, which would be a problem for OLS estimators. As mentioned, the interpretation of OLS with PCSE coefficients is exactly the same as that of OLS-coefficients: An increase in X_1 by one unit, holding all other independent variables constant, increases the predicted Y with β_{X1}.[2]

4.2.5 Controlling for country-specific factors: fixed effects and random effects

Two other much used techniques in contemporary social science research are fixed effects and random effects, which are classified as "panel data techniques". These two techniques are also used to analyze data structures with cross-section units observed at different time points. However, different assumptions on "how the world looks" point in the direction of applying different models to best estimate effects

[2]Interested readers are encouraged to check out Beck and Katz (1995) and Sayrs (1989).

when the data has such a format. More specifically, the assumptions one makes on whether and how cross-sectional variation should be used for making inferences are crucial when choosing between OLS with PCSE, random effects and fixed effects models.

For OLS with PCSE models, it can be somewhat simplistically stated that differences in X going together with observed differences in Y were used for inference, *independently* of whether the differences were observed along the time dimension within a unit or between two units at the same or different time points. Let me concretize with a model where democracy is the independent variable and economic growth the dependent variable. In the OLS with PCSE set-up, the fact that Afghanistan had a low level of democracy and low economic growth in 1987 and that Norway had a high level of democracy and a high level of growth in 2003 is used as information for inferences on democracy's effect on growth. The same goes for information from comparisons of Norway in 1850 and Norway in 2003.

OLS with PCSE does allow for the control for other observable variables when estimating the effect of one independent variable on a dependent variable. But, what if there are *non-observable factors* (or at least factors that are difficult to measure properly) that we do not include in the regression model those determine both the rate of growth and the degree of democracy in a country? More generally, what if there are non-observed factors that are specific for each cross-section unit that affect both the independent and dependent variables? In that case, OLS with PCSE is inappropriate, as one should control for such cross-section specific effects. As Acemoglu et al. (2008) argue, there are likely historical, country-specific factors that systematically affect both different institutional structures and economic outcomes. There may be underlying cultural, geographic, political-historical and socioeconomic structural factors that generate a positive correlation between for example democracy one hand and income level, economic growth or property rights protection on the other. Acemoglu, Johnson and Robinson (2001*b*), for example, showed that country-specific factors related to historical colonial institutions had strong effects on present institutional structures related to property rights protection, but also present democracy. Hence, exogenous conditions or long-run developmental processes might influence both democracy and property rights. How can we then estimate the effect of the former on the latter?

One solution to the above question is to run a fixed effects regression. This analysis incorporates dummy variables for all cross-section units. Thereby, going back to the democracy and growth example again, fixed effects only allows inferences about the effect of democracy on economic growth from investigating variation

within nations along the time dimension. In this sense, fixed effects analysis is a very restrictive analysis; it does not allow us to infer anything about effects from cross-national variation. One can, for example, not use information from the Benin–Togo comparison presented in Section 1.4.4 with regard to democracy's effect on economic growth. The main benefit of fixed effects models is that they reduce the possibility of omitted variable bias affecting results. One can also incorporate dummies for different time periods, thereby reducing the possibility of time-specific effects driving results. Hence, one can run fixed effects models with dummies only for cross section units, only for time periods, or for both.

However, one risks wasting a lot of information when using fixed effects models to draw inferences. What if the difference between growth rates in Benin and Togo, or in Norway and Afghanistan, are partly due to the fact that Benin and Norway are more democratic? In that case, on the quest to reduce omitted variable bias, one may risk wasting valuable information. The inclusion of country dummies contributes to low efficiency in the fixed effects estimators, when compared to many other estimators (Beck and Katz 2001). Put differently, since the fixed effects estimators are not using all relevant information, the estimators tend to have larger standard errors, which enhances the risk of committing Type II errors.

Fixed effects models assume that each cross-section unit has its own specific intercept in the regression. Random effects models moderate this assumption. Random effects, like fixed effects, creates a different intercept for each cross-section unit, "but it interprets these differing intercepts in a novel way. This procedure views the different intercepts as having been drawn from a bowl of possible intercepts, so they may be interpreted as random ... and treated as though they were part of the error term" (Kennedy 2003, 304). Under the assumption that the intercepts are truly randomly selected, that is they will have to be uncorrelated with the independent variables, random effects gives increased efficiency when compared to fixed effects. That is, the random effects coefficients will have smaller standard errors. However, random effects will be biased if the error term is correlated with any of the independent variables.

In practice, the above characteristics can often lead to random effects models finding significant effects when fixed effects models do not. However, if the country-specific effects are highly correlated with certain independent variables, random effects may be biased, and one should use fixed effects. Because of this trade-off, and given the limited knowledge on what the correct model specification is, the analyses in Chapters 5, 6 and 7 present results from both random and fixed effects

models.[3]

4.2.6 Taking into account the endogeneity of regime type: Two Stage Least Squares (2SLS)

The issue of reverse causality permeates many studies in the social sciences, thereby rendering assumption A4) above false. In studies of democracy's economic effects, for example, this "endogeneity problem" is likely of importance (for good discussions on this, see Przeworski and Limongi 1993; Przeworski et al. 2000). As discussed in Section 3.4, economic factors likely influence political institutions and processes, and a correlation between democracy and economic growth cannot readily be attributed to the causal effect of democracy on growth. Lagging the independent variable is one simple way to try to deal with the issue of reverse causality, as lagging independent variables exploits the temporal sequence of cause and effect. But, this is not a foul-proof solution to the endogeneity problem.[4] However, there exist other and more solid statistical solutions. One proposed solution, often used in the econometric literature, is to find so-called instrumental variables, or instruments, for endogenous independent variables.

There are two requirements for a variable to be a proper instrument for an endogenous independent variable. First, the instrument should be correlated with the independent variable. If the correlation is low, one will often obtain large standard errors for the estimated coefficients. Second, an instrument should not be directly related to the dependent variable. This means that the instrument should only be correlated with the dependent variable through the independent variable it instruments for, after having controlled for all other variables in the model. If this second condition is not satisfied, the resulting estimates from the analysis will not be consistent. These assumptions are visually represented in Figure 4.2.6. The intuition behind the procedure is that one only utilizes the "exogenous" part of the variation in the independent variable that is related to the exogenous instrument. Thereby, one obtains a better (consistent) estimate of the causal effect of the independent variable on the dependent.

A common technique based on the use of instrumental variables is two-stage least squares (2SLS). There can be more than one instrument incorporated in a

[3]There are several varieties of both techniques. The estimation procedure can for example rely on Generalized Least Squares or Maximum Likelihood estimation procedures. One can also incorporate possible heteroskedasticity or autocorrelation in the estimation procedures.

[4]This is especially the case if current values on both the dependent and independent variables are highly autocorrelated with past values.

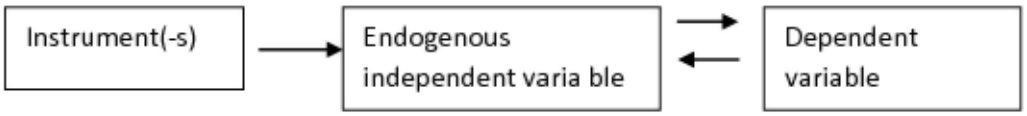

Figure 4.1: The assumed underlying causal structure of instrumental variable analysis.

2SLS analysis, and some of the 2SLS models in Chapter 6 draw on two separate instruments. Let me exemplify 2SLS by once again turning to the question of whether democracy increases economic growth rates. I now recognize the problem that democracy may be endogenous to growth, and I need to find a proper exogenous instrument for democracy. Thereafter, the procedure followed is to first use OLS on an equation where democracy (the endogenous independent variable in the original regression) is the dependent variable, and the instrument(s) and the control variables from the original regression are entered as right hand side variables. I run this (first-stage) regression and then take the predicted, instead of the actual, democracy values obtained from this regression and enter them into the original (second-stage) regression equation. In other words, I do regression analysis in two stages, where democracy is the dependent variable at the first stage, and economic growth is the dependent variable at the second stage. The instruments only enter into the regression equation at the first stage, but the regular control variables are used at both stages.

The 2SLS procedure does not yield unbiased estimates, but it yields consistent estimates if the instrument is valid. Consistency implies that the expected value of the estimator approaches the real value as the number of observations increases (asymptotical unbiasedness). This indicates that one should be careful when applying 2SLS in small samples. 2SLS can be used on cross-sectional data, but there are also panel data versions. A random effects version of 2SLS (RE2GSLS) is used in Chapter 6.

One "problem" with 2SLS is that it often produces relatively large standard errors for the endogenous independent variable's coefficient, especially if the correlation with the instrument is low. It is therefore often difficult to obtain significant 2SLS results. Another problem is the difficulty of finding truly exogenous instruments that are not directly related to the dependent variable. However, clever

suggestions for instruments exist, for example in the institutions and development literature: Acemoglu, Johnson and Robinson (2001*b*) utilize settler mortality for colonists in former colonies as an instrument for institutional structure when investigating the effect of institutions on income. Their main point is that settler mortality levels decades ago have no direct link to level of development today. Settler mortality is, however, related to present institutional structures, since it affected the probability of colonizers settling in colonies and building institutional structures there. These historical institutional structures, because of institutional inertia, affect the nature of institutions in these former colonies today. The instrument is therefore correlated with the independent variable of interest, institutions, but the instrument is not directly linked to the dependent variable, development (but, see McArthur and Sachs 2001).

Below, I will discuss a novel instrument for democracy, also discussed in Knutsen (2007) and Knutsen (2011*b*). The instrument draws on the observation from Huntington (1991) that democracy has thrived globally in temporal waves, and the methodical insight from Persson and Tabellini (2003) that the time point of adoption serves as a valid instrument for the characteristics of institutional structures. The particular instrument presented below in Section 4.6, called WAVE, fulfils the requirement of being at least moderately correlated with democracy, and the theoretical discussion and empirical tests also indicate that it is exogenous to various economic outcomes.

4.2.7 Taking into account non-linear effects: matching

Regression-based techniques assume linear effects (in the parameters), clearly stated in A1). This could be problematic when investigating particular social science research questions. Imposing a linearity restriction might be a too strong assumption to make, thereby leading to a too crude estimation procedure. Matching is a so-called non-parametric estimation technique, which relaxes assumptions of functional form. When applying matching models, one does not have to make an initial assumption on whether the relationship is linear or have any other particular functional form, and one does not have to assume that the effect is independent of values on contextual variables. Recently, there has been some interest in matching techniques among researchers studying political economic topics (see e.g. Persson and Tabellini 2003). However, relaxing strict assumptions, like the linearity assumption, bears with it a cost in terms of reduced estimator efficiency; that is, one tends to get relatively

large standard errors for the matching estimates.[5]

Matching techniques draw on experimental logic: "[t]he central idea in matching is to approach the evaluation of causal effects as one would in an experiment. If we are willing to make a conditional independence assumption, we can largely re-create the conditions of a randomized experiment, even though we have access only to observational data" (Persson and Tabellini 2003, 138). The main underlying idea is to split the independent variables into two groups, the control variables, and the treatment variable. Further, one must dichotomize the treatment variable and assume so-called conditional independence; that is, one needs to assume that the selection on the treatment variable is uncorrelated with the dependent variable, conditional on specific values on the control variables. If specific units self-select to a certain value on the treatment variable, this will pose troubles for inferences.

Matching is based on the underlying idea that one should compare the most similar units, for example most similar countries. In this sense, the logic does not only reflect that of experiments, but also that of the Most Similar Systems logic utilized in small-n studies in comparative politics (John Stuart Mill's "Method of Difference"). One makes "local" comparisons over units that are relatively similar on all variables except the treatment variable one is interested in investigating the effect of. As (Persson and Tabellini 2003, 139) put it, one attempts to find "twins" or a "close set of close relatives" to each observation, but these most similar countries need to differ on the treatment variable, for example regime type.

The estimated effect of democracy, for example on economic growth, is computed for each of the pairwise comparisons made, and thereafter an average of these effects is calculated to produce the final (generalized) estimate, the Average Treatment Effect (ATE). Hence, "[m]atching allows us to draw inferences from local comparisons only: as we compare countries with similar values of X [characteristics in terms of values on the control variables], we rely on counterfactuals that are not very different from the factuals observed" (Persson and Tabellini 2003, 139). One example of a good pairwise match for indications of a possible ATE of democracy on growth has already been mentioned in Section 1.4.4, namely Benin and Togo. Both these countries have relatively similar values on potential control variables such as historical colonizer (France), location (West Africa), prior level of development and population level. However, Benin can be classified as democratic and Togo as dictatorial on the treatment variable. In the time period from 1990 to 2003, Benin's average annual

[5]This trade-off between relaxing strict assumptions and efficiency is analogous to the trade-off when one exchanges OLS models with more robust (to endogeneity), but less efficient, 2SLS models.

growth rate, according to data from Maddison (2006), was 3.2 percentage points higher than Togo's. During this short time span under democracy, Benin went from having a GDP per capita that was only 43% higher than that of its neighbor to having a GDP per capita that is 121% higher. Thus, if a matching analysis was based only on the Benin-Togo comparison, one would have found an estimated positive treatment effect of democracy on growth.

Several specification issues arise when applying matching models to the data. Matching can for example be performed with and without replacement. Replacement indicates that the same unit can be used as a match several times; Benin can for example be used as a match for both Togo and Guinea. A second specification is the number of matches one uses to compare each unit with. A third type of specification issue is related to the application of bias-adjustment procedures (see Abadie and Imbens 2002). A fourth is related to the calculation of standard errors, and more specifically related to adjustment for heteroskedasticity. I will discuss these specification issues in Sect 6.4.1 in relation with the matching analysis on democracy and economic growth

4.2.8 Summing up the discussion

Going from cross section to PCSTS data increases the amount of information one can use when drawing inferences. Quantitative research in the social sciences is increasingly based on such data structures. OLS runs into serious problems when applied on PCSTS data, with autocorrelation being a main scourge. Fortunately, there are techniques yielding easily interpretable results that can be used to analyze such data. Many of these techniques build on the OLS framework. One is OLS with PCSE, where estimators are calculated on the basis of both cross-sectional and inter-temporal variation, with for example country-year being the unit of analysis.

However, if there are non-observed country-specific effects that strongly influence results, analysts are encouraged to switch to fixed effects models. Fixed effects models incorporate dummies for each cross section units, and should be embraced by researchers who believe that each country, for example because of a specific cultural characteristic or a specific history, is so unique that inter-country comparisons cannot be used for inference. This is, however, a very strong claim, often bordering on nihilism (see the discussion in Beck and Katz 2001), and fixed effects models may therefore waste a lot of valuable information.

Endogeneity is a general problem in the social sciences, and I presented a procedure that is constructed for dealing with endogenous independent variables, namely

2SLS. 2SLS yields consistent estimates, but standard errors are generally very large. Moreover, finding proper instruments is a very difficult task. Matching models draw on experimental logic, and this type of analysis allows analysts to shed the "linear effect" assumption. Every unit is compared with one or more similar units that differ on the treatment variable of interest, and treatment effects are estimated and finally averaged up to an Average Treatment Effect.

4.3 Some methodological problems for this study

In this section, I very briefly present three specific problems that are of importance to studies of the economic effects of democracy. Many contributions to the literature have ignored these questions altogether, whereas others have tried to deal with them, more or less successfully. The first and third problems are the more serious, and I include some comments on how this study mitigates these problems. The second problem, on measurement error and attenuation bias, is not explicitly dealt with in the empirical chapters. Nevertheless, this section's discussion should be kept in mind when *interpreting* the results in the empirical chapters.

4.3.1 Lack of data and sample selection bias

According to Ha-Joon Chang (Chang 2006, 145), 1960 is often considered as "year zero" in statistical studies of economic development, and this is due to the fact that the World Development Indicators (WDI) start recording much of its data in this year. This points to an obvious limitation in quantitative research on development topics; data samples are often limited to the very recent history. Many commonly used variables in the literature even have time series that start well after 1960. This is particularly problematic for the topic of this study, as meta analysis of empirical studies on democracy and economic growth show that results vary quite a lot depending on which decades are included in the analysis (Doucouliagos and Ulubasoglu 2008).

Although most countries started out quite poor around 1800 (see e.g. Maddison 2007), a few countries, mainly in Europe, North America and Oceania, had grown relatively rich by 1960. These countries were also relatively democratic. Much of the growth that took place between 1800 and 1960 in for example the US, UK, Scandinavia and the Benelux countries happened under relatively democratic rule. Cutting short the time series in 1960 means leaving out these fantastic growth performances, which *may* to a certain extent be attributed to democratic institutions.

Moreover, it also means leaving out the relatively sluggish performance of dictatorial countries such as Imperial China, and even some European dictatorships like Habsburg Austria and Romanov Russia. The massive "catch-up" performances of relatively dictatorial Singapore, South Korea before the mid-1980s, Taiwan before 1990 and China after 1979 are, however, included in samples starting in 1960.

This dissertation's empirical analysis includes some very extensive time series, thanks among others to the impressive data collection efforts by Maddison (2006), Baier, Dwyer and Tamura (2006) and the Polity Project (Marshall and Jaggers 2002). The long time series utilized should enhance the reliability, and even validity, of the results presented in Chapters 5 and 6, relative to results presented in previous studies (see Doucouliagos and Ulubasoglu 2006, 2008).

In order to expand the data material further, I could have used imputation techniques. Such techniques are used in previous studies on the economic effects of democracy (see Stasavage 2005), and can affect results. Recently, there has been tremendous development on imputation techniques, also for panel data (Honaker and King 2010). However, such imputation techniques are not utilized here. Rather, I have used a simpler interpolation technique for the population and GDP data from Maddison (2006) and for the physical capital, human capital and TFP data from Baier, Dwyer and Tamura (2006). In all instances, I have assumed constant growth rates within time periods (exponential interpolation). For the economic growth regressions, only about $\frac{1}{10}$ of the observations stem from the interpolation, and excluding these observations does not matter very much for results, although some models show a bit weaker results (see Knutsen 2008). As I will come back to in Section 4.5.1, the TFP regressions have a far higher share of interpolated observations as a result of the data structure in Baier, Dwyer and Tamura (2006). In Chapter 5, I therefore perform extensive robustness checks on the analysis of democracy and TFP growth without interpolated data, and the results are quite stable.

Although lacking data because of short time series is a problem, there exists one equally serious problem: particular countries often tend to lack data altogether. If the lack of national data were randomly generated, this would only have created a higher level of uncertainty in the estimates, due to the fewer observations. However, there are good reasons to believe that there is a systematic selection of countries that do not have data on economic variables. Halperin, Siegle and Weinstein (2005, 32) recognize this "frequently overlooked, recording problem", and calculate that about a quarter of autocratic countries lack economic growth data from 1960 to 2001, while only five percent of the country-years were missing among democracies

(Halperin, Siegle and Weinstein 2005, 33).

If one recognizea that there are incentives for authoritarian rulers presiding over "development disasters" to obstruct data collection, it may be that the worst performing autocracies are systematically excluded from the data sets. Some examples of dictatorships with missing official GDP data serve as anecdotal evidence for this claim: North Korea, Myanmar, Eritrea and pre-invasion Iraq and Afghanistan. If dictatorial growth disasters are not reporting data, whereas dictatorial growth miracles such as present-day China and all democracies are reporting, this will introduce a source of systematic bias in the analysis, with regression coefficients overestimating the positive effect of dictatorship on economic growth.

Moreover, there are concerns that some dictatorships report too high GDP growth figures, and do so over quite extensive periods of time. It is for example estimated that about 50 percent of the very large drop in GDP in some ex-Soviet Republics after 1991 was due to the Soviet government and statistical agencies having manipulated GDP figures upwards prior to 1991 (Blanchard 2000).[6] Arguably, this was partly due to the particular plan-economic structure and lack of equilibrium market prices in the Soviet Union. But, also present China has been accused of manipulating GDP numbers upwards and artificially "smoothing out" business cycles (Reuters 2009). Singapore's investment data have also been strongly questioned (Hsieh 1999). Although the present Greek experience (see e.g. Willis 2009) shows that democracies may also experience manipulation of public statistics, the power concentration and lack of transparency in dictatorships most likely increases this problem.

One possible solution to the problem of lacking data from particular countries is to expand the available data by including estimates from several different sources. Since the Penn World Tables (PWT) incorporate GDP data for some countries that are not included in the WDI (and vice-versa), one strategy is to include these numbers for countries lacking data on the WDI. An even better solution is to incorporate the predicted values on the WDI data estimated from a bivariate regression with PWT GDP as independent and WDI GDP as dependent variable (see Knutsen 2006). Another solution is to utilize data constructed by other actors, for example non-governmental organizations and researchers, for countries that do not have publicly available GDP data. To name one such example, The Bank of Korea (South Korea) keeps estimates on GDP in North Korea (Nanto 2006). It is of course difficult to judge the credibility of such data, but the alternative is to systematically leave

[6]See Wheatcroft and Davies (1994) for a very interesting study of political manipulation of, and other problems with, national statistics in the Soviet Union's early history.

particular countries without official data out of the analysis, thereby likely skewing results.

Although I have here dwelled on the problems of lacking data, this study incorporates one of the most extensive data samples of any study on democracy's economic effects. I have constructed a data set in a cross section – time series format, based on data from several different sources like for example Maddison (2006), Hall and Jones (1999), the World Bank, Penn World Tables, the Polity Project, Freedom House, UNESCO and UNCTAD. There are 227 current countries, countries that no longer exist and more or less independent territories in the data matrix, and the data set spans from 1820 to 2006.[7]. However, most variables have data for a substantially shorter period of time. Some of the models in this dissertation's empirical chapters incorporate close to 10 000 country-years as a basis for inference, and the observations (for some of the most extensive models) are listed in Table 4.2 in Section 4.4.

I will get back to the various, specific samples used for the different models below. But, let me mention that my selection of variables from sources with an extensive empirical scope leads to the inclusion of a number of countries that are regularly excluded from other studies in the literature. The sample with the longest time series on democracy and economic growth is for example largely based on data gathered from Polity (Marshall and Jaggers 2002) and Maddison (2006). When it comes to the Maddison data, Angus Maddison has estimated, based on a vast variety of sources, GDP data for countries and time periods where official GDP data are non-existent. North Korea and Burma (Myanmar) are for example both included in the sample, whereas one of the worst dictatorial growth disasters, Zaire (DR Congo), is not included. Hence, there may still be some sample selection bias in this study's results, although the extensive sample presented in Table 4.2 indicates that it is likely much smaller than in most previous studies.

4.3.2 Measurement error and attenuation bias

If there is unsystematic measurement error in the independent variable in a linear regression model, the estimated regression coefficient will be drawn towards zero. This is the so-called attenuation bias (e.g. Wooldridge 2002, 74–76).[8] If democracy

[7]This data set can be downloaded at $http://folk.uio.no/carlhk/$

[8]Norwegian readers can look up Biørn (2003, 347–355). For a more advanced treatment of measurement errors and biases, including a treatment on multivariate models, see the lecture note by Steve Pischke (Spring 2007) available at $http://econ.lse.ac.uk/staff/spischke/ec524/Merr_new.pdf$.

is measured with an error, which is almost certainly the case independent of whether one relies on the PI, FHI or any other measure, the effect of political regime type will tend to be underestimated due to this bias.[9]

Kenneth Bollen has produced several papers focusing on measurement errors in different indexes of democracy (Bollen 1980, 1990, 1993; Bollen and Paxton 2000). Bollen has used techniques based on factor analysis to estimate both systematic and random measurement errors for different democracy indexes. In general, Bollen (1993) and Bollen and Paxton (2000) find that the indexes constructed by Freedom House have relatively high validity when compared to the indexes created by Banks and by Sussman. Especially the Political Rights index from Freedom House fares well. Bollen (1993) estimates that 6% of the variation in this index is due to a systematic "Method Factor Error", and that the estimated random measurement error actually is 0%. The Civil Liberties index fares less well with the respective numbers being 16% and 6%. This indicates that the FHI, if the estimates from Bollen are accepted as true, are not as plagued by measurement error as some of its critics have claimed is the case. Nevertheless, whether these estimates of systematic and random measurement errors are actually correct is open to dispute (see e.g. Høyland, Moene and Willumsen 2009).

If we leave the question of methodology aside, what do Bollen's estimates on random measurement errors imply? If Bollen's estimates are at least *approximately* correct, the random measurement component of the aggregated FHI constitutes around 5% of the variance. In a bivariate regression model, where the independent variable has a random measurement error of 5%, the covariance of X and Y has to be divided by 95% of the observed variance in the measured X variable (the true variance), in order to find the "true β_{FHI}". This implies that the "observed" β_{FHI} as a rule of thumb will have to be divided by 0.95 in order to give a consistent estimate of the real effect.

If we observe a β_{FHI} of -0.300 in a bivariate model with economic growth as dependent variable, the "correct" coefficient estimate is thus -0.316.[10] This translates into an estimated positive effect of 1.9% extra annual growth when going from 7 to 1 on the FHI, instead of 1.8%. If the random measurement error is instead 10%, the "correct effect", according to these calculations, is 2%. Then again, these are only crude calculations, and attenuation bias in a multivariate regression model is

[9]Theoretically, it is more involved to develop propositions on the nature of the bias in a multivariate regression model. Note that random measurement errors in control variables may also bias the democracy coefficient, and the direction of such biases depend among others on whether democracy is positively or negatively correlated with the control variable in question.

[10]This estimate is close to many of the estimates of β_{FHI} found in Chapter 6.

more complicated to calculate, even if one assumes that only the democracy variable is measured with an error. Nevertheless, random measurement error in democracy indexes may lead to systematically downwards biased effects of democracy on for example technological change and economic growth in Chapters 5 and 6.[11]

4.3.3 Selection of regimes: When do countries change to and from democracy, and how does it affect results?

One source of endogeneity of regime type, which is problematic in regressions where economic factors are used as dependent variables, is the "selection" of regimes according to prior economic performance. Which conditions tend to produce a change in regime to more or less democratic types of regimes? Przeworski and Limongi discussed this issue in their seminal article from 1993, and the issue was further explored in Przeworski and Limongi (1997) and Przeworski et al. (2000). One central insight from these studies is that "everyone seems to believe that durability of any regime depends on its economic performance. Economic crises are a threat to democracies as well as to dictatorships. The probability that a regime survives a crisis need not be the same, however, for democracies and dictatorships" (Przeworski and Limongi 1993, 62). The key implication is that if "democratic regimes are more likely to occur at a higher level of development or if democracies and dictatorships have a different chance of survival under various economic conditions, then regimes are endogenously selected", and this will lead to biases when using OLS-based techniques.

One solution to this problem is to use modeling techniques that incorporate the selection bias, like the type of model suggested by Heckman (1978). But, as Przeworski and Limongi note "[s]election models turn out to be exceedingly sensitive: minor modifications of the equation that specifies how regimes survive can affect the signs in the equations that explain growth. Standard regression techniques yield biased (and inconsistent) inferences, but selection models are not robust" (Przeworski and Limongi 1993, 64).

One less ambitious way of dealing with the issue of democracy being endogenous to economic performance is to incorporate the time-specific *income level* at all times as a control variable in studies based on PCSTS data. However, this does not fully solve the endogeneity problem. Empirical studies have, for example, shown that coup

[11] When it comes to random measurement error in the *dependent variables*, for example economic growth, this will not bias the estimates (see e.g. Wooldridge 2002, 71–73). However, this will lead to increased standard errors for the various estimates, thus making it more difficult to find a significant effect of democracy on growth.

probabilities for autocrats are higher when there has recently been slower *economic growth* (Clague et al. 2003, 166). If one couples this with a moderate probability of entering democracy some time after the coup, one would observe fewer years with economic crisis in authoritarian regimes relative to "boom-years", than if the coup-probability was independent of growth rates. The same argument could analogously be made for democracy, if assuming that the probability of democratic breakdown increases in periods of economic crisis. Indeed, empirical estimates indicate this is the case: "[w]hen democracies face a decline in incomes, they die at the rate of 0.0523 and can be expected to last nineteen years, but when incomes are growing, they die at the rate of 0.0160, with an expected life of sixty-four years" (Przeworski and Limongi 1997, 167). These two effects may partially cancel each other out, but whether they do so is an empirical question.

Using 2SLS models might be an even better way of dealing with the endogeneity problem than using Heckman models (for a brief discussion of the functional equivalence of Heckman models and 2SLS, see Acemoglu 2005). As discussed in Section 4.6, 2SLS is the preferred strategy used to cope with endogeneity in this study. The choice of 2SLS is made viable by the new instrument, WAVE, which according to the empirical tests conducted in Section 4.6 should generate consistent 2SLS estimates of the effect of democracy on growth. 2SLS is preferred partly because of the dichotomization of regime type required in Heckman selection models; such dichotomization was argued to be untractable in Chapter 2. 2SLS is also preferred partly because of the sensitivity of the Heckman selection models noted above.

4.4 Model specifications and samples

In this section, I present the concrete model specifications and the main types of samples used in this thesis' empirical analysis.

4.4.1 A general discussion on model specification

Let me continue where I left in Chapter 3, namely by discussing the selection of appropriate control variables in statistical models investigating the economic effects of democracy. A point that was mentioned in Chapter 3, and indicated by Figure 3.6, was that several of the variables often controlled for in statistical analysis of democracy's economic effects are likely important channels through which democracy affects economic factors (for an example, see Barro 1997). More specifically, one important implication of the discussion in Chapter 3 is that one should be careful

of controlling for factors related to human and physical capital accumulation, and one should even be careful of controlling for economic institutional aspects related to property rights protection and control of corruption. Economic institutional aspects may stand in a quite complex reciprocal relationship with democracy (see e.g. Feng 2005; North, Wallis and Weingast 2009; Knutsen 2011*b*). However, empirical estimation strategies that explicitly incorporate the possibility of both democracy and economic institutional aspects being endogenous, find that the causal effects mainly tend to go *from* democracy to property rights (Knutsen 2011*b*) and other economic institutional aspects (Feng 2005). Democracy, as Rodrik (2008) notes, is a meta institution with important effects on other institutional aspects and policies (see also Acemoglu and Robinson 2006*c*).

Figure 3.6 in Chapter 3 also suggests which types of variables that *should* be incorporated as control variables, among them income level, demographic factors, geographic factors, cultural factors and political-historical factors. In the empirical analyses in Chapters 5 and 6, I test different models with different sets of control variables. More control variables reduces the risk of omitted variable bias, but may also increase the risk of controlling away effects that are indirect causal effects of democracy. It may also reduce the efficiency of estimates, among others because of multicolinearity between democracy and other control variables.

I will go through the rationale for including the specific control variables in the next section, but let me already briefly mention the main control variables used in this study. In the baseline model, *Model I*, I control for income level, measured by ln GDP per capita, or alternatively ln TFP when TFP growth is the dependent variable. I also control for ln population level, as population size may affect both regime type and economic performance. Moreover, even if political stability may be a channel through which democracy affects growth (see Feng 1997, 2005), I control for ln regime duration to ward of a possible large omitted variable bias: political instability reduces economic growth (e.g. Alesina et al. 1996), and also affects the nature of the regime type.[12] Moreover, I control for the ethnic fractionalization index constructed by Alesina et al. (2003). Ethnic composition may affect both the probability of having a democracy, and, as discussed in Section 3.3.1, it is also likely to affect economic outcomes (see e.g. Easterly and Levine 1997; Alesina and La Ferrara 2005).[13] Finally, I control for region dummies, as geographic region may

[12] As, Feng (1997, 2005) notes, and as has been much discussed in the literature, political stability is an ambiguous concept. I control only for aspects related to regime duration. I discuss this questionable choice more in detail below.

[13] However, see the analysis in Posner (2005) on how ethnic cleavages and structures may be endogenous to political factors.

be related to a host of geographical, historical and cultural variables that affect both the probability of having a democracy and economic growth rates.

In the more extensive *Model II*, I add sets of dummies for historical colonizing country to the variables in Model I. The identity of the former colonizer may be correlated with specific political-historical factors that may affect economically relevant political institutions (like structures of the bureaucracy and the legal system) that are not part of the regime type concept. I also add dummies for plurality religion. As discussed in Section 3.3.1, Weber (2002) argued that cultural aspects related to Protestant (and Reformed) Christianity generated higher economic productivity, and some scholars have argued that beliefs and values tied to Confucianism has a similar effect (e.g. Lee 2003). As Kim (1994) and Sen (1999), I am not particularly swayed by these arguments (see Knutsen 2010*b*), but I add these controls in any case. They *may* be correlated with cultural aspects that are relevant for regime type and economic growth, and plurality religion is relatively exogenous both to growth and regime type.

In *Model III*, I add decade dummies to the variables in Model II to control for time-specific effects, for example related to global economic and political trends, that may bias the relation between democracy and growth.

In *Model IV*, I further add controls for absolute latitude, total trade as share of GDP and urban population as share of total population to Model III. Although trade may be endogenous to regime type, as discussed in Chapter 3, the other variables are likely exogenous, and all these factors may impact on both regime type and growth (e.g. Hall and Jones 1999; Acemoglu, Johnson and Robinson 2001*b*; Acemoglu 2005). The above specification for Model IV is actually only used for what I below call the "short sample". For the "long sample", Model IV includes absolute latitude and a proxy for trade intensity based on the Frankel-Romer index; I do not have long time series for urban as share of total population and trade as share of GDP.

4.4.2 The long and the short samples used in the economic growth regressions

Before I start discussing the data sources and operationalizations, let me list the various countries included in selected models in Chapter 6. Table 4.1 lists the countries that are included in one of the models based on the "short" time series. More precisely, this is the data used in Model I in Table 6.1, which uses PPP-adjusted GDP per capita growth drawn from the World Development Indicators as dependent variable and the FHI as the operationalization of democracy. Although

there are variations in the samples between the particular models used, Table 4.1 gives a decent general picture of the data material underlying the short time series models.[14]

Albania 1981-2004	Algeria 1976-2004	Angola 1981-2004	Armenia 1991-2004
Australia 1976-2004	Azerbaijan 1991-2004	Bahrain 1981-2004	Bangladesh 1976-2004
Belarus 1991-2004	Belgium 1976-2004	Benin 1976-2004	Bolivia 1976-2004
Botswana 1976-2004	Brazil 1976-2004	Bulgaria 1981-2004	Burkina Faso 1976-2004
Burundi 1976-2004	Cambodia 1994-2004	Cameroon 1976-2004	Canada 1976-2004
Centr. Afr. Rep. 1976-2004	Chad 1976-2004	Chile 1976-2004	China 1976-2004
Colombia 1976-2004	Comoros 1981-2004	Congo DR 1976-2004	Congo R 1976-2004
Costa Rica 1976-2004	Cote d'Ivoire 1976-2004	Croatia 1991-2004	Denmark 1976-2004
Djibouti 1991-2004	Dom. Rep. 1976-2004	Ecuador 1976-2004	Egypt 1976-2004
El Salvador 1976-2004	Equ. Guinea 1986-2004	Estonia 1991-2004	Ethiopia 1982-2004
Finland 1976-2004	France 1976-2004	Gabon 1976-2004	Gambia 1976-2004
Georgia 1991-2004	Germany 1990-2004	Ghana 1976-2004	Greece 1976-2004
Guatemala 1976-2004	Guinea 1987-2004	Guinea-Bissau 1976-2004	Guyana 1976-2004
Haiti 1976-2004	Honduras 1976-2004	Hungary 1976-2004	India 1976-2004
Indonesia 1976-2004	Iraq 1976-2004	Ireland 1976-2004	Israel 1976-2004
Italy 1976-2004	Jamaica 1976-2004	Japan 1976-2004	Jordan 1976-2004
Kazakhstan 1991-2004	Kenya 1976-2004	Korea, South 1976-2004	Kuwait 1976-2004
Kyrgyz Rep. 1991-2004	Lao 1985-2004	Latvia 1991-2004	Lebanon 1989-2004
Lesotho 1976-2004	Lithuania 1991-2004	Macedonia 1992-2004	Madagascar 1976-2004
Malawi 1976-2004	Malaysia 1976-2004	Mali 1976-2004	Mauritania 1976-2004
Mauritius 1981-2004	Mexico 1976-2004	Moldova 1991-2004	Mongolia 1982-2004
Morocco 1976-2004	Mozambique 1981-2004	Namibia 1990-2004	Nepal 1976-2004
Netherlands 1976-2004	Nepal 1976-2004	New Zealand 1976-2004	Niger 1976-2004
Nigeria 1976-2004	Norway 1976-2004	Oman 1976-2004	Pakistan 1976-2004
Panama 1976-2004	Paraguay 1976-2004	Peru 1976-2004	Philippines 1976-2004
Poland 1991-2004	Portugal 1976-2004	Romania 1981-2004	Russia 1992-2004
Rwanda 1976-2004	Saudi Arabia 1976-2004	Senegal 1976-2004	Sierra Leone 1976-2004
Slovakia 1993-2004	Slovenia 1991-2004	South Africa 1976-2004	Spain 1976-2004
Sri Lanka 1976-2004	Sudan 1976-2004	Swaziland 1976-2004	Sweden 1976-2004
Switzerland 1976-2004	Syria 1976-2004	Tajikistan 1991-2004	Tanzania 1989-2004
Thailand 1976-2004	Togo 1976-2004	Trinidad Tobago 1976-2004	Tunisia 1976-2004
Turkey 1976-2004	Turkmenistan 1991-2004	Ukraine 1991-2004	UK 1976-2004
US 1976-2004	Uzbekistan 1991-2004	Venezuela 1976-2004	Vietnam 1985-2004
Zambia 1976-2004	Zimbabwe 1976-2004		

Table 4.1: Countries included in one model specification based on the short time series using the FHI as democracy indicator and PPP-adjusted GDP per capita growth from the World Development Indicators as dependent variable

As mentioned in Chapter 3, meta analyses (Przeworski and Limongi 1993; Doucouliagos and Ulubasoglu 2008) point out that empirical results on whether democracy increases or decreases economic growth rates depend both on the data and methodology used. Hence, one should use the most extensive data set available in order to include all possible relevant information, and one should use the most proper methodological techniques at hand. Lack of data sets with long time series on all relevant variables have often forced quantitative social scientists to leave out the main part of modern history, conceived by historians to have started with the "dual revolutions", the industrial revolution in Great Britain and the political revolutions in eighteenth century United States and France.

[14]More precise descriptions of country years for the various models are available in STATA log-files on request.

Luckily, thanks to the Polity Project and the data gathering effort by economic historian Angus Maddison, such historical data is actually possible to utilize. This dissertation includes the most extensive study on democracy and growth in the literature, incorporating data from 1820 (for some countries) to 2003. Moreover, and as noted above, several countries that are often left out of studies of democracy and growth because of lacking GDP data, like North Korea, are included in this study. As I discussed in Section 4.3.1, this is important not only because of pure sample-size considerations, but also presumably because it is often the economically worst performing dictatorships that are left out of statistical analyses. If this is true, many previous studies have used samples that have contributed to the underestimation of democracy's effect on economic growth (and on other measures of economic performance).

Table 4.2 shows the data used for Model I in Table 6.6, based on the long time series. In this model, the operational dependent variable is annual growth in PPP-adjusted GDP data from Maddison (2006) and the democracy measure is the PI, lagged with two years relative to the dependent variable. The first and last years a country enters the data sample is noted in the table; some countries have interrupted time series in the Maddison data, but most do not.

I noted some of the countries listed and not listed in Tables 4.1 and 4.2 when discussing possible selection biases in Section 4.3.1. Neither of these samples are complete in terms of incorporating all countries for their respective time periods. The short sample lacks "usual suspects", such as North Korea and Myanmar. The long sample lacks Zaire, and many countries that existed in the 19th century those no longer exist, like Baden, Bavaria, Naples and Piedmonte. Additionally, all models based on the PI, which include all models using the long sample, lack relatively small countries in terms of population; Polity does not score countries with a population lower than 500 000 in 2002 (see Marshall and Jaggers 2002, 4). This means that Iceland, Luxembourg and some Caribbean and Pacific island states, among others, are excluded.

The country-years in Tables 4.1 and 4.2 are those used as basis of inference in models with the smallest set of control variables. However, some country-years lack data for specific control variables. The models incorporating the most extensive set of control variables tend to have 300–400 observations less than those using the least extensive set of control variables, for the short sample, and 700–800 fewer for the long sample. The observations that drop out, however, make up less than ten percent of the observations of the respective samples.

Afghanistan 1964-2000	Albania 1950-2001	Algeria 1962-2001	Angola 1975-2001
Argentina 1890-2001	Armenia 1991-2001	Australia 1901-2001	Austria 1820-2001
Azerbaijan 1991-2001	Bahrain 1971-2001	Bangladesh 1972-2001	Belarus 1991-2001
Belgium 1830-2001	Benin 1960-2001	Bolivia 1945-2001	Botswana 1966-2001
Brazil 1824-2001	Bulgaria 1900-2001	Burkina Faso 1960-2001	Burma 1950-2001
Burundi 1962-2001	Cambodia 1953-2001	Cameroon 1960-2001	Canada 1870-2001
Centr. Afr. Rep. 1960-2001	Chad 1960-2001	Chile 1820-2001	China 1862-2001
Colombia 1900-2001	Comoros 1975-2001	Congo R. 1960-2001	Costa Rica 1920-2001
Croatia 1991-2001	Cuba 1929-2001	Czechoslovakia 1920-1992	Cote d'Ivoire 1960-2001
Denmark 1849-2001	Djibouti 1977-2001	Dominican R. 1950-2001	Ecuador 1939-2001
Egypt 1950-2001	El Salvador 1920-2001	Eq. Guinea 1968-2001	Ethiopia 1950-2001
Estonia 1991-2001	Finland 1917-2001	France 1820-2001	Gabon 1960-2001
Georgia 1991-2001	Germany 1868-2001	Ghana 1960-2001	Greece 1890-2001
Guatemala 1920-2001	Guinea 1958-2001	Guinea-Bissau 1974-2001	Haiti 1945-2001
Honduras 1920-2001	Hungary 1870-2001	India 1950-2001	Indonesia 1949-2001
Iran 1950-2001	Iraq 1950-2001	Ireland 1921-2001	Israel 1950-2001
Italy 1861-2001	Jamaica 1959-2001	Japan 1870-2001	Jordan 1950-2001
Kazakhstan 1991-2001	Kenya 1963-2001	Kuwait 1963-2001	Kyrgyz Rep. 1991-2001
Laos 1954-2001	Latvia 1991-2001	Lebanon 1950-1974	Lesotho 1966-2001
Liberia 1950-2001	Libya 1950-2001	Lithuania 1991-2001	Macedonia 1991-2001
Madagascar 1960-2001	Malawi 1964-2001	Malaysia 1957-2001	Mali 1960-2001
Mauritania 1960-2001	Mauritius 1968-2001	Mexico 1890-2001	Moldova 1991-2001
Mongolia 1950-2001	Morocco 1956-2001	Mozambique 1975-2001	Namibia 1990-2001
Nepal 1870-2001	Netherlands 1820-2001	New Zealand 1860-2001	Nicaragua 1920-2001
Niger 1960-2001	Nigeria 1960-2001	N. Korea 1950-2001	Norway 1820-2001
Oman 1957-2001	Pakistan 1950-2001	Panama 1945-2001	Paraguay 1939-2001
Peru 1896-2001	Philippines 1935-2001	Poland 1929-2001	Portugal 1850-2001
Quatar 1971-2001	Romania 1870-2001	Russia 1992-2001	Rwanda 1961-2001
Saudi Arabia 1950-2001	Senegal 1960-2001	Sierra Leone 1961-2001	Singapore 1959-2001
Slovakia 1993-2001	Slovenia 1991-2001	Somalia 1960-1990	South Africa 1913-2001
S. Korea 1948-2001	Spain 1850-2001	Sri Lanka 1948-2001	Sudan 1954-2001
Swaziland 1968-2001	Sweden 1820-2001	Switzerland 1850-2001	Syria 1950-2001
Tajikistan 1991-2001	Tanzania 1961-2001	Thailand 1938-2001	Togo 1960-2001
USSR 1928-1991	Trinidad Tobago 1962-2001	Tunisia 1959-2001	Turkey 1923-2001
Turkmenistan 1991-2001	Uganda 1962-2001	Ukraine 1991-2001	UAE 1971-2001
UK 1837-2001	US 1820-2001	Uruguay 1870-2001	Uzbekistan 1991-2001
Venezuela 1900-2001	Vietnam 1976-2001	Yugoslavia 1921-2001	Zambia 1965-2001
Zimbabwe 1970-2001			

Table 4.2: Countries included in one model specification based on the long time series. The PI (lagged with two years) is used as measure of democracy and annual growth in PPP-adjusted GDP from Maddison (2006) is the dependent variable in this model. Years reflect years for independent variables ($t - 2$).

4.5 Data and operationalizations

The three democracy measures used in this study, the FHI, the PI and the dichotomous AREG measure from Alvarez et al. (1999), were extensively discussed in Chapter 2. In this section, I first look at data for the dependent variables used in Chapters 5, 6 and 7. These are different measures of economic growth, technological change, human capital, physical capital and property rights protection. Thereafter, I discuss the operationalization and data sources for the various control variables. In this section, I also present some descriptive statistics for the data used in the next chapters' statistical models.

4.5.1 Dependent variables

The analysis in Chapter 5 first studies how democracy affects physical and human capital accumulation, and thereafter how democracy affects technological change. Chapter 6 studies democracy's effect on economic growth. In Chapter 7, a brief analysis on how various dictatorship types affect property rights protection is presented. I start here with discussing the operationalization and data for economic growth. Thereafter, I discuss the measures used for technological change, physical capital and human capital. At last, I present the property rights index used in Chapter 7, which is also used in Knutsen (2011*b*).

Economic growth

Economic growth in a geographic area is defined as the percentage increase in the aggregate level of production during a year. I focus here on economic growth in per capita terms, and 'economic growth' is throughout used as shorthand for 'economic growth per capita'. I operationalize the concept mainly by using growth in Purchasing Power Parity-adjusted (PPP-adjusted) real GDP per capita. Using real rather than nominal GDP is necessary to account for inflation. In the short sample, GDP data are collected from the World Development Indicators (WDI). More specifically, the dependent variable in the short sample is the annual percentage growth rate in PPP-adjusted GDP per capita, measured in 2000 dollars. I use PPP-adjusted instead of exchange rate-adjusted GDP per capita because my main underlying concern is the welfare effects of democracy, and I therefore need to take into account the local price levels (for an excellent discussion on this issue, see Bhagwati 1984). PPP-adjusted GDP per capita uses local prices, calculated from a specified basket of goods, as price denominator. Exchange rate-adjusted GDP is for example more relevant for tourists or international companies evaluating whether to invest abroad or not on the basis of the size of the foreign market (see Hveem, Knutsen and Rygh 2009). However, most people evaluate their incomes in terms of how many goods and services they are able to buy at home.

There has been raised criticisms on the selection of goods and services used to calculate (PPP) price levels (e.g. Wade 2008). Moreover there are also strong indications that statistical calculations of price adjustments, generally, are unable to fully capture the changing quality of various goods and services, which leads to the underestimation of the actual rate of economic growth (Nordhaus 1998). There are several other methodological problems with using GDP per capita growth as a proxy for economic growth. For instance, depreciation of capital is not calculated

into the concept, and the depletion of natural resources is not taken into account either (for example oil and mineral extraction taken from known reserves). The most problematic issue when it comes to using it on a global sample, however, is that GDP (growth) does not take into account the size (growth) of the informal economy, which is relatively large particullarly in some developing countries (for more extensive discussions, see De Soto 1989; Wade 2008; Knutsen 2006).

As already mentioned, Angus Maddison's data set includes quite long time-series data on GDP and population (see description of the data in Maddison 2006, 2007, 2010).[15] Estimating GDP in years when the national accounting system was not even invented is a heroic task, and Maddison's estimates are bound to contain large errors. Maddison utilizes PPP-adjusted GDP-data (measured in US 1990 dollars), and the data thus take into account differing local price levels. This poses an extra dimension of uncertainty for the GDP data, as local price levels need to be estimated based on a specific basket of goods and services, as briefly discussed above.

Econometric theory suggests that if dependent variables are measured with an unsystematic error, it will be more difficult to find significant regression coefficients. This has implications, in my case, for example for the t-values of PI coefficients. Hence, errors in the dependent variable that do not produce specific biases in one direction or the other, in terms of being positively or negatively correlated with degree of democracy, do not threaten the validity of any reported significant relationship in Chapter 6. If anything, large unsystematic measurement errors in the GDP per capita growth data make it more difficult to find significant effects of democracy. There may of course be systematic biases, for example because data quality is lower in dictatorships, but it is hard to say anything determinate about in which direction this bias goes. In any case, the results from the analysis using the Maddison data can be triangulated against results from regressions using the temporally less extensive, but "higher quality", WDI data.

For the Maddison GDP data, the measurement error is likely larger for years early in the time series, as there was no national accounting system and the data used to estimate GDP for the early years are of varying quality (for a detailed discussion of these sources and the estimation procedures for different countries, see Maddison 2007). Some countries' GDPs are also more difficult to estimate precisely in recent times, because of lack of reliable data; examples could be the Soviet Union prior to 1991 and present-day North Korea. The most problematic aspect of the Maddison data, however, is the fact that some "core countries", where historical data are more abundant, are used as benchmark countries for other countries, most

[15]The data can be downloaded from Maddison's homepage: *http* : *//www.ggdc.net/maddison/*.

often close neighbors and mostly for the early years. This means that the growth rate in a country A, which has an abundance of data, will sometimes by construction be correlated with the growth rate in country B, which has less available data for estimating GDP. This may lead to difficulties in finding actual effects of democracy on growth, if A is a democracy and B a dictatorship, as the measured growth rates diverge less than the actual. If a fast-growing democracy is used as a benchmark for (actually) slow-growing democracies, and a slow-growing dictatorship is used as a benchmark for fast-growing dictatorships, there will be a bias upwards for democracy's growth effect. Nevertheless, there are no indications that this is the case in general.

Although there are obvious and quite substantial data problems, Maddison (2007, 294) claims that "[f]or the epoch of capitalist economic growth back to 1820, quantitative economic historians have made great progress in measuring growth performance ... There is still a need to fill gaps and crosscheck existing estimates, but the broad contours of world development in this period are not under serious challenge".[16]

Figure 4.2 shows the distribution of country-years according to recorded economic growth from the Maddison data set. The figure only shows the distribution of country-years that are included in the 2-year lag OLS with PCSE model with the fewest control variables from Chapter 6 (Model I in Table 6.13). The histogram excludes the few country-years with extreme growth rates below -20 percent or above 20 percent.[17] The mean growth rate in this sample is 1.68 percent, and the standard deviation is 5.84 percent. As shown in the Figure, the vast majority of country-years experienced growth rates between -5 percent and +10 percent, and the distribution is not far from a normal distribution.

Technological change

Measuring technological change is difficult (see e.g. Nelson 2005). One common proxy for technological change, or at least for technological change-induced economic

[16]In the long sample I include about 800 country-years where data on GDP per capita growth, GDP per capita level or population level is constructed by interpolation. Several of the time series for individual countries are interrupted in the Maddison data set. I only constructed interpolated GDP data where at least 90% of the years missing between two observation-years have the same score on the Polity Index. Where I interpolate, I assign the average growth rate of the period to all the years. Hence, I will get artificially low variation in the estimated GDP per capita growth rates, but the average growth rate is correct by construction. There will be "construction errors" in the estimates of GDP levels and population levels at particular points in time, but the influence of this error on the estimated effect of democracy on growth is likely to be tiny.

[17]If nothing else is indicated, all histograms below only utilize observations that are included in Model I in Table 6.13.

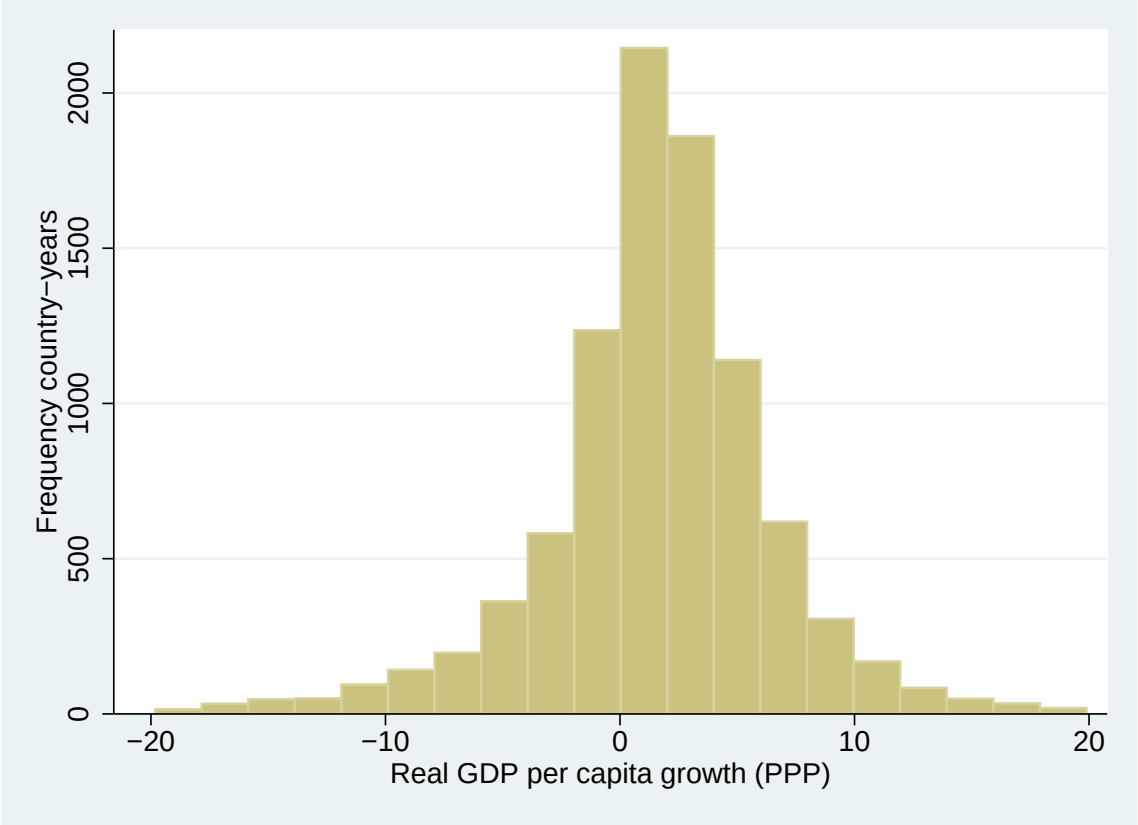

Figure 4.2: The distribution of country-years according to real GDP per capita growth.

growth, is Total Factory Productivity (TFP) growth. TFP is calculated as a residual, when economic growth stemming from changes in factor inputs like physical capital, human capital and labor are subtracted from total economic growth (see e.g. Barro and Sala-i Martin 2004; Baier, Dwyer and Tamura 2002).

I utilize the extensive TFP data from Baier, Dwyer and Tamura (2006). These data cover 145 countries, and have very long time series; 24 countries have time series that extend over more than 100 years. The TFP data are estimated with uneven intervals, approximately averaging a data point every tenth year for most countries. The data are based on multiple sources. TFP is calculated using income per worker rather than per person, and by assuming Hicks-neutral technology and a capital share of $\frac{1}{3}$. For a closer description of these data and the underlying assumptions, see Baier, Dwyer and Tamura (2002). I interpolate these time series, assuming constant TFP growth rates within periods, to get estimates of TFP growth on an annual basis. I use both the interpolated annual data, and the periodic observations provided in Baier, Dwyer and Tamura (2006) in different analyses in Chapter 5.

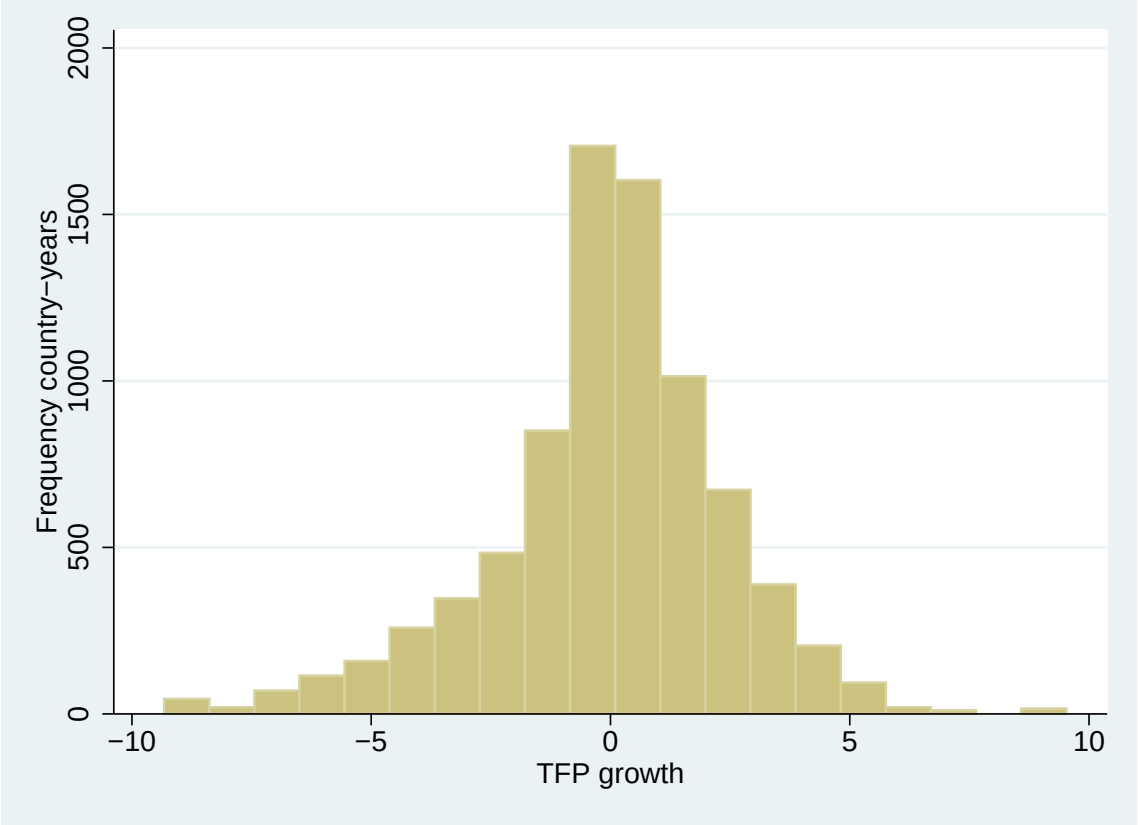

Figure 4.3: The distribution of country-years according to TFP-growth.

Figure 4.3 shows the distribution of TFP growth for all country-years with TFP data (interpolated). The mean TFP growth rate is actually negative, more precisely -0.16 percent, and the standard deviation is 2.78.[18]

There are several problems with TFP as a measure of technology-induced economic growth. First, TFP responds to any type of economic shock, for example under-utilization of capacity in a recession, or profit windfalls from oil-price hikes. However, the long time series used here mitigates this problem somewhat, as short term shocks matter less over a long time frame. Second, TFP is a theoretical construct based on a particular macro-production function, and therefore relies on the assumptions underlying the particular model (see Rodrik 1997*b*). Moreover, TFP growth may be systematically underestimated since investment and work effort likely increase when technology level, and thereby returns to inputs, increase (see e.g. Verspagen 2005). If so, technological change is a cause of input accumulation, but growth accounting will assign the growth to the accumulation of inputs.

[18]See Baier, Dwyer and Tamura (2002) for a discussion of the generally low TFP growth rates in the sample

Nevertheless, there is no good reason for why such biases should critically influence the relationship between democracy and TFP growth. TFP data are also troubled by unsystematic measurement error, especially for the older data, where both GDP, physical capital stock and human capital stock estimates are based on thin data material (see Baier, Dwyer and Tamura 2006; Maddison 2006). If these errors are unsystematic, they do not bias coefficients but should only increase the regression's standard errors, thereby making it harder to find significant results. Therefore, the mediocre quality of the older TFP data do not necessarily cast serious doubts on the validity of the results in Section 5.4.

A tricky issue related to measuring the impact of technological change on economic growth is the time lag (see e.g. Verspagen 2005; Crafts 2003). When it comes to economic growth benefits from General Purpose Technologies (GPTs), Crafts argues that "[t]he lag before a GPT has its full effect on productivity is measured in decades not years" (Crafts 2003, 19). There is also likely a substantial time lag from the effect of political institutions and policies on innovation and idea diffusion: First, there may be lags tied to the effect of institutional structures on diffusion of ideas *into* the nation. Second, it takes time before ideas diffuse widely *within* the national economy. Using patent citation data, Caballero and Jaffe (1993) estimate the diffusion lag of ideas between US firms to be on average between one and two years, whereas "Mansfield, Schwartz, and Wagner (1981) found that 60 percent of the patented innovations they studied were imitated within 4 years" (Segerstrom 1991, 808). Third, it takes time before economic actors can efficiently utilize new ideas in actual production. As no concrete model exists that would allow me to better guess the total time lag of the effect of democracy on TFP growth, I use models that operate with different time lags in Chapter 5.

Finally, because of the many problems related to operationalizing technology level and change, I use the ArCo-index constructed by Archibugi and Coco (2004, 2005) to test the robustness of the results on democracy's effect on technology based on TFP data. This index, which is not without its problems as an operationalization of technology, is discussed more in detail in Chapter 5.

Physical capital and human capital

Chapter 5 also includes analysis of how democracy affects physical and human capital. The data used for both these measures are drawn from the WDI for the short samples, and from Baier, Dwyer and Tamura (2006) for the long samples.

The standard operationalization of physical capital draws on investment account

data. Investment flows are easier to measure precisely than capital stocks, for example because there is widespread disagreement on what the correct average depreciation rate is; the depreciation rate of capital may vary between countries, sectors and even firms (see e.g. Bu 2006). Moreover, the estimation of capital stocks is sometimes complicated by wars and natural disasters that may destroy a large share of existing stocks.[19] Additionally, given the limited time series, the part of the capital stock stemming from older investments has to be calculated based on a stringent set of assumptions, mainly related to the expected average historical depreciation rate (see e.g. Barro and Sala-i Martin 2004; Knutsen 2006).

Gross domestic investment (flow) data are measured in percentage of GDP, and are as mentioned taken from the WDI for the short samples. Hence, the dependent variable is $\frac{Investment_t * 100\%}{GDP_t}$ in the short sample analysis. According to the World Bank, gross domestic investment, or gross capital formation

> consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.[20]

When it comes to gross savings measured in percent of GDP, these are according to the World Bank "calculated as gross national income less total consumption, plus net transfers".[21] Chapter 5 also contains analysis where $\frac{Savings_t * 100\%}{GDP_t}$ is the dependent variable. These data are also gathered from the WDI.

Regarding the measurement of human capital, the number of different operationalizations used in the literature is quite large. Human capital can be defined as the economically relevant capabilities, skills and knowledge of the workforce. Despite some usage of cross-national tests that more directly tap the skills and knowledge of citizens (OECD 2006), operationalizations of human capital have tended to focus on policies related to, or spending on, two types of issue areas that are widely agreed to affect capabilities, skills and knowledge, namely health and education.

[19] See for example the discussion and the estimates of capital stock depletion in the UK during WWII in Brown (1946).

[20] $http://data.worldbank.org/indicator/NE.GDI.TOTL.ZS$

[21] $http://data.worldbank.org/indicator/NY.GNS.ICTR.ZS$

The main operationalization used in Chapter 5 (short time series) is related to the education system. More specifically, the main proxies for human capital are gross enrollment ratios for primary, education and tertiary education. The enrollment data are taken from the WDI. According to the World Bank, "[g]ross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown".[22]

I will not go deep into the more general discussion on the operationalization of human capital here (see e.g. Klenow and Rodriguez-Clare 1997; Lake and Baum 2001). However, let me note that enrollment data are much used, but quite certainly imperfect, proxies for human capital. These data only measure the reach of the education system, in terms of the share of the young population covered, and not spending per student or quality of the system. Moreover, empirical analysis has shown that some estimated empirical relationships involving human capital are quite sensitive to whether primary, secondary, or tertiary enrollment ratios are chosen as indicator (see Mankiw, Romer and Weil 1992; Klenow and Rodriguez-Clare 1997). Previous studies have investigated the link between democracy and various measures of human capital much more in detail than the analysis in this dissertation. I encourage the reader to confront these studies (e.g. Lake and Baum 2001; Baum and Lake 2003; Stasavage 2005; Lindert 2005), which were briefly discussed in Chapter 3 and will be further elaborated on in Chapter 5.

In Chapter 5, the analysis of the long time series use human and physical capital-induced economic growth as dependent variables. As was noted in the discussion of the TFP data, there are likely large measurement errors in these estimates because of the growth accounting procedure, and the assumptions it is based on (see e.g. Rodrik 1997*b*; Verspagen 2005; Eberhardt 2008). In any case, the data from Baier, Dwyer and Tamura (2006) are used. Baier, Dwyer and Tamura (2006) combine data from several different data sources to construct their measures. Among others, they use data from Barro and Lee (1993) on education, and they also draw on various measures from the Penn World Tables (Summers and Heston 2000), the World Development Indicators (World Bank 2001) and from Maddison's data (Maddison 1995) for calculating their growth rates. However, their main sources are the data collected in Mitchell (1998*a*,*b*,*c*).[23]

When it comes to the concrete operationalization of human capital in the Baier, Dwyer and Tamura (2006) data set, the "measure of human capital per worker in each country reflects both average education and average number of years employed"

[22] $http://data.worldbank.org/indicator/SE.PRM.ENRR$.

[23] See Baier, Dwyer and Tamura (2006, 24–26) for a closer description of the various data sources.

(Baier, Dwyer and Tamura 2006, 29). The authors use a similar computation as that in Barro and Lee (1993).[24] The physical capital stocks are calculated using the perpetual inventory method (Baier, Dwyer and Tamura 2006, 29), assuming an annual capital depreciation rate of 7%.[25]

Protection of property rights

Chapter 7 includes an empirical analysis of how various dictatorship types, as categorized by Hadenius and Teorell (2006), affect protection of property rights.[26] The property rights data are taken from the ICRG Researcher's Data Set collected by The PRS Group.[27] More specifically, I use a self-constructed index based on two of the ICRG data set's components.[28] This index is referred to as ICRGPROP. The first component of ICRGPROP is the so-called Investment Profile index (IP), which ranges from 0 to 12 and builds on three sub-components. These sub-components, Contract Viability/Expropriation Risk, Profits Repatriation and Payment Delays, all range from 0 to 4. The second component of ICRGPROP is the Law and Order index (LO). LO is constructed on the basis of a Law component and an Order component. The Law component assesses the strength and impartiality of the legal system, whereas the Order component assesses popular observance of the law. LO ranges from 0 to 6, and its two sub-components both range from 0 to 3.

In order to capture different aspects of protection of property rights, I calculate $ICRGPROP = IP + 2 * LO$. This index ranges from 0 to 24. The lowest country-year score is Somalia in 1993 (1), and the highest score (24) is given to Austria, Canada, Finland, Ireland, Luxembourg, Netherlands, Singapore, Sweden and the United Kingdom in one or more years. The data on ICRGPROP go back to 1984. The mean (in a sample of 3166 country-year observations) is 14.3 and the standard deviation is 4.8. The standard deviation between panels is 3.9, and the standard deviation within panels is 2.7, which indicates that there is decent variation in property rights protection also within countries over time.

[24] To be concrete, the specification of human capital per worker, H is given by $H = H_0 exp(\phi_P P + \phi_I I + \phi_S S + \lambda_1 Ex + \lambda_2 Ex^2$, "where H is human capital, H_0 is the level of human capital with no schooling or experience; ϕ_p, ϕ_i, and ϕ_s are parameters on years of primary, intermediate, and secondary plus higher education; and λ_1 and λ_2 are parameters on years of work experience and experience squared" (Baier, Dwyer and Tamura 2006, 31). See the whole discussion in Baier, Dwyer and Tamura (2006, 29–32).

[25] See my discussion and utilization of this method for the growth accounting analysis performed in Knutsen (2006).

[26] For a brief conceptual discussion of 'property rights', see Knutsen (2011*b*).

[27] For a short description of the methodology used for constructing the variables in this data set, see $http://www.prsgroup.com/ICRG_Methodology.aspx$.

[28] This is the same index as that used, and discussed more extensively, in Knutsen (2011*b*).

4.5.2 Control variables

As noted several times above, when investigating the effect of a variable, X, on another, Y, one needs to filter out the correlation between X and Y that is due to other variables, $\mathbf{Z}$, affecting both X and Y. If one is mainly interested in the total, rather than direct, effect of X on Y, one should not control for variables $\mathbf{W}$ that are likely effects of X but causes of Y. Figure 3.6 gives strong indications of which variables to include as control variables and which to exclude, if I am to investigate the total effect of democracy on economic growth. Here I very briefly sum up the rationale for the specific control variables included in the following chapters' regression models, as the discussion in Chapter 3 has already provided the motivation for the selection of more general classes of control variables. I also present the concrete operationalizations of the control variables and their data sources.

Income level and level of technological efficiency

From the discussion in Chapter 3 on the possible underlying causes of regime type and economic growth, I concluded that prior income level is likely one of the most important control variables. Despite the results in Acemoglu et al. (2008), there are good reasons to at least suspect that *income level* may affect probability of democratization and of democratic breakdown. Moreover, because of convergence mechanisms (see e.g. Barro and Sala-i Martin 2004), but also poverty trap mechanisms (see e.g. Hübler 2012), initial income level is a vital determinant of subsequent growth in income. This is also the case for technology level, when it comes to its impact on technological change. Thus, I use *log real GDP per capita*, mainly PPP-adjusted, as a control variable in the economic growth regressions, and *log TFP level* in the technological change regressions.[29] In addition to income level itself being a central variable, GDP per capita is highly correlated with several other possibly relevant control variables, like for example education level and degree of urbanization. This adds to the importance of incorporating income level as a control variable.

I discussed (the growth rate of) GDP per capita and TFP as operationalizations above, and also presented the concrete data used. The data sources for these control variables (the levels) are always the same as that for the dependent variable in the various regression models. When it comes to using level of these variables as controls, there are very good theoretical and methodical reasons for log-transforming income per capita and technology level (see e.g. Barro and Sala-i Martin 2004). Generally,

[29] All log-transformations in this thesis are based on the natural logarithm, and I will use denotations as "ln" and "log" interchangeably.

it is plausible to assume that a dollar increase in GDP per capita for example has a much larger effect, for example on the probability of democratic breakdown, for very poor countries with GDP per capita around 1000 dollars, than for a country with an average income of 50 000 dollars. This has also been indicated empirically, as democracies almost never break down over a medium level of income (see Przeworski and Limongi 1997).[30]

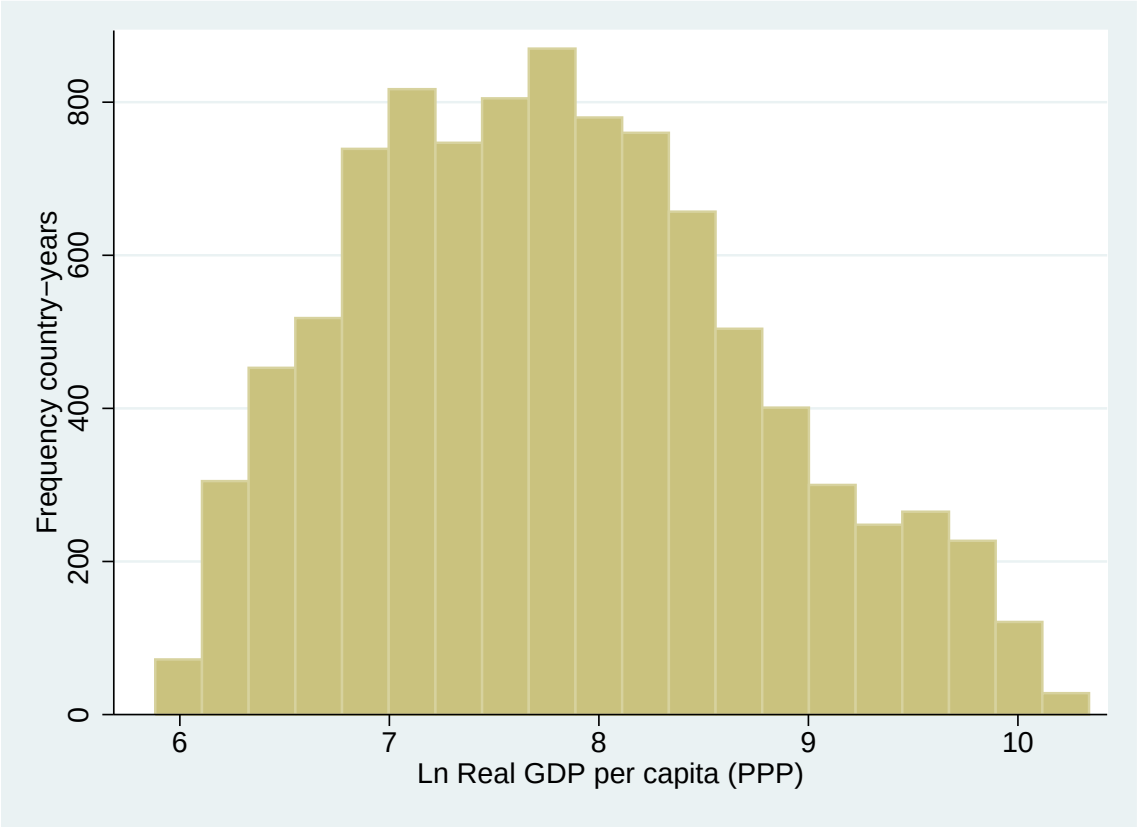

Figure 4.4: The distribution of country-years according to ln real GDP per capita.

Mean real GDP per capita from the Maddison (2006) data set (PPP-adjusted and measured in 1990 dollars) is 3965 dollars, and the standard deviation is 4444 dollars. The median GDP per capita is much lower than the mean, 2337 dollars, reflecting the skewed distribution of GDP per capita; there are many relatively poor country-years and a small share of the country-years have very high incomes. However, as with TFP, the logarithmically transformed variable produces a distribution that is much closer to the normal distribution. Figures 4.4 and 4.5 show the distribution of log GDP per capita, from the Maddison sample, and log TFP level respectively.

[30]The latter comment indicates more generally that concave transformations are plausible, but, economic growth theory indicates that there are some particular benefits to using a log-transformation (e.g. Barro and Sala-i Martin 2004).

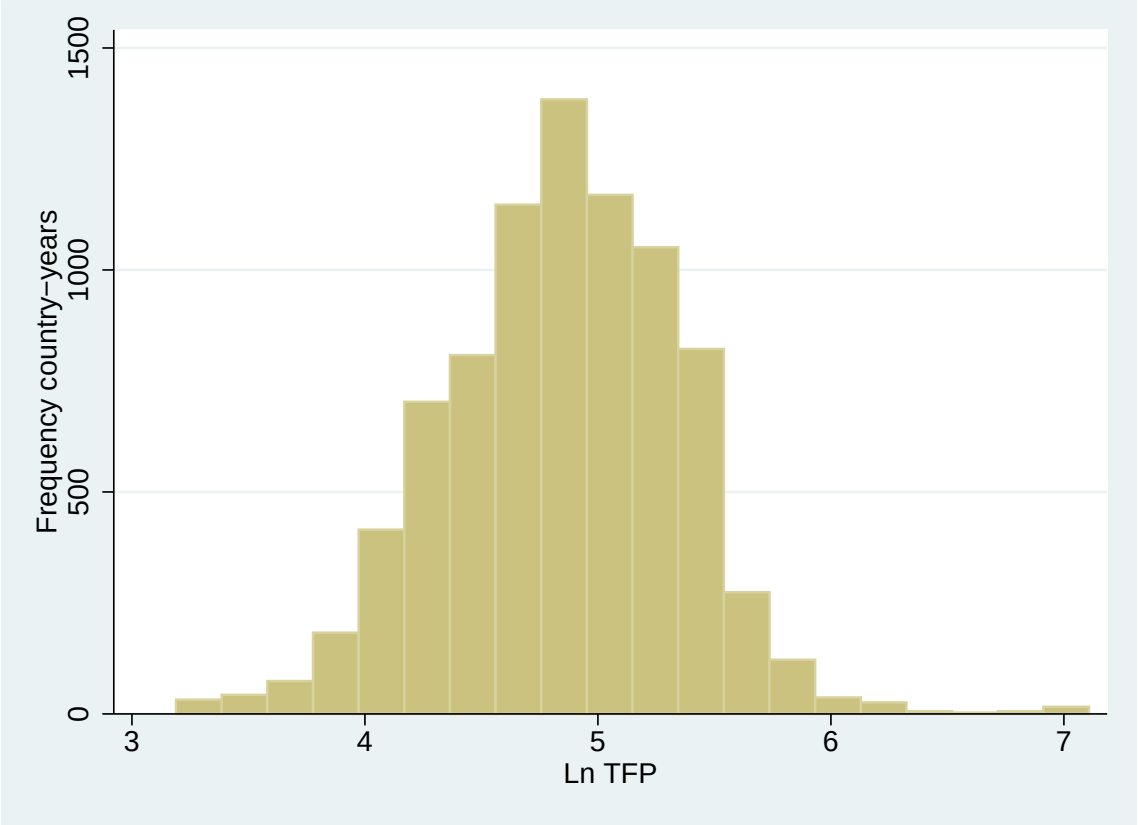

Figure 4.5: The distribution of country-years according to ln TFP.

Mean log GDP per capita is 7.82 and the standard deviation is 0.94. Mean log TFP is 4.85 and the standard deviation is 0.50.

Country size

Country size is another variable that may impact on both degree of democracy and economic outcomes. Country size is here operationalized by the *log of population level*. Population level is initially measured with one unit equaling 1000 citizens These data are drawn from the Maddison dataset when the dependent variables is from the Maddison dataset, and from the WDI when this is the data source also for economic growth. As was indicated by the discussion on demographic factors as deep determinants of economic growth in Chapter 3, population size is an important control variable for the analyses in this thesis. Population size may for example affect the degree of specialization in markets, and thus efficiency and productivity growth (e.g. Smith 1999; Mokyr 1990; Romer 1990), and may enhance productivity through increased economies of scale in some sectors (e.g. Krugman 1979, 1991). Thus, larger countries may experience increased economic growth (see also Kremer

1993*b*), although smaller countries may mitigate such advantages through free trade policies and economic integration with regional neighbors (see particularly Katzenstein 1985). The Single Market in Europe is a prominent recent empirical example of the latter.[31]

Population size might also affect the nature of institutions. Democracy is for example more prevalent in smaller countries (Knutsen 2006). There may also be a priori reasons to believe that it is easier for the public to exercise control over popular decision making in smaller communities, although the relation between population size and quality of democratic decision making is probably non-linear (see e.g. Dahl and Tufte 1973). According to the "Olsonian" logic of public goods provision (Olson 1965), it might also be easier to enforce, for example, property rights in smaller communities (see also Knutsen 2007), with plausible further positive effects on for example economic growth. Population level is therefore an important control variable. However, as for income, an increase in population of 1 million inhabitants is likely to have larger impacts on economic and political matters for a country the size of Norway than for a country the size of China. Thus, I log-transform also population level.

Other size indicators, such as geographic extension (area), may also matter for regime type (see Stasavage 2010) and economic growth, and so may measures like population density. However, population level is the more plausible control because of the theoretical reasons indicated above and discussed in Chapter 3. The distribution of log population level is shown in Figure 4.6. The mean for this variable is 9.05 and the standard deviation is 1.46.

Political stability

Political stability is another variable that is related to regime characteristics, for example degree of democracy (see e.g. Gates et al. 2006), and likely also to economic growth (Alesina et al. 1996; Feng 1997, 2005). Although, there exist plausible arguments indicating that democracy may enhance growth through stabilizing polities and institutions (Feng 1997, 2005), I find it safer to control for political stability. Two reasons are that stable regimes may evolve systematically in more or less democratic directions as they stabilize, and that democracies and dictatorships have different life expectancies because of various reasons other than regime type per se (see e.g. Przeworski and Limongi 1997; Przeworski et al. 2000; Acemoglu et al. 2008).

[31]Indeed, the free trade policy and integration arguments are explicitly made in many of the theoretical contribution in economics pointing out the static or dynamic efficiency gains of size. Examples are Krugman (1979, 1981) and Romer (1990).

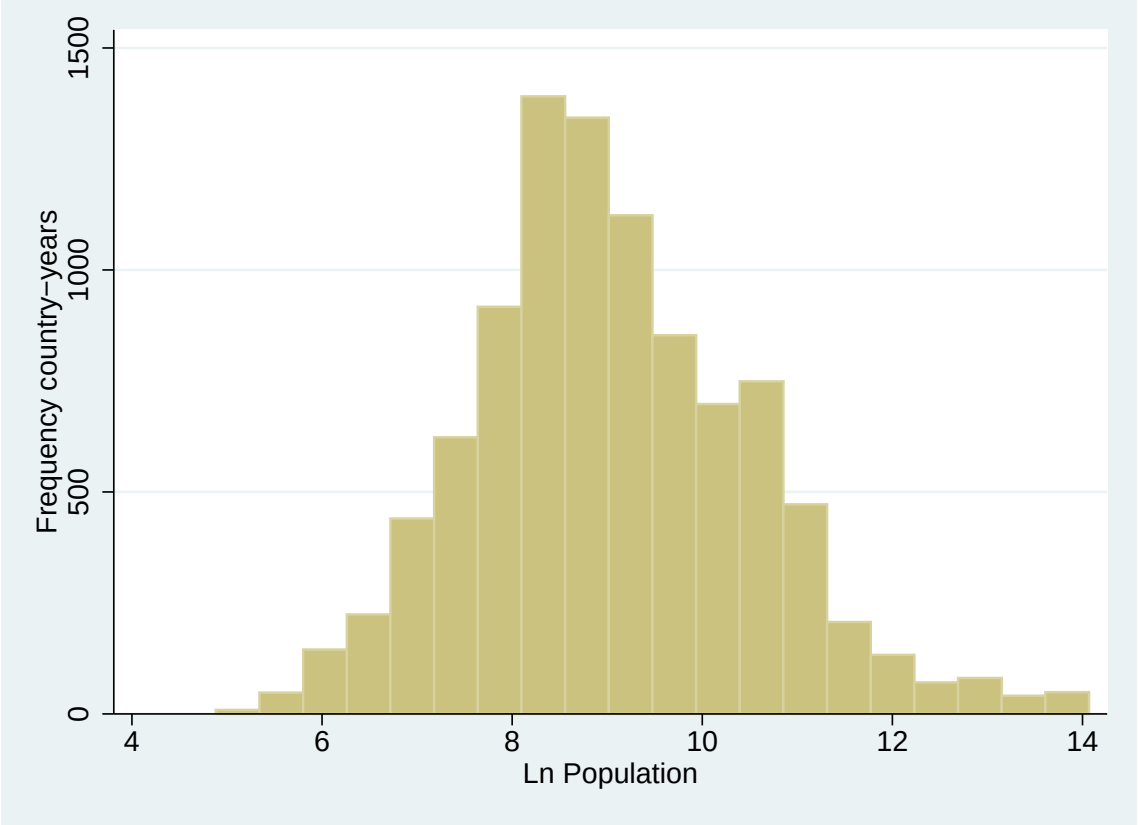

Figure 4.6: The distribution of country-years according to ln population size.

Regressions that do not control for stability may thus conflate effects on growth that are due to stability with effects that are due to regime type.

All regression models therefore include the *log of (regime duration + 1)*. The regime duration data are taken from the Polity IV data set. Regime duration is recorded as number of years since the regime was first established. A regime change is recorded by Polity if a country experiences a three-point movement or more on the Polity Index (PI), in three years or less, or if it experiences the end of a transition period "defined by the lack of stable political institutions" (Marshall and Jaggers 2002, 16). When a regime change or regime breakdown is followed by a transition period or a "no regime" period, the regime duration variable in Polity takes the value 0.

It is not given that the logarithmic transformation of the regime duration variable yields the best possible specification, although it seems reasonable that a concave transformation is preferable to a linear. The effects of a regime consolidating its power yet another year on economic outcomes is likely larger for a very young regime than for a regime that has already existed 80 years. As mentioned in Chapter 3,

empirical studies have indicated that the effect of democracy on economic outcomes like corruption and property rights protection increases as the democracy becomes more mature (see Clague et al. 2003; Rock 2009*a*). Moreover, these studies show that the change in effects are *particularly* large for the first years of consolidation. Hence, a concave transformation of the regime duration variable, for example a logarithmic transformation, is most likely appropriate.

The log regime duration variable does not directly measure some important aspects of political stability, like degree of political violence and coup attempts. However, for example coups attempts are strongly related to the number of years past since the last regime change, especially in a regime's early years (Clague et al. 2003). Thus, log of (regime duration + 1) is a decent variable to include in regression models as a proxy for political stability.

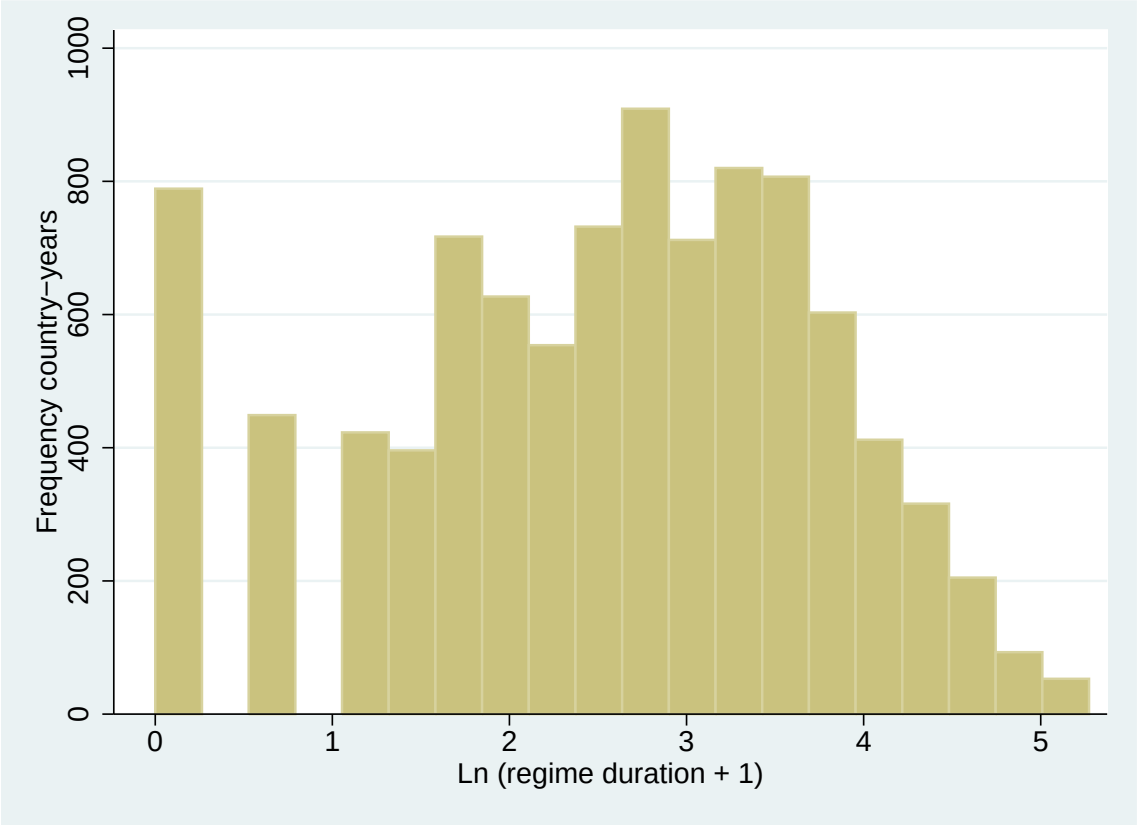

Figure 4.7: The distribution of country-years according to ln (regime duration+1).

The distribution of the transformed regime duration variable is shown in Figure 4.7. The mean of this variable is 2.51 and the standard deviation is 1.25.

Ethnic composition of the population

The Ethnic Fractionalization Index from Alesina et al. (2003) is also entered as a control variable. This index varies between 0 and 1, and can be interpreted to measure the probability that two randomly drawn individuals from a country's population belong to the same group.[32] The index is computed as one minus the Herfindahl index of ethnic group shares (Alesina et al. 2003, 158–159).[33] The index from Alesina et al. (2003) is similar to the historically more utilized ELF index from the 1964 *Atlas Narodov Mira*, but Alesina et al.'s index has data for more countries than ELF has, particularly on relatively young countries (see the discussion in Alesina et al. 2003).

Several empirical studies have found that there are negative economic effects of a high degree of ethnic fractionalization (see e.g. Easterly and Levine 1997), and theoretical and empirical studies indicate that a heterogenous population may make it more difficult to solve various coordination problems that are vital for ensuring efficiency-enhancing public goods provision (Alesina, Baquir and Easterly 1999; Baldwin and Huber 2010). Furthermore, various types of heterogeneity in the population, among them ethnic heterogeneity, may impact on the design of political institutions and regime type (see e.g. Lijphart 1999). More specifically, there may be stronger incentives for various groups of citizens to capture and monopolize power if there is a high degree of ethnic heterogeneity (e.g. Miquel 2007). Several dictators, Mobutu Sese Seko being one prominent example (Meredith 2006; Wrong 2000), have used the ethnically fractionalized nature of their societies to play divide-and-rule with supporters from various ethnic groups, and thus stabilized their dictatorial regimes. Furthermore, lack of social trust between ethnic groups may prevent the construction of democracy if a dictatorial regime collapses, and a new dictatorial regime may be the result.

As ethnic fractionalization may impact on economic outcomes and the likelihood of having a democratic regime, it is presumably an important control variable. One could have entered more or other control variables on ethnic structures, such as

[32]See Baldwin and Huber (2010) for a recent study analyzing the differences between various measures of ethnic diversity, and how the choice of measure affects estimates of the empirical effects of diversity. The results presented in Baldwin and Huber (2010) indicate that I should preferably have tried out also alternative measures of ethnic diversity than the fractionalization index used here. As also Garcia-Montalvo and Reynal-Querol (2002) show, choice of measure may yield different results regarding the relationship between ethnic structures and for example economic growth. Nevertheless, the practical consequences is likely not very large in my case, as I am interested mostly in ethnic diversity as a control variable.

[33]The formula is given by $Fractionalization_j = 1 - \Sigma s_{ij}^2$, where s_{ij} is group i's share of the population in country j.

considering not only the degree of fractionalization, but also whether for example there exists one dominant ethnic group in a heterogeneous country.[34] Also other fractionalization indexes could have been entered as control variables, such as lingual fractionalization (see e.g. Alesina et al. 2003).

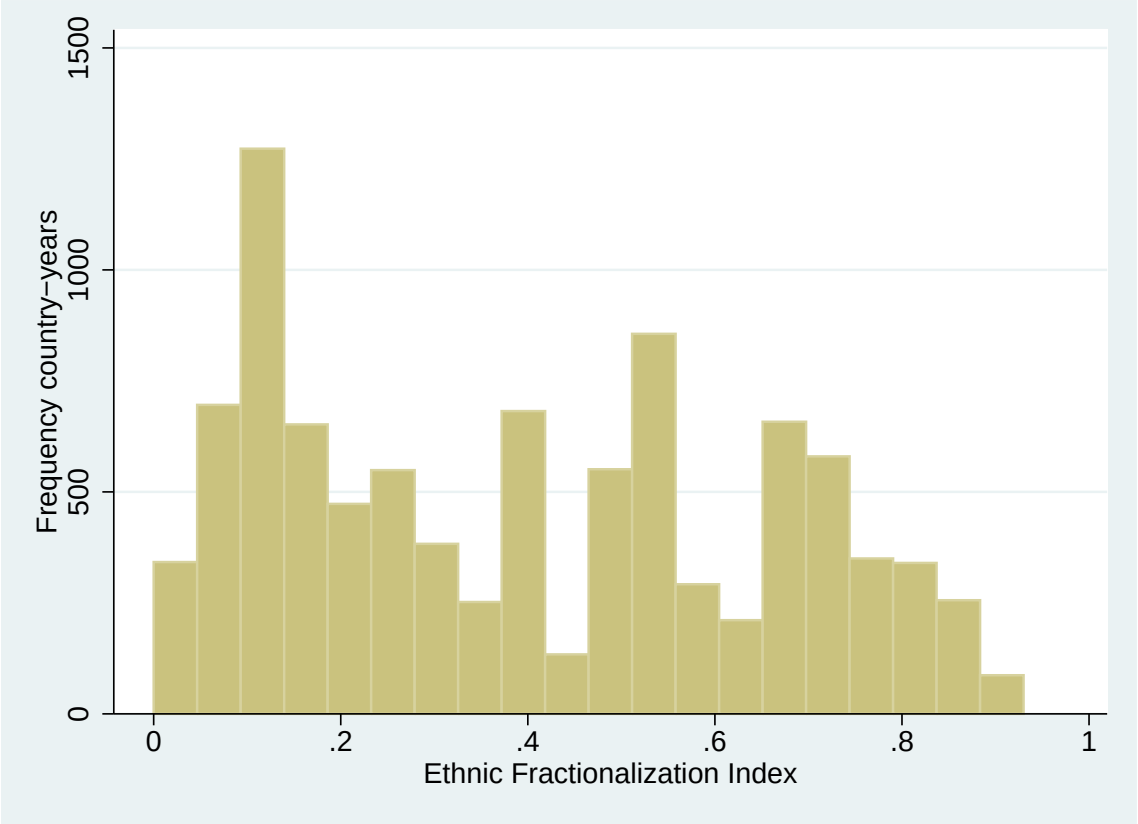

Figure 4.8: The distribution of country-years according to ethnic fractionalization.

The distribution of the ethnic fractionalization index is shown in Figure 4.8. The mean of this index is 0.40, which is the same as the median, whereas the standard deviation is 0.26.

Proxies for geographical, political-historical and cultural factors

In Knutsen (2007) I constructed three sets of dummy variables for *region, historical colonizer and plurality religion*. These sets of dummies enter into different models in the empirical analyses below.

As discussed in Chapter 3, there are several reasons for why geographic location

[34]For discussions of hetereogeneity measures and relations to for example polarization, see discussions in Esteban and Ray (1994); Garcia-Montalvo and Reynal-Querol (2002); Alesina et al. (2003).

may affect both political regimes and economic outcomes. Specific geographical, soil quality and climatic factors may affect growth (see e.g. Sachs 2005) and political institutions (e.g. Engerman and Sokoloff 1994), and these factors are to some extent correlated with geographic region. Cultural or political historical aspects are also broadly related to geographic regions, and these may be important for political institutions and for economic outcomes (e.g. Hall and Jones 1999; Acemoglu, Johnson and Robinson 2001*b*). In addition, spill-over effects from neighbors and the specific identity and strength of regional or global powers in a particular region may be relevant for regime stability and change (e.g. Starr 1991; Gleditsch 1996; Gleditsch and Ward 2006). Economic spill-over effects from neighbors may also be important, for example because of trade-induced demand. This is illustrated by the importance of distance in the standard gravity model of trade theory (see Feenstra 1998).

Hence, there are multiple reasons to include region as a control variable in regression models that investigate the effects of democracy on economic outcomes. The regions of the world are categorized as follows: (1) Western Europe with North America plus Australia and New Zealand, (2) Eastern Europe and (ex-) Soviet Union (countries), (3) Africa south of the Sahara, (4) Asia, (5) Middle East and North Africa (MENA), and (6) Latin America. The first category is used as reference category in the regression models below.

These region dummies are arguably crude categorizations. Although they capture some geographical, cultural and historical aspects that are relevant for the probability of having a democracy and for economic outcomes, they do not exhaust all such possible confounding factors. For example, both Latin America and Asia are vast regions which could have been further divided. However, the fixed effects models use country-dummies that provide safe-guards against idiosyncratic geographic, cultural and historical factors biasing the effect of democracy on economic outcomes, although this comes at the cost of reduced efficiency. A more fine-grained regional division would "draw" the OLS with PCSE models towards the fixed effects models. I have therefore chosen to use larger regions to have one type of model that advantages efficiency considerations over omitted variable bias concerns.

When it comes to colonial history, strong arguments could be made that this historical variable affects both political regime type and economic outcomes. Former British colonies are more likely to be democratic than other former colonies (see e.g. Lipset and Lakin 2004, 173–178). However, also legal structures are strongly correlated with earlier colonial power, as the type of legal structure in a country often stems from a particular inherited legal tradition like British Common Law or French Civil Law (Djankov et al. 2003). La Porta et al. (1999) find that legal origin

is important for quality of government, and, among others because of this, also for economic outcomes (see La Porta, Lopez-de Silanes and Shleifer 2008).

The more general point is that historical variables like colonizing power are often correlated with several institutional structures in a nation. Institutions were often formed in a particular historic context under influence of a colonizing power with preferences for particular institutional arrangements. Institutions show a great deal of inertia, implying that the institutional structure of the past often strongly resembles that of the present (e.g. North 1990; Acemoglu, Johnson and Robinson 2001*b*; Mamdani 1996).

I construct dummy variables for former (1) British and American rule, (2) French rule, (3) Spanish rule, (4) Portuguese rule and (5) Belgian rule.[35] A country is scored a 1 on maximum one dummy, and this gives rise to classification problems; some countries have had several colonizers in temporal order, or alternatively have had its territory split between different colonial rulers. I aim at capturing historical sources of influence on existing institutional structures with these variables, and countries are therefore most often scored a 1 on the colonizer with the longer rule. If time periods are about equal, the latest colonizer is given prevalence. Togo is for example scored as French and not as German, and Rwanda as Belgian and not as German. When it comes to split countries, the relative sizes of territories matter. Hence, Cameroon is for example classified as French and not British.

The colonizer dummies are imperfect measures of the political historical, legal institutional and even cultural (influence from colonizer) aspects they aim at capturing. First, there is the obvious problem, mentioned above, that some countries have had several colonizers, and have thus experienced influences from various sources. Second, as Acemoglu, Johnson and Robinson (2001*b*) convincingly argue, important institutional structures influenced by colonial history, such as those related to property rights protection, are influenced less by the identity of the colonizer than by to which degree colonists actually settled and participated in the political life of a colony. Therefore, although the set of dummies used here capture some relevant political historical and other factors that may influence democracy and economic outcomes, they do not capture all relevant information. However, once again, the country dummies included in the fixed effects models should control for country-specific factors, also those tied to particular political histories and cultural influences from a colonizer.

Religion can be considered a cultural variable, and it might be the case that

[35] Dummies for Italian and Dutch rule are not necessary to add to the regression models, as these coefficients can not be estimated because of perfect multicolinearity.

religious structures affect both political and economic outcomes. As mentioned in Chaper 3, Weber (2002) for example argued that the work ethic promoted by Protestantism and Calvinism enhanced productivity, and lately, there have been presented similar arguments for the productivity-enhancing effect of Confucianism (see e.g. Lee 2003). There may also be some negative economic effects from having Islam as a dominant religion. This is due to Islamic Law's restrictions on capital income, which likely reduces financing of new firms and projects, and thereby static and dynamic economic efficiency. However, rational economic actors may find alternative strategies to counter some of these negative effects (e.g. Aggarwal and Yousef 2000).

Although these arguments on religion's, and the cultural aspects that correlate with religion's, economic and political effects are a bit vague, and the empirical rationale for them are weak (see e.g. Sen 1999; Kim 1994), I control for religion in some models to be on the safe side in terms of avoiding omitted variable bias. I use a dummy for each of the following: (1) Protestantism (including Anglicanism and other varieties of Christendom related to or springing out of Protestantism), (2) Greek/Russian/Armenian Orthodox Christendom, (3) Catholicism, (4) Sunni Islam, (5) Shia Islam, (6) Buddhism (combined with Taoism and Confucianism), (7) Hinduism and (8) a dummy for indigenous beliefs (mainly African). A score of 1 is given on the dummy which represents a country's plurality religion (the religion with the largest group of followers in a country). As described in Knutsen (2007), the data are drawn from the World Book of Facts 2007, but also from other relatively recent sources when data were lacking in the World Book of Facts.

There are clear validity and reliability problems with the particular religion measure used here; some countries provide official figures for formal participation in, for example, a given church, whereas for other countries the estimates are more subjective. Moreover, although religious affiliation has historically changed slowly, with some exemptions like the Reformation in Europe in the 16th century, the time-invariant coding of these data likely generates measurement errors for some country-years. The religion dummies can of course also be criticized for being too crude, as they do not differentiate countries according to degree of religious fragmentation. It is for example plausible that a country having two or more large religious groups will have different economic growth rates and different probability of having a democracy than a more homogeneous country. In some countries, such as Baathist Iraq, the dominant religion of the political and economic elites (Sunni Islam) were not even similar to the plurality religion (Shia Islam). Finally, in some countries religion plays a larger role in political and economic life than others. Despite these problems, the plurality dummies are easy to gather relatively comparable data on for

all countries (which means no listwise exclusion of observations). Moreover, they tap some relevant information, and are not necessarily less valid than other observable operationalizations of cultural factors tied to religion.

Region		Colonizer		Plurality Religion	
W. Europe + offshoots	0.30	British+American	0.20	Protestantism+	0.20
E. Europe + Soviet rep.	0.09	French	0.11	Catholicism	0.41
Sub-Saharan Africa	0.18	Spanish	0.18	Orthodox	0.06
MENA	0.09	Portuguese	0.03	Sunni	0.18
Asia-Pacific	0.13	Belgian	0.01	Shia	0.02
Latin America	0.21			Buddh.+Conf.+Shinto	0.08
				Hindu	0.02
				Indigenous	0.04
N	9617	N	9617	N	9617

Table 4.3: Relative frequencies of country-years for various regions, colonizers and plurality religions

Table 4.3 shows the relative frequencies for the various regions, historical colonizers and plurality religions, as shares of total number of country-years. The relative frequencies are based on the data included in Chapter 6's Model I in Table 6.13.

Additional control variables in the most extensive models

Additional controls are added in some of the models in the empirical chapters below. For example, region does not exhaust all geographically relevant information and some models thus include an *absolute latitude* measure based on latitude data from Hall and Jones (1999). This measure correlates with climatic factors that may affect economic outcomes and possibly also political institutions. Moreover, latitude-based measures may tap various aspects that correlate with degree of western influence on political and economic institutions (Hall and Jones 1999), although this argument has been disputed (Acemoglu, Johnson and Robinson 2001*b*). In any case, this measure is added as a control in the most extensive models; leaving it out may generate omitted variable bias due to unmeasured factors, like temperature and disease environment, that are correlated with absolute latitude. Average absolute latitude for the country-years included in Model I in Table 6.13 is 30.39, and the standard deviation is 17.11.

Another measure included in the most extensive models, but only for the short time series models, that correlates with various economic-structural aspects, is *the percentage share of the population living in urban areas*. These data are collected from the WDI. The mean score on this variable is 49.6 for the country-years listed in Table 4.1, which are those included in Model I in Table 6.1. The standard

deviation is 23.8. Urbanization, which is related both to the share of the populace coming from the middle and organized working classes and to the relative power of urban versus rural interests, has traditionally been viewed as one of the main determinants of having a democratic regime type (e.g. Lipset 1959; Moore 1966; Boix 2003). Development economists have also discussed how and why urban economic sectors are more productive than rural sectors (e.g. Lewis 1954), although such "dual economy models" also have received a lot of criticism. Therefore, one may argue that urbanization share is a plausible control variable, although one should also note that urbanization may mainly be an outcome of growth processes, rather than a determinant.

At last, the most extensive models also include control variables for economic openness. In the short time series models, I use *total trade divided by total GDP*, in percentage terms, as a proxy. Total trade is the sum of total imports and total exports, and this variable is thereby operationalized as $100 * \frac{Imports+Exports}{GDP}$.

Economic openness, and trade more in particular, is a likely determinant of economic performance, and most large-n empirical studies have found a positive effect of trade on economic growth (see the thorough review in Hallaert 2006). But, openness may also affect the probability of democratization and stability of democratic regimes. Rigobon and Rodrik (2005) argue that trade, and economic openness more generally, reduces the probability of having, or the degree of, democracy, through exacerbating distributional conflicts.

However, including this variable in regression models may exclude some of the total effect of democracy on growth from the estimates, as democracy may enhance or reduce economic openness, which again enhances economic growth (see e.g. the discussion in Doucouliagos and Ulubasoglu 2008, 75–76). Dictators, as was discussed in Chapter 3 and will be discussed thoroughly in Section 5.4, may have strong incentives to shut down or reduce economic interaction with other countries. However, and as earlier noted, also democratically elected politicians may respond to demands from important groups of voters or lobby-groups to enact protectionist policies (e.g. Olson 1982; Persson and Tabellini 2000; Grossman and Helpman 1994, 2001). In any case, openness is likely endogenous to regime type (but, see Rigobon and Rodrik 2005). Moreover, economic openness may be an effect rather than a cause of economic growth (see e.g. Rodrik 1999*b*).

Finally, trade is by far the only relevant indicator for economic openness (see e.g. Feenstra 1998, 2003). For example inward and outward foreign direct investment and financial capital investment are also important types of economic interaction

across borders.[36] However, foreign direct investment, at least inward, is clearly endogenous to democracy, as was discussed in Chapter 3. There are also far shorter time series for foreign direct investment (see UNCTAD 2010) than for trade.

Anyhow, for the country-years listed in Table 4.1, the mean score for $100 * \frac{import+export}{GDP}$ is 69.3, and the standard deviation is 38.2.

I do not have trade data with long time series. Hence, I instead use the *log of the Frankel-Romer index* for the long time series models. This measure, which is based on geographic variables, is constructed to capture factors that influence trade, but are exogenous to income and political factors. Therefore, although the measure may be less reliable as a measure of openness, it has the benefit of being exogenous to democracy and economic growth. The data are taken from Hall and Jones (1999), and the mean is 2.71 and the standard deviation is 0.77 for this variable.

Controlling for time-specific effects

I also add *decade dummies* in several models to control for the possibility that there are common global trends that affect both the degree of democracy and various economic outcomes. For example, the decline of Communism, and the subsequently claimed hegemonic status of Western type "Liberal, Capitalist and Democratic" societies (see particularly Fukuyama et al. 1989; Fukuyama 1992), would lead many to predict that both the number of democracies and the average degree of property rights protection has increased in recent years because of global factors.

At least, different periods of modern history have been associated both with varying global economic growth rates (see e.g. Maddison 2006, 2007) and varying degrees of democratization and stability of democratic regimes (Huntington 1991). These systematic trends may be due to technological innovation patterns or longer business cycles for economic outcomes, and to power relationships among the main actors (democratic and non-democratic) in the international system, as well as diffusion effects between countries, for regime type. Thus, it may be dangerous to leave out controls for these temporal factors in regression models investigating the economic effects of democracy, at least in models drawing on long time series. One should, however, be aware that including such control variables may actually control away relevant information. The observed global trend in property rights protection, for example, is presumably at least partly an effect of increasing average degree of

[36] One interesting study, which investigates the economic consequences of democracy and openness and which uses different measures of openness, is Reuveny and Li (2003). This study finds that both democracy and trade reduce income inequality. However, the study finds that FDI increases income inequality, and that financial capital flows do not affect inequality.

democracy causing increasing average property rights protection (see the discussion in Knutsen 2007).

Decade	Relative frequency
1820s	0.01
1830s	0.01
1840s	0.01
1850s	0.01
1860s	0.02
1870s	0.03
1880s	0.02
1890s	0.03
1900s	0.03
1910s	0.03
1920s	0.04
1930s	0.05
1940s	0.05
1950s	0.08
1960s	0.11
1970s	0.13
1980s	0.13
1990–2002	0.21
N	9617

Table 4.4: Relative frequencies of country-years for decades included in the long sample.

Table 4.4 shows the relative frequencies of country-years according to decade for the long sample. As for the various tables and figures above (except for the TFP data), the numbers are based on country-years included in Model I in Table 6.13 in Chapter 6. As seen from Table 4.4, about 56 percent of the country-year observations are from after 1960, whereas only about 14 percent of the observations are from 1820 to 1900. This is partly due to the increase in the number of independent countries particularly after 1960. The other reason is a systematically lower availability of data on several variables for the earlier years. Thus, the analysis in Chapters 5 and 6 are based on unbalanced panels.

4.5.3 Regression models

To sum up, the models in Chapters 5 and 6 control for income and population levels, political stability, and for geographic, cultural, political-historical and time-related factors. As discussed in Chapter 3, some of the variables that may be considered causally prior to democracy and various economic outcomes may also partly be

endogenous to democracy, and thereby channels through which democracy affect various economic outcomes. As there is no consensus in the literature on the model that best balances these benefits and drawbacks, regarding the inclusion of control variables, different models are used below. Four model specifications are used in Chapters 5 and 6 for analyzing the short time series sample. The least inclusive models mitigate the possibility of controlling away causally relevant indirect effects, whereas the most inclusive models mitigate the possibility of omitted variable bias.

By presenting various models, I increase the requirements to the reader when it comes to interpreting results, but I consider this strongly preferable to presenting only one, more or less arbitrarily selected, model. By including several models, I obtain better information on how robust potential effects of democracy are; this has great informative value related to how credible the results are. Effects that "survive" in different model specifications, and when using various econometric techniques based on different assumptions, are arguably more credible than effects that are sensitive to such specification issues.

To concretize, the least inclusive OLS with PCSE model for the short time series in Chapter 6, with economic growth as dependent variable (EGR), includes as independent variables a democracy index (DEM), log GDP per capita level (GDP), log population level (POP), log regime duration (RDU), the ethnic fractionalization index (EFR), and the set of geographic region dummies (REG_j).[37] I use different lags on the independent variables to further check the results' robustness, but the specifications below are for the models using a 5-year lag. Hence, the econometric model has the following form, where i refers to the cross-section units (countries), and t to the temporal dimension (year):

$$EGR_{i,t} = \beta_0 + \beta_{DEM}DEM_{i,t-5} + \beta_{GDP}GDP_{i,t-5} + \beta_{POP}POP_{i,t-5} + \beta_{RDU}RDU_{i,t-5} + \beta_{EFR}EFR_{i,t-5} + \Sigma(\beta_{REG_j}REG_{j,i,t-5}) + \epsilon_{i,t}$$

The second type of model also includes the set of colonizer dummies (COL) and the set of plurality religion dummies (REL). The econometric specification is:

[37] As already mentioned, the models used for analyzing the effects of democracy on the immediate determinants of growth are structurally similar, except, of course, when it comes to the dependent variable.

$$EGR_{i,t} = \beta_0 + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) + \Sigma(\beta_{COL_k} COL_{k,i,t-5}) + \Sigma(\beta_{REL_l} REL_{l,i,t-5}) + \epsilon_{i,t}$$

The third model type also controls for decade-specific effects, by including a set of decade dummies (DEC). The model is thereby specified as:

$$EGR_{i,t} = \beta_0 + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) + \Sigma(\beta_{COL_k} COL_{k,i,t-5}) + \Sigma(\beta_{REL_l} REL_{l,i,t-5}) + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \epsilon_{i,t}$$

The fourth, and last, type of model incorporates three additional variables that may generate omitted variable bias for the effect of democracy on growth when left out. These are absolute latitude (LAT), share of the population living in urban areas (URB) and total trade (exports + imports) divided by total GDP (TRA). This most inclusive model, in terms of number of control variables, is thus specified as:

$$EGR_{i,t} = \beta_0 + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) + \Sigma(\beta_{COL_k} COL_{k,i,t-5}) + \Sigma(\beta_{REL_l} REL_{l,i,t-5}) + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \beta_{LAT} LAT_{i,t-5} + \beta_{URB} URB_{i,t-5} + \beta_{TRA} TRA_{i,t-5} + \epsilon_{i,t}$$

The OLS with PCSE regression equations above are as mentioned those used on the short samples. The equations used for random effects models are structurally similar to those of used for OLS with PCSE. For fixed effects models, where a set of country dummies (COU_i) are included for all but one country, all time-invariant variables are dropped because of perfect multicolinearity. The three types of fixed effects models used in Chapter 6 are thereby:

$$EGR_{i,t} = \beta_0 + \Sigma(\beta_{COU_i} COU_i) + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \epsilon_{i,t}$$

$$EGR_{i,t} = \beta_0 + \Sigma(\beta_{COU_i} COU_i) + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \epsilon_{i,t}$$

$$EGR_{i,t} = \beta_0 + \Sigma(\beta_{COU_i} COU_i) + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \beta_{URB} URB_{i,t-5} + \beta_{TRA} TRA_{i,t-5} + \epsilon_{i,t}$$

To round up the presentation of the most important regression equations in Chapter 6, I also present the OLS with PCSE models used for the long time series samples. Since two of the variables used above do not have data with sufficiently long time series URB has to be dropped, and TRA is substituted with log of the Frankel-Romer index (FRO). However, for the long time series it is vital to control for time specific effects, as the temporal factors that affect variation in degree of democracy and growth rates are more important when considering the period from 1820 to 2002 than the period from 1960 to 2005. Therefore, the most parsimonious model for the long sample is:

$$EGR_{i,t} = \beta_0 + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \epsilon_{i,t}$$

The second model includes the COL and REL dummies to control for geographic and cultural factors affecting democracy and growth, whereas the third model also adds LAT and FRO:

$$EGR_{i,t} = \beta_0 + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) + \Sigma(\beta_{COL_k} COL_{k,i,t-5}) + \Sigma(\beta_{REL_l} REL_{l,i,t-5}) + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \epsilon_{i,t}$$

$$
\begin{aligned}
EGR_{i,t} = {} & \beta_0 + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} \\
& + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) + \Sigma(\beta_{COL_k} COL_{k,i,t-5}) \\
& + \Sigma(\beta_{REL_l} REL_{l,i,t-5}) + \beta_{LAT} LAT_{i,t-5} + \beta_{FRO} FRO_{i,t-5} \\
& + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \epsilon_{i,t}
\end{aligned}
$$

4.6 Dealing with endogeneity

4.6.1 General solutions to endogenous independent variables

As discussed above, the issues of reverse causality and omitted variable bias are important to deal with in the study of democracy's economic effects. Omitted variable bias may be dealt with, first of all, by incorporating a relatively extensive set of control variables. Furthermore, one may incorporate country-specific dummies in a fixed effects analysis.

The endogeneity issue is somewhat more involved, and this section will present some suggested solutions on how to deal with the endogeneity of regime types. The review in Chapter 3 indicated that various economic factors influence political processes and structures, including regime type (e.g. Lipset 1959; Diamond 1992; Przeworski et al. 2000; Inglehart and Welzel 2006). Therefore, a correlation between democracy and economic factors does not imply that there is a causal effect of democracy on these economic factors.

As mentioned above, lagging the independent variables is one simple way to handle the issue of reverse causality, by exploiting the temporal sequence of cause and effect. However, there is still the problem that both democracy and growth are positively autocorrelated with their respective past values. This means that lagging variables is not a foolproof strategy; if growth in $t - x$ is strongly correlated with growth in t, growth in t taps growth in $t - x$, which may have caused democracy in $t - y$, if $y < x$. I therefore need another strategy to deal better with the issue of reverse causation. In Chapter 6, I first investigate the possible endogeneity of democracy to economic growth through applying Granger tests. However, there exist even more elaborate and better ways to deal with endogeneity.

As discussed in Section 4.2.6, one proposed solution in the econometric literature is to find so-called instrumental variables, or just 'instruments', for endogenous independent variables, and subsequently run 2SLS models. To quickly repeat the points from above, there are two requirements for a variable to be a proper instru-

ment for an endogenous independent variable: First, it should be correlated with the independent variable. If the correlation is weak, 2SLS estimators will be inefficient; the standard errors for the estimated coefficients will be large (see e.g. Greene 2003). Second, an instrument should not be directly related to the dependent variable. This, often referred to as "satisfying the exclusion restriction", means that the instrument should only be correlated with the dependent variable through the independent variable it instruments for. If this second condition is not satisfied, the resulting 2SLS estimates will not be consistent. The intuition behind the 2SLS procedure is that one only utilizes the "exogenous" part of the variation in the independent variable, which is related to the instrument, and that one thereby gets a better estimate of the causal effect of the endogenous independent variable on the dependent.

4.6.2 Instruments for democracy? A suggestion based on Huntington's "waves of democratization"

Instrument variables in the literature

The empirical literature on the economic effects of democracy does not contain many instrumental variable analyses, when compared with the usage of this econometric technique in other fields. This is maybe not surprising: it is difficult to find instruments that match the two criteria set up above for problem questions on democracy's economic effects. Many of the instruments in the literature on the economic effects of institutions, such as settler mortality (Acemoglu, Johnson and Robinson 2001*b*) and fraction of English and other European language speakers (Hall and Jones 1999), are not valid instruments for democracy. These variables are not only linked to political regime type, but also, as argued in the studies they are used in, to economic institutions that influence property rights protection, and thereby also to technological change and economic growth. As Acemoglu (2005) recognizes, it is important to propose specific instruments that are targeted to the problem question under investigation, and not use "of the shelf" instruments.

One decent exception to this general trend in the democracy and growth literature is the study by Helliwell (1994). He uses past value of democracy as an instrument for present values. However, there are reasons to believe that the political history of a country affects its present growth rates (Gerring et al. 2005). Accordingly, the analysis below also indicates that historical democracy values used as instrument for present values *may* not satisfy the exclusion restriction. Despite

this, lagged democracy values are used in some 2SLS analysis below, but then in addition to another instrument, called WAVE. I have discussed this instrument in Knutsen (2007) and Knutsen (2011*b*), but I will revisit this discussion here and add some empirical tests to further validate that this is a proper instrument for democracy.

A discussion on the validity of WAVE

WAVE draws on Huntington's (1991) observation that the number of democratic regimes globally has followed systematic temporal trends; democratization (and the relative lack of democratic breakdowns) has historically proceeded in three temporal waves. According to Huntington's categorization, the first long wave started in 1828 and ended in 1926, and the second wave lasted from 1943 to 1962 (Huntington 1991, 16). The third wave of democratization "began, implausibly and unwittingly, at twenty-five minutes after midnight, Thursday, April 25, 1974, in Lisbon, Portugal, when a radio station played the song "Grandola Vila Morena". The broadcast was the go-ahead signal for the military units in and around Lisbon to carry out plans for the coup d'etat" (Huntington 1991, 3). So-called reverse waves have come between the three waves, and in these reverse waves democratization has either stagnated or regressed (globally). Huntington wrote "The Third Wave" in the early 1990's, and the book therefore provides no concrete suggestion to when the third wave ended. However, Freedom House Executive Director Jennifer Windsor stated that "[a]lthough the past 30 years have seen significant gains for political freedom around the world, the number of Free countries has remained largely unchanged since the high point in 1998". Also Diamond (2008) suggests a reverse trend in the spread of democracy from this point on, with regionally important countries such as Russia and Venezuela leading the way. I will therefore assign 1998 as the end-year of the third wave of democratization.

To repeat, Huntington's claim is that democracy as a regime type, at the global level, has tended to thrive relative to dictatorship in a temporally clustered fashion.[38] As I will show below, the instrument, WAVE, drawing on Huntington's categorization, has a quite strong correlation with various democracy measures. This correlation holds even when controlling for other variables, including decade dummies. This is due to the fact that regimes are quite persistent institutional structures, and that the time-point of regime change thereby serves as a good predictor for current regime type even many years after the adoption (for a relevant discussion, but more

[38]See e.g. Przeworski et al. (2000) for nuances and criticisms of this claim.

specifically on constitutional rules, see Persson and Tabellini 2003).

However, the strong conditional correlation between WAVE and democracy indexes only ensures efficient 2SLS estimates. The more serious issue is whether WAVE satisfies the exclusion restriction. Does WAVE, when controlling for all the other variables in the model (importantly including decade and region dummies and ln regime duration), tap exogenous variation in regime type? I argue that this is the case, and both theoretical considerations and empirical tests back up this proposition.

Although national factors related to social and economic structure, as well as political history, are very important for probability of democratization and democratic stability, the broad trends of timing and clustering of democratization experiences and democratic breakdowns can likely be attributed to factors that are exogenous to national politics in the different countries. These exogenous effects include important geo-political events and contagion effects from neighbors (see also Knutsen 2007, 54–55). If democratization waves and reverse waves indeed represent such exogenous factors that affect the probabilities of democratization and democratic breakdown, and are not directly related to economic growth after having controlled for all other variables in the model, a dummy variable that scores countries after whether their current regime originated within or outside a wave can serve as a valid instrument for democracy.

Here, I will not go deep into *why* democratization globally has followed the above described pattern. Huntington links the first wave to the American and French revolutions and the second wave to the allied victory in World War II. These were important geo-political events that changed the regime type in key countries, and shifted the relative strength of important players in the international system. The outcome from these historical events was an international environment more friendly to democratic regimes, also in smaller countries. Moreover, transitions among politically and otherwise important countries provided concrete examples on which actors could model their democratization efforts. Although Huntington asserts that the third wave started in Southern Europe in the mid-70's, and soon transplanted to Latin America, many of the democratization processes in Eastern Europe, Central Asia and Africa can be connected to the fall of the Berlin Wall and the Soviet Union and its empire, which were decisive geo-political events.

However, not only important geo-political events lead to democratization coming in clusters. There are also "contagion effects" or "spill-over effects" between countries, for example neighbors (see e.g. Starr 1991; Gleditsch 1996; Gleditsch and Ward 2006). It is plausible to speak of more or less direct effects from one country's

democratization process on other countries' political processes, and these effects are transmitted through various mechanisms such as actors learning how to proceed with democratization efforts, and such as activities in one country providing focal points for the populace in a neighboring country to rise up against a dictatorial regime in a coordinated fashion (for a description of such mechanism in post-Cold War Africa, see Bratton and van de Walle 1997). For example, when Portugal went through its democratization in the 1970s, it set a precedent for those in Spain fighting for democracy. Another illustrative example comes from the middle of the 19th century: The 1848 revolution in Paris set a precedent for revolutionary attempts in Poland and the Netherlands as well as in several small and large (including Prussia and Austria) German states, although the communication and transport technology of the day lead to time-lags of a few days, weeks or months. Historians have recognized this relatively direct effect of the events in Paris on the (timing of) revolutionary attempts elsewhere (see the fascinating history of the 1848 revolutions in Rapport 2008). More recently, the clustering of demonstrations and revolutionary attempts against dictatorial regimes in North Africa and the Middle East in late 2010 and early 2011, with actions and events in Tunisia setting a precedent for opposition groups in other countries, arguably constitute examples of such spill-over mechanisms. Thus, one country's democratization increases the probability of neighboring (and other) countries democratizing, and possibly also stabilizes existing democracies in neighboring countries.

It is hard to determine the relative importance for democratization from major geo-political factors on the one hand and contagion from neighbors on the other, but this is irrelevant here. Independent of whether the direct cause of change in a nation's regime comes from underlying global political-economic structures or spill-over from neighboring or other countries, the timing and clustering of democratization experiences can be attributed to factors that are *exogenous* to national politics. Thereby, the clustering is not endogenous to national economic factors either. The latter condition is vital for producing a valid instrument: *If* democratization waves represent exogenous factors, like global political environment or spill-over effects from neighbors, that affect the probability of regime transition to democracy, and the above described waves are not directly related to national economic factors, *then* regime transition for a country within one of these waves is a valid instrument for democracy.

The operational definition of WAVE

More specifically when it comes to the construction of WAVE, I employ the same approach as Persson and Tabellini (2003), who propose instruments for various constitutional rules. Persson and Tabellini (2003) used the date for adoption of a constitution as an instrument for type of constitution. Their analysis was, however, limited to democracies only.

I use the starting year of the political regime, according to the Polity data, as a point of departure, and score countries after whether their *existing* regime (at a particular point in time) originated in a **reverse wave** or not. I could also have categorized after regime change in a wave, since Huntington's categorizations are somewhat ambiguous with temporally overlapping waves and reverse waves. Huntington claimed that the reverse waves lasted from 1922–1942 and from 1958–1975 (Huntington 1991, 16). As shown in Knutsen (2007), the reverse wave dummy is the one with the highest correlation with democracy, and I therefore use this variable, rather than a dummy based on waves in the analysis below. According to the econometric theory of instrumental variables, the preferred instrument is the one with the higher correlation with the endogenous independent variable, since it will produce more efficient estimates (see e.g. Greene 2003). In my particular case, both instruments would be consistent, but the reverse wave-based instrument is more efficient.

Therefore, country-years where the reigning regime originated in the (reverese wave) periods $\langle, 1827]$, $[1922, 1942]$, $[1958, 1975]$, $[1998, 2003]$ are scored a 1 on the dummy instrument, which as mentioned is called WAVE despite being based on the reverse wave categorization.[39] All other country-years are scored 0.

To sum up, regime transition within or outside a reverse wave is used as an instrument to isolate exogenous variation in democracy measures such as the FHI and PI, and filter out variation in degree of democracy that is endogenous to national economic factors. By using Huntington's observation and Persson and Tabellini's methodological trick, I can generate consistent (2SLS) estimates of democracy's economic effects, even if democracy is endogenous to national economic factors.

[39]The only exception to this rule is the scoring of the current US regime, which is explicitly categorized by Huntingon to belong to the "first wave regimes" (Huntington 1991, 16). According to Polity, this regime originates in 1827.

4.6.3 Empirical validation of WAVE

The discussion above indicated that WAVE, and possibly also the lagged value of democracy, may be valid instruments for democracy. However, one can further test the validity of the instruments empirically.[40] The first criterion for a valid instrument, which is at least a modest correlation between the instrument and the endogenous independent variable, is clearly satisfied: the Pearsson correlation coefficient between WAVE and the PI is quite large. For example, for the 9295 observations included in (the 2SLS) Model I in Table 6.12, the absolute value of the correlation coefficient is .45.

However, a better measure for the strength of the instrument(s) are t-values in first-stage regressions, when the other independent variables of the regression are controlled for. If these t-values are high, the instrument is a good independent predictor of regime type, adding extra informational value to the prediction of democracy values. As discussed above, 2SLS performs a first-stage regression in order to obtain predicted values for democracy, which are to be used in the second-stage regression rather than the actual values for the democracy measure. To be specific, the first-stage regression using only WAVE (only the most extensive model for the long time series is presented) in Chapter 6 takes the following form[41]:

$$\begin{aligned} DEM_{i,t-5} = \beta_0 &+ \beta_{WAVE} WAVE_{i,t-5} + \beta_{GDP} GDP_{i,t-5} + \beta_{POP} POP_{i,t-5} \\ &+ \beta_{RDU} RDU_{i,t-5} + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) \\ &+ \Sigma(\beta_{COL_k} COL_{k,i,t-5}) + \Sigma(\beta_{REL_l} REL_{l,i,t-5}) + \beta_{LAT} LAT_{i,t-5} \\ &+ \beta_{FRO} FRO_{i,t-5} + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \epsilon_{i,t} \end{aligned}$$

The corresponding first-stage regression for the model using both WAVE and PILAG (here lagged with 15 years relative to the PI) as instruments has the following form[42]:

[40] I here illustrate and test the validity of WAVE when economic growth is the dependent variable. In Knutsen (2011*b*), I present various tests and a thorough discussion of WAVE when property rights protection is the dependent variable. The main conclusion from this study is that WAVE is also a valid instrument for democracy when property rights protection is the dependent variable. When investigating ICRGPROP, the indicator for property rights protection used in Knutsen (2011*b*) and in Chapter 7, WAVE performs very well. The various empirical tests conducted below (with economic growth as the dependent variable) yield at least equally strong results for the instrument(-s) when used in regressions where ICRGPROP is the dependent variable.

[41] To underline that the independent values are lagged by five years in the second-stage regression, I denote all variables as measured in $t-5$

[42] To be consistent with the notation used above, I denote PILAG with $DEM_{i,t-20}$

$$
\begin{aligned}
DEM_{i,t-5} = {} & \beta_0 + \beta_{WAVE} WAVE_{i,t-5} + \beta_{DEM} DEM_{i,t-20} + \beta_{GDP} GDP_{i,t-5} \\
& + \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) \\
& + \Sigma(\beta_{COL_k} COL_{k,i,t-5}) + \Sigma(\beta_{REL_l} REL_{l,i,t-5}) + \beta_{LAT} LAT_{i,t-5} \\
& + \beta_{FRO} FRO_{i,t-5} + \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \epsilon_{i,t}
\end{aligned}
$$

The first-stage regressions indicate that WAVE is highly correlated with democracy even when controlling for the model's other variables, and WAVE is thus a relatively strong instrument. Table 4.5 only shows results for the most extensive model for the long sample, both when WAVE is used alone and when WAVE is used together with PILAG. However, the results are not very different for the other 2SLS models in Chapter 6, and WAVE and PILAG are always strong instruments.

The models in Table 4.5 shows that WAVE has t-values of -40.30 and -37.73 in the models where it is in the only instrument and in the model including PILAG, respectively. The predicted decrease on the 21-point PI, when changing from a situation where the current regime did not originate in a reverse wave to a situation where it originated in a reverse wave is about 5 points, which makes up about $\frac{1}{4}$ of the PI's range. Also PILAG is a strong instrument. Holding all other variables constant, a one point higher score on the PI 15 years ago increases the current PI score with about 0.28 points according to the model in the rightmost column in Table 4.5. The t-value for PILAG is a very high 27.43. Thus, it seems safe to conclude that WAVE and PILAG are sufficiently strong instruments.[43]

The instruments must also pass the exclusion restrictions to be considered valid instruments; they must not be directly related to economic growth for 2SLS to produce consistent estimates. The partial correlation of WAVE and economic growth is very low when controlling for PI, which points in the direction of WAVE passing the exclusion restriction. More specifically, the partial correlation of WAVE and GDP per capita growth (Maddison data) is approximately 0 (.0003) when controlling for PI (based on the 9295 observations in Model I in Table 6.12).

However, more elaborate tests are needed to ensure that the exclusion restriction is satisfied. Overidentification tests are the main tool for testing the validity

[43] A common test to indicate whether instruments are sufficiently strong or if they are too weak, is the F-test performed on the first-stage models including the instruments and the resembling models excluding the instruments. These tests show that the inclusion of WAVE, and of course inclusion of both WAVE and PILAG, significantly enhances the predictory power of the model. The Stock-Watson benchmark of an increase in F-value of more than 10 is surpassed by a large margin for all 2SLS models used in Chapter 6 (see also Knutsen 2011*b*).

	IV: WAVE		IV: WAVE & PILAG	
	b	*t*	*b*	*t*
WAVE	-5.060***	-40.30	-4.735***	-37.73
PILAG			0.284***	27.43
Ln GDP pc	2.693***	22.49	2.072***	16.71
Ln popul.	-0.443***	-5.04	-0.254***	-3.02
Ln reg. dur.	-0.688***	-15.91	-0.619***	-13.90
Ethn. fr.	-0.481	-1.05	-0.373	-0.86
E.E.-Soviet	-8.592***	-18.92	-6.645***	-15.76
Africa	-4.500***	-8.63	-3.911***	-7.83
Asia-Pac.	-2.392***	-3.77	-2.193***	-3.62
MENA	-11.276***	-22.99	-8.456***	-17.09
Lat. Am.	-0.392	-0.70	-0.433	-0.81
1820s	-5.493***	-9.09	-6.432***	-11.05
1830s	-6.231***	-10.93	-4.745***	-6.20
1840s	-6.187***	-10.94	-4.693***	-8.46
1850s	-6.240***	-12.74	-5.519***	-11.44
1860s	-5.528***	-12.48	-5.122***	-11.58
1870s	-4.900***	-12.35	-4.390***	-11.01
1880s	-4.061***	-10.53	-3.810***	-10.15
1890s	-3.237***	-8.82	-3.438***	-9.64
1900s	-2.870***	-8.29	-3.253***	-9.60
1910s	-2.070***	-6.11	-2.559***	-7.66
1920s	-1.195***	-4.01	-2.394***	-7.98
1930s	-1.118***	-3.80	-2.416***	-8.23
1940s	-2.059***	-7.28	-2.826***	-10.18
1950s	-1.661***	-7.17	-2.510***	-10.36
1960s	-0.971***	-4.96	-2.362***	-10.93
1970s	-2.194***	-12.14	-2-913***	-15.52
1980s	-1.996***	-11.69	-1.938***	-11.61
British	3.761***	22.49	2.063***	8.00
French	-0.262	-0.80	0.544*	1.66
Portuguese	0.417	0.71	1.501**	2.39
Spanish	-1.169**	-2.29	0.106	0.21
Belgian	3.665***	4.63	3.021***	3.67
Sunni	-12.201***	-13.35	-7.353***	-8.31
Shia	-12.833***	-12.60	-7.430***	-7.57
Catholic	-14.233***	-14.46	-9.380***	-9.74
Protestant	-13.479***	-13.65	-8.348***	-8.64
Orthodox	-13.539***	-12.29	-8.412***	-7.95
Hindu	-8.859***	-8.17	-5.033***	-4.79
Buddhist+	-13.834***	-13.25	-8.439***	-8.33
Indigenous	-11.483***	-11.54	-6.532***	-6.72
Abs. Lat.	0.054***	5.10	0.461***	4.74
Frankel-Romer	-0.633***	-3.49	-0.347**	-2.04
Constant	4.482	2.02**	1.750	0.83
N	8129		6904	

Table 4.5: First-stage regressions for various 2SLS models using the long time series. PI as dependent variable

of the exclusion restriction, and results from such tests will be presented below. However, the overidentification tests require at least two instruments. Another way of testing the exclusion restriction for 2SLS models using only one instrument is to run the second-stage regression model as an ordinary regression, but including the instrument directly in this equation (see Knutsen 2011*b*). If there is no direct, independent effect of WAVE on economic growth, the WAVE-coefficient in such a regression should not be significantly different from zero. The structure of this regression model, exemplified by the least extensive model based on the long time sample is given below:

$$\begin{aligned} GRO_{i,t} = \beta_0 &+ \beta_{WAVE} WAVE_{i,t-5} + \beta_{DEM} DEM_{i,t-5} + \beta_{GDP} GDP_{i,t-5} \\ &+ \beta_{POP} POP_{i,t-5} + \beta_{RDU} RDU_{i,t-5} + \beta_{EFR} EFR_{i,t-5} + \Sigma(\beta_{REG_j} REG_{j,i,t-5}) \\ &+ \Sigma(\beta_{DEC_m} DEC_{m,i,t-5}) + \epsilon_{i,t} \end{aligned}$$

Table 4.6 shows the results from random effects regressions including WAVE in regression models resembling the second-stage regressions in Chapter 6 for the long time sample. The results indicate that there are no significant, independent effect of WAVE on economic growth. WAVE is insignificant at the 10 percent level in all models. Hence, 2SLS models using WAVE as an instrument for PI do likely not violate the exclusion restriction, and should produce consistent estimates of the effect of democracy on growth.

Although WAVE is a strong predictor of current democracy level and 2SLS models using WAVE as an instrument do not violate the exclusion restriction, including another instrument should increase the precision of the 2SLS-estimates. I discussed PILAG as an additional instrument, in relation with the instrument strategy used by Helliwell (1994), above. The first-stage regressions above indicated that PILAG was, as WAVE, a strong instrument, and that the first requirement for a proper instrument is thereby fulfilled.

However, the results shown in Table 4.7 indicate that PILAG may violate the exclusion restriction, which implies that 2SLS estimates from models including PILAG may generate inconsistent estimates. PILAG has a positive, direct effect on economic growth, and this effect is significant at the 5 percent level in Model I and at the 10 percent level in Models II and III. As Gerring et al. (2005) pointed out, not only present level of democracy, but also the democratic history of a country may matter for various outcomes, also economic. This result should lead me to interpret 2SLS results based on models using both WAVE and PILAG as instruments

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
WAVE	0.094	0.49	0.175	0.90	0.023	0.12
PI	0.041***	2.75	0.042***	2.70	0.024	1.44
Ln GDP pc	-0.392*	-1.77	-0.637***	-2.69	-0.660***	-2.75
Ln popul.	0.012	0.22	-0.004	-0.07	-0.123	-1.47
Ln reg. dur.	-0.065	-1.02	-0.039	-0.63	-0.068	-1.09
Ethn. fr.	-1.001***	-2.72	-0.595	-1.61	-0.260	-0.64
E.E.-Soviet	0.299	0.79	0.338	0.90	-0.119	-0.30
Africa	-1.606***	-3.20	-1.749***	-2.99	-1.934***	-3.29
Asia-Pac.	-0.111	-0.26	-1.435*	-1.71	-0.985	-1.29
MENA	-0.098	-0.24	0.554	0.97	0.224	0.35
Lat. Am.	-0.562**	-1.96	-2.455***	-4.26	-1.544***	-3.13
1820s	-2.330**	-2.31	-2.848***	-2.76	-3.132***	-2.93
1830s	-1.891*	-1.93	-2.387**	-2.38	-2.670***	-2.58
1840s	-1.611*	-1.66	-2.057**	-2.07	-2.313**	-2.27
1850s	-1.408	-1.61	-1.855**	-2.07	-2.109**	-2.28
1860s	-1.254	-1.56	-1.722**	-2.09	-1.965**	-2.29
1870s	-1.791**	-2.44	-2.231***	-2.97	-2.458***	-3.09
1880s	-1.928***	-2.63	-2.349***	-3.15	-2.544***	-3.22
1890s	-1.122	-1.55	-1.512**	-2.05	-1.677**	-2.15
1900s	-1.524**	-2.11	-1.876**	-2.56	-1.998***	-2.59
1910s	-0.911	-1.25	-1.254*	-1.71	-1.293*	-1.67
1920s	-1.641**	-2.34	-1.988***	-2.80	-2.018***	-2.71
1930s	-1.032	-1.49	-1.387**	-1.98	-1.447*	-1.96
1940s	0.254	0.38	-0.059	-0.09	-0.028	-0.04
1950s	0.387	0.70	0.223	0.40	0.304	0.51
1960s	0.693	1.49	0.660	1.42	0.873*	1.73
1970s	-0.857*	-1.89	-0.880*	-1.94	-0.761	-1.56
1980s	-1.665***	-3.77	-1.700***	-3.86	-1.267***	-2.69
British			0.190	0.70	0.130	0.40
French			-0.560*	-1.76	-0.645*	-1.81
Portuguese			1.154**	2.17	0.296	0.58
Spanish			1.613***	2.91	0.644	1.40
Belgian			-0.056	-0.05	0.475	0.41
Sunni			-0.975	-1.60	-1.355**	-2.06
Shia			-3.094***	-3.19	-3.347**	-2.52
Catholic			-0.315	-0.39	-0.893	-1.00
Protestant			-0.560	-0.75	-1.249	-1.51
Orthodox			-0.983	-1.09	-1.418	-1.30
Hindu			-0.405	-0.46	-1.474	-1.61
Buddhist+			1.234	1.44	0.636	0.75
Indigenous			-1.698**	-2.52	-1.907***	-2.65
Abs. Lat.					0.018	1.63
Frankel-Romer					-0.296*	-1.70
Constant	6.139***	3.09	8.836***	4.01	10.908***	4.25
N	8822		8822		8129	

Table 4.6: Random effects regressions similar to the second-stage regressions in Chapter 6's 2SLS models using the long time series and with GDP per capita growth as dependent variable, but including WAVE as regressor.

with some care, although I will investigate the exclusion restriction further below. WAVE is still statistically insignificant at the 10 percent level in all models including PILAG, and this further strengthens the validity of WAVE as an instrument for democracy.

As mentioned above, so-called overidentification tests (see e.g. Greene 2003) can be used to test the exclusion restriction when there are more than one instrument. I performed such tests on all the 2SLS long sample models in Chapter 6 that use both WAVE and PILAG as instruments. These results actually indicate that the exclusion restriction is satisfied. More specifically, I used the XTOVERID STATA-package (Schaffer and Stillman N.d.) to run the overidentification tests. The resulting Sargan-Hansen statistics from these tests indicate that the instruments are valid. The null hypothesis, which assumes the instruments are uncorrelated with the error term and correctly excluded from the second-stage equation, cannot be rejected at the 10%-level. For Model I, II and III in Chapter 6's Table 6.13, using 2-year lagged independent variables, the p-values are 0.92, 0.86 and 0.95 respectively. The overidentification-test results for the corresponding models from Table D.18, using 3-year lags, are p-values of 0.28, 0.19 and 0.41. For the models in Table D.19, using 5-year lags, the p-values are 0.25, 0.18 and 0.57. Thus, these standard econometric tests of whether the exclusion restriction is valid, in the 2SLS models using both WAVE and PILAG, strongly suggest that the assumption indeed holds. Hence, these models should generate consistent estimates for the effect of democracy on economic growth.

Although the alternative test proposed above indicates that PILAG may be directly linked with economic growth, the results from these overidentification tests provide a quite strong argument for accepting the estimates proposed in Tables 6.13, D.18 and D.19 as quite valid estimates of democracy's growth effect.

4.7 Summing up

This chapter has dealt with a number of seemingly scattered topics. However, the different discussions all serve a particular function, namely to prepare the ground for the empirical analysis in the following chapters. The chapter briefly, and in a simplified manner, discussed the properties of the various statistical techniques used. Thereafter, the chapter discussed three methodological problems threatening the inferences from the empirical analysis in this thesis, namely selection biases due to lack of data, measurement error and attenuation bias, and bias due to the endogeneity of regime type to economic growth. After that, the chapter presented the

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
WAVE	-0.046	-0.22	-0.011	-0.05	-0.146	-0.69
PILAG	0.033**	1.97	0.032*	1.84	0.029*	1.67
PI	0.005	0.25	0.007	0.38	-0.009	-0.47
Ln GDP pc	-0.345	-1.47	-0.645***	-2.66	-0.695***	-2.86
Ln popul.	0.054	0.88	0.017	0.25	-0.071	-0.75
Ln reg. dur.	-0.093	-1.35	-0.054	-0.81	-0.065	-0.97
Ethn. fr.	-0.626	-1.43	-0.520	-1.19	0.270	0.62
E.E.-Soviet	-0.026	-0.06	0.011	0.02	-0.145	-0.33
Africa	-1.635***	-2.98	-1.995***	-3.08	-2.536***	-3.83
Asia-Pac.	0.023	0.05	-1.399	-1.36	-1.015	-1.29
MENA	0.033	0.08	0.520	0.77	0.069	0.10
Lat. Am.	-0.545*	-1.82	-3.455***	-4.87	-2.204***	-4.00
1820s	-2.270**	-2.15	-2.887***	-2.68	-3.265***	-2.96
1830s	-1.103	-0.79	-1.687	-1.20	-2.075	-1.46
1840s	-1.374	-1.37	-1.924*	-1.88	-2.320**	-2.23
1850s	-1.389	-1.52	-1.912**	-2.05	-2.316**	-2.45
1860s	-1.222	-1.42	-1.766**	-2.00	-2.138**	-2.39
1870s	-1.585**	-2.02	-2.075***	-2.62	-2.430***	-2.98
1880s	-1.721**	-2.22	-2.214***	-2.83	-2.547***	-3.16
1890s	-0.995	-1.31	-1.456*	-1.90	-1.763**	-2.23
1900s	-1.390*	-1.83	-1.795**	-2.35	-2.065***	-2.64
1910s	-0.756	-0.99	-1.149	-1.49	-1.308*	-1.65
1920s	-1.484**	-2.03	-1.873**	-2.53	-2.046***	-2.71
1930s	-0.999	-1.40	-1.354*	-1.86	-1.556**	-2.09
1940s	0.292	0.43	-0.008	-0.01	-0.134	-0.19
1950s	0.627	1.02	0.482	0.77	0.428	0.66
1960s	0.897*	1.65	0.885	1.57	0.855	1.44
1970s	-0.917*	-1.89	-0.850*	-1.75	-0.907*	-1.87
1980s	-1.561***	-3.71	-1.540***	-3.68	-1.221***	-2.97
British			0.353	1.11	0.185	0.45
French			-0.317	-0.74	-0.794*	-1.95
Portuguese			2.519***	3.44	1.191*	1.70
Spanish			2.627***	3.77	1.377**	2.37
Belgian			-0.303	-0.18	0.496	0.28
Sunni			-0.728	-1.01	-0.840	-1.14
Shia			-2.815***	-2.61	-3.567**	-2.41
Catholic			-0.279	-0.29	-0.940	-0.98
Protestant			-0.557	-0.60	-1.201	-1.26
Orthodox			-1.065	-0.94	-1.768	-1.48
Hindu			-0.659	-0.57	-1.959*	-1.86
Buddhist+			1.327	1.23	0.561	0.56
Indigenous			-1.591*	-1.94	-1.670**	-2.01
Abs. lat.					0.018	1.55
Frankel-Romer					-0.212	-1.02
Constant	5.301***	2.58	8.662***	3.96	10.433***	3.87
N	7319		7319		6904	

Table 4.7: Random effects regressions similar to the second-stage regressions in Chapter 6's 2SLS models using the long time series and with GDP per capita growth as dependent variable, but including WAVE and PILAG as regressors.

data material used in this study, and briefly discussed operationalization issues and issues of inclusion and exclusion of control variables in regression models. Finally, the chapter focused more intensively on how empirical analysis may deal with the endogeneity of regime type. The chapter presented and evaluated a new instrument for democracy, WAVE, which is used in Chapter 6's 2SLS analysis on democracy's effect on economic growth. The evaluation included different empirical tests, and the results indicated that WAVE is a proper instrument for democracy.

Chapter 5

Democracy's effects on physical capital, human capital and technological change

This chapter investigates whether and how democracy and dictatorship affect "the immediate sources of economic growth", physical capital, human capital and technological change. The chapter briefly discusses theoretical arguments on how democracy and dictatorship affect physical and human capital accumulation. It is hypothesized that dictatorship enhances physical capital investment, mainly through boosting domestic savings rates, and that democracy enhances human capital investment. Furthermore, it is hypothesized that these are channels through which democracy affects economic growth. However, few of these hypotheses find robust empirical support. The chapter then focuses on the effect of democracy on technological change, and develops a formal theoretical model illustrating how dictatorial regimes may have strong incentives to slow the diffusion of information and ideas into and within their countries. The main hypothesis derived from the model, which finds robust empirical support, is that democracies have higher technology-induced economic growth than dictatorships.

5.1 The immediate sources of growth, revisited

As discussed in Chapter 3 and illustrated by Figure 3.6, economic growth ultimately stems from changes in either production factors (inputs) or from technological change, broadly conceived as changes in how inputs are combined to produce economic output. This chapter investigates how democracy affects such "immediate sources of economic growth". I provide only brief theoretical discussions on how democracy affects accumulation of two selected broad classes of inputs, namely physical capital and human capital.[1] However, I provide a more extensive theoretical treatment of regime type's effect on technological change. This relationship is probably even more important than the relationships between democracy and various forms of capital, if the goal is to understand the long-term relation between regime type and economic growth. Moreover, this relationship is far less studied empirically than the relationships between democracy on the one hand and physical and human capital on the other. The chapter contains extensive empirical studies not only on how democracy affects technological change, but also on how democracy affects physical and human capital accumulation. Some regression models draw on data from about 140 countries, with time series going back to the first half of the 19th century.

The economic growth literature was discussed in Chapter 3, and it was noted that physical and human capital are central explanatory variables in various theoretical models of economic growth (for overviews of this large literature, see Helpman 2004; Barro and Sala-i Martin 2004; Acemoglu 2008). Also various empirical studies (see particularly Barro 1991, 1997; Mankiw, Romer and Weil 1992), and sensitivity analyses (e.g. Levine and Renelt 1992; Sala-i Martin 1997) of the empirical determinants of economic growth, have found that these are important and robust determinants of growth (but see Klenow and Rodriguez-Clare 1997). However, several theoretical models indicate that technological change may be even more important than physical and human capital accumulation for long-run economic growth rates (see e.g. Nelson and Winter 1982; Romer 1990; Aghion and Howitt 1992; Grossman and Helpman 1991). Moreover, several empirical analyses also indicate that technological change is the central determinant of long-run economic growth (e.g. Abramowitz 1956; Solow 1957; Denison 1968; Klenow and Rodriguez-Clare 1997).

[1] As noted in Chapter 3, labor and land are two other broad input categories. Another category, which may include land, is natural resources. These broad input categories have been further subdivided in some empirical analyses, for example in growth accounting studies and studies of domestic factor endowments and international trade. See for example Trefler (1993), who uses ten factor categories in his empirical analysis.

Physical and human capital accumulation and technological change may be relevant for human well-being not only because they contribute to economic growth. Arguably, human capital in particular has inherent importance; human capital is related to schooling and health care, which are vital for human capabilities and welfare independent of production or income level (see e.g. Sen 1999). As an illustration of this point, the Human Development Index (UNDP 1990) incorporates indicators on both literacy, schooling and health.[2]

When it comes to physical capital investment, one could argue that an increase in savings, and thus physical capital investment, decreases utility if one holds level of income constant. When the national savings rate ($\frac{Savings}{GDP}$) increases, the share of national income going to consumption decreases. For most people, income generates individual well-being if it is consumed, and not if it is saved, although there might be exceptions (like Scrooge McDuck). Of course, savings that are invested increase the future production level, and is thus likely to generate more future consumption if the savings rate is below the so-called "golden rule" rate (see e.g. Barro and Sala-i Martin 2004). However, as an economic entity in its own right, physical capital differs from human capital as it arguably does not generate much well-being independent of the future production level. The Soviet Union is an interesting example in this regard. The national savings rates, for example under Stalin, regularly topped 0.4, and even 0.5 (e.g. Przeworski and Limongi 1993; Davies, Harrison and Wheatcroft 1994). Soviet production, especially in the 1930s, increased as a result of the massive capital investment allowed by such savings rates. However, the Soviet Union was infamously known for its lack of basic consumption goods for many of its citizens.

Historians, sociologists and others have discussed the disruptive effects of technological change, including organizational change, on different aspects of society (for analysis of technological and social change in different historical epochs, see e.g. Ashton 1997; Fukuyama 1999). This does not lead to any straightforward implications on whether technological change, when holding income level constant, is desirable or not. However, one important consideration to bear in mind, for example when interpreting the real-world importance of the empirical results presented in this chapter, is that economically relevant technological change is not perfectly captured in GDP statistics (Nordhaus 1998). Price deflators used in GDP statistics underestimate the quality improvements embodied in several new products, and thereby these new products' contribution to satisfying consumer's preferences. Hence, if a factor α of technological change's contribution to "quality-adjusted" economic growth is overlooked, a potential effect of democracy on technological change

[2]See Chapter 8 for a discussion of this index.

may be underestimated.[3]

I will, however, leave this discussion, and rather investigate the empirical effects of regime type on human capital, physical capital and technological change using available data on observable proxies. These estimated effects, although interesting in their own right, are again important building blocks for an explanation of why regime type might affect economic growth, which is the main issue analyzed in Chapter 6.

In Sections 5.2 and 5.3, I present theoretical arguments and empirical evidence on how democracy affects physical capital accumulation and human capital accumulation, respectively. Different theoretical arguments, and some previous studies, indicate that democracy reduces physical capital accumulation, mainly through reducing domestic savings rates, and that it increases human capital accumulation. However, the empirical analysis below finds only non-robust support for a negative effect of democracy on savings, investment and physical capital-induced economic growth. Moreover, although some support is found for the hypothesis that democracy enhances human capital, the analysis below does not find any effect of democracy on human capital-induced economic growth.

In Section 5.4, I provide a thorough treatment on how regime type may affect technological change, and technological change-induced economic growth more in particular. The section presents a theoretical model, indicating how a rational dictator in self-interest may pursue policies that ultimately reduce diffusion of new ideas and technologies into and within his country. The hypothesis that dictatorship reduces technological change-induced economic growth relative to democracy finds quite robust empirical support.

5.2 Democracy's effect on physical capital

5.2.1 Theoretical arguments, previous empirical literature and some anecdotal evidence

Several plausible arguments indicate that dictatorial regimes can more easily promote a set of policies that increase savings rates, and thereby increase investment rates. In his analysis of the proximate sources of growth in the Asian Tiger countries, Young (1995) finds that capital investment was an important contributor to

[3]However, the unobserved "quality effect" of technological change is probably not similar between countries and over time.

these countries' high growth rates, especially in the 1960s and 70s. Their capital stocks grew rapidly as their investment rates ($\frac{Investment}{GDP}$) increased:[4]

> In Singapore the constant price investment to GDP ratio, at 10 percent in 1960 had reached 39 percent by 1980 and an extraordinary 47 percent by 1984, after which it declined substantially, only to begin another rise in the late 1980s. In South Korea, investment rates, which were around 5 percent (in constant prices) in the early 1950s, exploded up to 20 percent in the late 1960s, reached 30 percent by the late 1970s, and were approaching 40 percent by 1991. Finally, in Taiwan the constant price investment to GDP ratio, at around 10 percent in the early 1950s, grew steadily to a high of 27 percent in 1975, after which it fluctuated around a value of about 22 percent (Young 1995, 644–645).

However, it may be argued that the Asian Tigers are exceptional cases (see e.g. the discussions in Halperin, Siegle and Weinstein 2005), and it is not given that dictatorship generally enhances investment. Indeed, as noted in Chapters 1 and 3, democracy generally seems to strengthen property rights protection (Knutsen 2011*b*), arguably one of the most important determinants of investment (see e.g. Smith 1999; North 1990; Knack and Keefer 1995; Besley 1995), and not the least foreign direct investment (FDI) (e.g. Asiedu, Jin and Nandwa 2009; Blonigen 2005; Li 2009; Knutsen, Rygh and Hveem 2011).[5] Moreover, democracy may generate incentives for politicians to increase the amount of resources allocated to certain types of *public investment*, especially in public goods that benefit a large share of the populace (Bueno de Mesquita et al. 2003).

The empirical evidence on whether dictatorship increases investment is also mixed. For example, Tavares and Wacziarg (2001) find a very substantial and robust, negative effect of democracy on growth via the physical capital channel, using data from 65 countries between 1960 and 1975 (cross-section specification). Przeworski et al. (2000) draw on more extensive data material, and find that dictatorship increases physical capital investment somewhat, but only for relatively rich countries. However, the results from the meta analysis in Doucouliagos and Ulubasoglu (2008) indicate that there is no robust indirect effect of democracy on economic growth via physical capital accumulation.

[4] In Knutsen (2010*b*) I find that although dictatorship does not increase economic growth in Asia, it increases investment as a share of GDP by approximately 2 percentage points. However, Rock (2009*a*) finds no such effect from dictatorship on investment in Asia.

[5] See also the discussion in Knutsen (2011*a*).

Nevertheless, one common notion is that dictatorships "are better able to marshal the limited resources available and direct them towards productive activities that will increase economic output" (Halperin, Siegle and Weinstein 2005, 3). As discussed in Chapter 1, it is often argued that democracies are vulnerable to popular pressures for mass consumption, be it public consumption or private consumption (see also e.g. Przeworski and Limongi 1993).[6] If this is true, democracy reduces savings rates, which again reduces investment rates. A negative effect of democracy on savings rates *may* also matter for long run economic growth as "[e]conomies with higher savings rates grow faster because they allocate (endogenously) more resources to inventive activities" (Helpman 2004, 45). Thus, if democracy undermines saving, dictatorial regimes may have an advantage in promoting economic growth.

There are different varieties of the "democracy-reduces-savings" argument, and some of these were briefly presented in Chapter 1. However, one common assumption underlying these varieties of the argument is that the populace is short-sighted and wants immediate consumption. Hence democratic politicians are pressured to redistribute resources to both private and public consumption, since consumers are also voters, and voters are assumed to punish politicians in the next election if their demands for consumption are not met. Dictators can presumably more easily neglect pressures for mass consumption without losing office, which allows dictatorial regimes to allocate more of their countries' resources to various investment projects.

Let me expand on the discussion in Section 1.3: As noted in that section, democracy may increase consumption through different channels. One such channel is politically induced redistribution of wealth. Empirically, most national income distributions are skewed such that there are relatively few rich citizens, and the majority of citizens have incomes below the national *average* income. In democracies, this leads to political incentives for the *relatively* poor majority of citizens to use their votes to redistribute from the relatively rich, who are fewer in numbers and crucially do not as a group contain the "median voter" (e.g. Meltzer and Richards 1981; Przeworski and Limongi 1993; Acemoglu and Robinson 2000; Boix 2003; Acemoglu and Robinson 2006*b*). Thus, one would expect more progressive redistribution of resources in a democracy, given that the relatively poor have more political power under such a regime. When this is combined with the hypothesis (often called the "Kaldor hypothesis") that rich individuals save and invest a higher proportion of

[6] As I discussed in Chapters 1 and 3 (see also Knutsen 2010*b*), there are several problems with this type of argument. One general counter-argument is that even if dictators are *able* to increase savings rates, they may not always have the incentives to do so. A version of the latter (counter-)argument will be presented in Section 7.1., although it will be related to development-enhancing policies more generally rather than specifically to savings and investment policies.

their income than poor individuals (see e.g. Keynes 1997, 96–98), one would expect more consumption and less savings on aggregate in a democracy. In other words, the taxation of rich individuals (and firms) in democracy combined with redistribution to the relatively poor majority is expected to lower savings and thus investment rates.

Likewise, democracy may increase consumption through increasing wages (Rodrik 1999*b*). Freedom of association, which includes the right to form collective labor organizations, is an important feature of democracy, at least when defined broadly as in Chapter 2. Workers right to organize most likely increases the workers' bargaining power in the labor market, which by all accounts generate higher wages. Workers are again likely to consume a higher share of their income than relatively wealthy capital owners are. Conversely, reducing wages through co-opting or coercing labor is one way to increase capital accumulation in dictatorships, where freedom of association is less well protected. In Singapore, the share of national income going to wages varied between 0.3 and 0.4, which is quite low, from at least 1970 to 1990 (Przeworski et al. 2000, 172). Labor in Singapore has been aligned with, or even co-opted by, the ruling PAP-government (Deyo 1998, 202). Other examples also point to the weakness of labor under dictatorship; the numbers of labor disputes in South Korea and Taiwan in the 1960s were extremely low, often in the single digits per year. Moreover, only some of these disputes were related to demands for wage increases (Cho and Kim 1998, 140).

Dictatorial regimes may also reduce consumption and increase savings through not providing social security and other government insurance schemes. Although citizens would have preferred such insurance schemes, they do not have the political power to make their government comply under dictatorship. Thus, the extensive welfare arrangements found in many Western democracies have more or less been lacking in most historical dictatorships (for a brilliant analysis, see Lindert 2005), Communist dictatorships perhaps excepted. Reducing the amount of public resources spent on social security and other welfare arrangements allows a government to increase public saving, and thus public investment. However, this is not the only relevant effect on savings; the response of rational citizens is to save privately when public welfare and insurance schemes are non-existent or insufficient. Robert Wade explicitly links the high household savings rate in Taiwan to the lack of social security systems; Taiwanese citizens had to save a large share of their income in order to ensure resources for consumption at old age and for potential sickness. Taiwanese households also saved a large share of their incomes to support expensive education for their children (Wade 1990, 62–63). Summing up, the lack of political

responsiveness and accountability to the broader citizenry in dictatorships allow political elites to reduce funding for welfare, social security and education programs; these are programs that a "median voter" probably would push for in a democracy.

Dictatorships can also, more directly, impose specific regulations that curb consumption. Historically, many dictatorships have imposed regulations to reduce consumption of various goods not deemed "necessary" for survival, and particularly imported luxury goods. Such regulations are presumably unpopular among many citizens, and thus politically difficult to implement in democracies. One example is the regulation of luxury consumption in some East Asia countries, where non-democratic regimes "imposed heavy tariffs and domestic taxes on, and sometimes even banned the domestic production as well as the import of, certain 'luxury products'" (Chang 2006, 25). One curious case is the ban on tourism in military-ruled South Korea. This ban expired with political liberalization in the 1980s. Moreover, state-owned banks did not provide loans for consumption or import of for example cars, washing machines and video cameras (Shin 1998, 8). In Taiwan under the Kuomintang, selective indirect taxes on luxury goods and amusement services were favored by the regime, which generated disincentives for private consumption and thus enhanced private savings. Indirect taxes accounted for approximately 70 percent of total Taiwanese tax revenue in the late 1970s (Wade 1990, 60).

The arguments discussed above indicate that dictatorship enhances investment, through increasing domestic public and private savings. However, there is no necessary relationship between savings and investment in an open economy, because of the possibility of investing abroad. The empirical correlation between domestic savings- and investment rates has historically been high (Feldstein and Horioka 1980), but the correlation might have weakened over the last decades as FDI has increased (e.g. Knutsen 2011*a*). Today, FDI makes up a larger share of new investments than historically. To illustrate, in the year 2007 net FDI inflows as percentage share of GDP totalled 4.08, 2.01, 4.09 and 8.87 in France, USA, China and Egypt, respectively. For 1990, the corresponding FDI numbers were 1.06, 0.61, 0.98 and 1.70. In contrast, domestic savings as share of GDP made up respectively 20.29, 13.19, 52.20 and 16.27 for the four countries in 2007 and 21.18, 16.30, 39.63 and 16.15 in 1990. Globally, FDI inflows accounted for 0.99 percent of global GDP in 1990 and 4.28 in 2007, whereas domestic savings made up 23.75 percent in 1990 and 22.34 in 2007. [7] Thus, although the volume of FDI has increased substantially over the last couple of decades, domestic savings is still the main source of investment in most countries around the world.

[7] These data are drawn from the World Development Indicators.

Nevertheless, democracies may, especially after circa 1990, partly mitigate a likely dictatorial investment advantage due to higher savings rates through attracting more FDI because of better investment climates. I noted above and in Chapter 3 that several empirical studies find a positive effect of democracy on FDI. Also as noted above, empirical studies have uncovered a positive effect of democracy on property rights protection (Leblang 1996; Boix 2003; Knutsen 2011*b*) and control of corruption, at least in consolidated democracies (Rock 2009*a*), and several studies show that FDI is positively affected by property rights protection and negatively affected by corruption (see the review in Blonigen 2005). Hence, there is a rationale for further studying the effect of democracy on investment, and for estimating this effect based on data from different time periods.

5.2.2 Statistical analysis

Investment rates as dependent variable

I first investigate whether democracy affects the share of GDP going to physical capital investment.[8] The models used for the 'short time series' were introduced and justified in Chapter 4. The same control variables are used for models investigating the effect of democracy on physical capital accumulation in this section, on human capital accumulation and technological change later in this chapter and on economic growth in Chapter 6. The Freedom House Index (FHI) is, as discussed in Chapter 2, the preferred measure of democracy, and lower values on the FHI represent more democratic regimes.

To quickly recapitulate the models presented in Chapter 4, Model I includes the FHI, log GDP per capita, log regime duration, log population, the ethnic fractionalization index from Alesina et al. (2003), and region dummies. Model II adds colonizer and plurality religion dummies to Model I. Model III adds decade dummies to Model II, and Model IV adds absolute latitude, urban population as percentage share of total population and total trade as percentage share of GDP to Model III. The investment data are collected from the World Development Indicators, as described in Chapter 4.

First, I run OLS with PCSE to incorporate cross-sectional and within-nation

[8]In the analyses where investment as a share of GDP, saving as a share of GDP or gross education enrollment ratios are entered as dependent variables, exchange rate-adjusted rather than PPP-adjusted GDP per capita is used. The reason is that these time series are often very short, and using PPP-based data from the World Developement Indicators would reduce the number of observations even more. In the analysis of the various sources of growth for the long time series, the extensive PPP-adjusted GDP per capita data from Maddison (2006) are used.

variation. The results from the OLS with PCSE models (using no lag on the independent variables) presented in Table A.1 in Appendix A indicate that dictatorship as a regime type increases investment as share of GDP. All models, except the most extensive Model IV, find that democracy has a negative effect on investment shares, significant at the 5% level. The estimated effect of going from most democratic (1) to least democratic (7) on the FHI, is an increase in $\frac{Investment*100\%}{GDP}$ of about 2.1 according to Models I and II.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	0.122	0.88	0.135	0.87	0.118	0.79	-0.181	-1.52
Ln GDP pc	1.230***	3.15	1.001***	2.84	1.057***	3.11	0.560	1.32
Ln reg. dur.	0.077	0.58	0.176	1.49	0.170	1.44	0.069	0.53
Ln popul.	-1.004***	-3.05	-0.810**	-2.38	-0.716**	-2.20	0.101	0.36
Ethn. fr.	-5.611***	-3.20	-5.348***	-3.92	-5.047***	-3.90	-1.584	-1.22
Africa	2.423	1.56	3.886**	2.48	4.206***	2.86	1.869	0.88
Asia	7.017***	4.62	0.940	0.39	0.816	0.37	0.987	0.46
Lat. Am.	0.547	0.51	-3.140	-1.00	-2.750	-0.95	0.014	0.01
E.E.-Soviet	1.879	1.48	1.758	1.23	2.186*	1.71	-0.964	-0.87
MENA	1.168	0.77	0.501	0.27	0.957	0.56	2.172	1.02
British			-1.689**	-2.51	-1.758***	-2.80	-1.350**	-2.10
French			-3.203*	-1.78	-2.931*	-1.66	0.034	0.03
Spanish			2.275	0.83	1.771	0.73	-0.496	-0.26
Portuguese			0.280	0.15	0.396	0.23	1.233	0.63
Belgian			-10.993***	-4.48	-11.230***	-4.60	-8.938***	-4.12
Sunni			1.391	0.77	1.865	1.07	1.304	0.79
Shia			4.030*	1.65	5.060**	2.16	5.691**	2.11
Catholic			2.785	0.99	3.282	1.19	2.751	0.98
Protestant			-0.241	-0.12	0.298	0.16	1.325	0.69
Orthodox			-0.558	-0.28	-0.015	-0.01	1.782	0.69
Hindu			3.776	1.20	4.309	1.46	1.264	0.53
Buddhist+			9.351***	2.76	9.914***	3.14	6.795***	2.95
Indigenous			0.986	0.37	1.331	0.52	1.107	0.46
1970s					0.863	1.05	1.238	1.57
1980s					-0.091	-0.13	0.173	0.25
1990s					-0.291	-0.53	-0.165	-0.31
Abs. lat.							0.071*	1.73
Urbaniz.							-0.036	-1.44
Trade							0.023**	2.34
Constant	28.609***	3.96	26.586***	3.63	23.875***	3.34	12.348*	1.69
N	3647		3647		3647		3313	

Table 5.1: OLS with PCSE analysis. Gross investment as percentage share of total GDP as dependent variable. 2-year lag on independent variables. Short sample.

However, as discussed in Chapter 4, the simultaneous specification of the models (no lags on independent variables) in Table A.1 is likely not proper; the effect of institutional structures on investment decisions, and further implementation of investment projects, may come with a substantial time lag. I therefore also ran models using 2- and 5-year lags on the independent variables. The results from these

OLS with PCSE regressions show less evidence for the hypothesis that democracy reduces the share of GDP being invested. Indeed, none of the models using 2-year lags, reported in Table 5.1, find a significant effect of FHI even at the 10% level.

The results from the models using 5-year lags on the independent variables provide some, but not unequivocal, support for the hypothesis that democracy reduces investment shares. Among these models, reported in Table A.2 in the Appendix, Model I finds a significant effect at the 5% level, whereas Models II and III find a significant effect only at the weak 10% level. These models' point estimates indicate an increase in investment ratio of about 1.8 percentage points when going from 1 to 7 on the FHI. Model IV does not find any significant effect of FHI. Thus, there are some indications from these (preliminary) analysis that dictatorship increases investment, although the relationship is far from robust.

What may the explanations for the lack of robust results be? Several potential explanations can be drawn from the discussions above in this section, and discussions in Chapters 1 and 3. First, one should note the models above draw on observations from 1972 and up until 2004. The last half of this period saw an explosive growth in FDI, despite its still modest level relative to domestic savings. Even if dictatorships have a domestic savings advantage, a counteracting positive effect of democracy on FDI, as found in for example Li and Resnick (2003), Jensen (2003) and Busse and Hefeker (2007), may contribute to the non-robust results.

Second, and likely more important; although dictatorships may be able to pursue policies that increase domestic savings rates because of autonomy from the general populace, some dictatorial regimes may not have the *incentives* to pursue high-savings policies.[9] The models from Bueno de Mesquita et al. (2003), Robinson (2001) and Acemoglu and Robinson (2006*a*) provide some possible explanations for why dictators may have little incentive to generate high public savings rates, and why they may also negatively affect property rights protection, which deters private investment. Such issues, related to dictators' incentives for pursuing "predatory" rather than "developmental" policies, were discussed in Chapters 1 and 3 and will be further dealt with in Section 5.4 and Chapter 7. Let us here only note that, empirically, dictatorships show a very high variation in investment rates, indicating that the incentives for pursuing policies that generate high savings rates and attract FDI vary strongly between regimes. For example, around the year 2000 China typically invested around 35 to 40 percent of its GDP, whereas Myanmar invested around 10 percent of its GDP.

[9] I have discussed this argument more thoroughly for example in Knutsen (2010*b*).

The hypothesis that dictatorship increases physical capital investment takes a further blow when taking into account that there may be non-observable country-specific factors that affect both investment behavior and regime type. I ran the three different fixed effects models, presented in Chapter 4, for the short time series sample, both when using 2-year and 5-year lagged independent variables. The results are shown in Tables A.3 and A.4 in the Appendix. None of the six models in these two tables find a significant negative effect of democracy on investment ratio. To the contrary, Model II with 2-year lagged independent variables and Model I with 5-year lagged independent variables show a positive and significant effect of democracy at the 5% level. Thus, the results from some of the OLS with PCSE models above may be due to omitted variable bias, and dictatorship may not enhance investment rates.

However, given the nature of the dependent variable, the estimates above may be biased. More specifically, $\frac{Investment*100}{GDP}$ can be considered to have natural upper and lower boundaries, at least in the long run. Even if it is logically possible to have negative values of investment, for example if a foreign investor draws out substantial amounts of capital, 0 is a natural long term lower boundary. It is also possible to have $\frac{Investment*100}{GDP} > 100$, particularly if there is a large inflow of foreign direct investment in one particular year. However, 100 is a natural long term upper boundary, as no country are likely to invest more than its GDP for a sustained period of time. Even this upper boundary is likely too lenient, as no one would survive in an economy without consumption.

As a consequence, I run random effects tobit (RET) models, using 0 as a lower censoring value and 100 as an upper censoring value. RET models are more proper to use for analyzing the relationship at hand than OLS-based techniques are, simply because the dependent variable is restricted; OLS-based techniques give biased estimates when applied on restricted dependent variables (e.g. Long 1997; Greene 2003), but tobit models do not. The RET coefficient estimates' sizes are a bit involved to interpret (see Long 1997), and I thus focus only on sign and significance level here.

First, I run a preliminary analysis using only ln GDP per capita as independent variable, to obtain starting values on the coefficient estimates for a more efficient estimation of the main model. I run 5000 iterations of the model in this preliminary analysis. The coefficients from this analysis are kept and entered as starting values in the main analysis. The main analysis is conducted by running 20 000 iterations. I ran structurally similar models (in terms of variables) to those used in the OLS with PCSE analysis in the (main) RET analysis. The results for the models using

2- and 5-year lags on the independent variables are shown in Tables A.5 and A.6.

The RET models are based on between 2992 and 3647 country-year observations, and for the most extensive model, in terms of observations included, 143 countries enter the analysis. The average number of years for each panel (country) is 25.5 in this model, with the maximum time series being 32 years long. The results from Tables A.5 and A.6 cast further doubt on the "dictatorship-enhances-investment" hypothesis. There are no significant negative democracy coefficients, even at the 10% level, for any of the eight models represented in Tables A.5 and A.6. In fact, the only significant estimate at the 10% level, from Model IV using 5-year lags, indicates a positive effect of democracy on investment rates.

When I consider all the results from the various models presented above, the data do not allow me to conclude that there is an investment advantage for dictatorships, although a few models find such an effect.

Savings rates as dependent variable

When looking into the various theoretical arguments presented above on why dictatorships may increase investment, one identifies that they are mainly based on dictatorships being able to pursue policies that enhance domestic saving. I can investigate the validity and relevance of these arguments somewhat further by substituting gross investment as share of GDP as the dependent variable with domestic saving as share of GDP. More specifically, I substitute the dependent variable used above with $\frac{Savings*100}{GDP}$ in structurally similar models to those investigated above. Table 5.2 shows the results for the 2-year lag specification. In the Appendix, I also report results for models using no lags and 5-year lags on the independent variables in Tables A.7 and A.8, respectively.

The models represented in Table 5.2 mostly indicate a strong, positive effect of having a dictatorial regime on $\frac{Savings*100}{GDP}$.[10] Models I, II and III show a significant effect at the 1% level. The point estimates indicate an increase in savings as percentage share of GDP of between 5.6 and 6.4 percentage points when going from 1 to 7 on the FHI. These models' point-estimates indicate a far stronger effect of dictatorship on savings rates than corresponding models did on investment rates. This was expected, based on the theoretical discussion above; in a relatively open world economy, (at least some rich) people in high-saving dictatorships may move some of

[10]The results presented in Table A.7 in the Appendix show that the results are qualitatively similar when not lagging the independent variables. However, the results in Table A.8, where independent variables are lagged with five years, are far weaker, and indicate that the effect of regime type on savings rate is not robust to choice of lag-specification.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	0.997***	4.24	1.059***	4.53	0.927***	3.96	0.225	1.36
Ln GDP pc	8.361***	15.25	8.480***	13.93	8.627***	14.13	9.118***	14.51
Ln reg. dur.	-0.148	-0.81	-0.170	-0.91	-0.150	-0.83	-0.406**	-2.44
Ln popul.	1.786***	5.11	1.851***	5.04	2.019***	5.44	2.586***	6.40
Ethn. fr.	13.430***	7.26	11.569***	6.25	11.221***	6.10	8.024***	4.07
Africa	8.275***	4.20	9.158***	3.95	11.415***	4.99	11.500***	5.06
Asia	16.643***	9.62	16.198***	6.90	16.426***	6.30	16.594***	6.95
Lat. Am.	7.347***	5.48	7.245**	2.43	8.681***	2.89	8.399***	3.91
E.E.-Soviet	10.238***	9.03	14.582***	8.09	17.068***	9.51	8.354***	6.55
MENA	6.390**	2.50	8.573***	3.17	9.429***	3.58	16.047***	5.28
British			0.716	0.61	0.143	0.12	-3.386**	-2.47
French			0.197	0.13	-0.113	-0.07	-1.446	-0.97
Spanish			2.271	0.92	1.782	0.72	-3.785*	-1.78
Portuguese			0.725	0.31	0.886	0.38	-1.746	-0.80
Belgian			0.404	0.13	-0.024	-0.01	-6.884**	-2.45
Sunni			14.854***	3.51	15.216***	3.56	26.362***	7.26
Shia			10.138*	1.93	11.162**	2.12	33.638***	9.12
Catholic			15.137***	3.54	14.945***	3.42	30.479***	6.97
Protestant+			17.897***	4.34	17.959***	4.25	31.907***	7.98
Orthodox			10.550**	2.33	10.644**	2.32	31.414***	6.57
Hindu			18.888***	4.12	19.508***	4.18	32.841***	7.80
Buddhist+			16.863***	4.18	17.814***	4.27	28.418***	8.30
Indigenous			16.547***	3.65	16.700***	3.70	30.082***	7.41
1970s					4.262***	3.50	4.377***	3.59
1980s					1.784*	1.67	1.721	1.58
1990s					0.260	0.32	0.262	0.30
Abs. lat.							-0.247***	-4.54
Urbaniz.							-0.056*	-1.72
Trade							0.038***	3.68
Constant	-89.97***	-12.26	-108.18***	-11.79	-114.05***	-12.81	-128.15***	-16.46
N	3761		3761		3761		3420	

Table 5.2: OLS with PCSE analysis. Domestic savings as percentage share of total GDP as dependent variable. 2-year lag on independent variables. Short sample.

their savings to safer investment locations than the home country (like democratic Switzerland), and low-saving democracies may attract FDI because of a relatively safe investment climate. However, Model IV shows an insignificant effect of regime type on savings ratios, both for specification using 2-year lags (see Table 5.2) and 5-year lags (see Table A.8), indicating that omitted variable bias *may* drive the result in the models not controlling for latitude, urbanization and trade.

I investigate the possibility of omitted variable bias driving the results above further by running fixed effects models. The fixed effects models using savings rates as dependent variable are shown in Table 5.3 (2-year lags).[11] In contrast with the fixed effects models for investment rates, all coefficient estimates are signed so that they indicate a negative effect of democracy, even if none of the coefficients are statistically significant. Model I in Table 5.3, however, has a democracy coefficient that

[11]The results do not change when I use a 5-year lag specification. These results are shown in Table A.9 in the Appendix.

comes close to being significant at the 10% level, with a t-value of 1.62. Nevertheless, these results indicate that the estimated effect of democracy on savings rates obtained from the OLS with PCSE models above is non-robust, and may be due to omitted variable bias.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
FHI	0.230	1.62	0.167	1.16	0.120	0.88
Ln GDP pc	11.018***	18.81	11.763***	18.50	9.925***	14.70
Ln reg. dur.	-0.332**	-2.07	-0.270*	-1.68	-0.590***	-3.82
Ln popul.	-4.205***	-6.81	-0.296	-0.27	-0.894	-0.75
1970s			2.763***	3.52	3.295***	4.28
1980s			-0.377	-0.66	0.249	0.44
1990s			-0.739*	-1.81	-0.176	-0.43
Urbaniz.					0.027	0.71
Trade					0.054***	6.27
Constant	3.229	0.31	-65.316***	-3.26	-46.673**	-2.22
N	3761		3761		3420	

Table 5.3: Fixed effects analysis. Domestic savings as percentage share of total GDP as dependent variable. 2-year lag on independent variables. Short sample.

As for the regressions on investment rates, linear models may generate biased results; also savings rates are restricted. I therefore, again, run random effects tobit (RET) models with 0 as lower censoring value and 100 as upper censoring value. Again, I run a first regression, corresponding to the one for investment rates, with only ln GDP per capita as independent variable to obtain starting values. This initial model is based on 5000 iterations, and the main models are based on 20 000 iterations. The results for the models using 2- and 5-year lags on the independent variables are shown in Tables A.10 and A.11 in the Appendix. All point estimates from the various RET models in Tables A.10 and A.11 indicate a positive effect of dictatorship on savings rates. Moreover, Models I, II and III, independent of lag specification, find that the effect is statistically significant at least at the 10% level, and all models except Model III using the 5-year lag find a significant effect at least at the 5% level.

Thus, despite the non-significant findings from the restrictive fixed effects models, the empirical results taken together seem to indicate that dictatorial regimes save a larger share of their GDPs than democratic regimes do. This is in line with the theoretical arguments presented above, and there are more evidence indicating an effect of dictatorship on savings rates than an effect on investment rates. The possible reasons for these differences were discussed above, in Section 5.2.1, and re-

late among others to better property rights protection in democracies, which induces domestic and foreign capital owners to translate their savings into investments in the domestic economy.

However, it remains to be tested whether the non-robust effect of dictatorship on investment above is a result of the relatively short time series used, with a large share of the country-years coming from a period of time when FDI became an important economic factor. Moreover, it remains to be tested whether a potential capital accumulation advantage for dictatorships translates into higher physical capital-induced economic growth.

Democracy and physical capital-induced economic growth, long samples

The long time series in the data provided by Baier, Dwyer and Tamura (2006) allow me to investigate the effect of democracy on physical capital investment on a much larger data material than that used above, or indeed in previous empirical studies. I focus here on whether regime type affects physical capital-induced economic growth. More specifically, I use the estimated economic growth stemming from changes in physical capital per worker obtained from the growth accounting exercise performed in Baier, Dwyer and Tamura (2006). I am thus moving away from investigating the effect of regime type on investment level, as such, and rather focusing on the ultimate effect of regime type, via capital accumulation, on economic growth. The effect of regime type on the other immediate sources of growth in GDP per capita (or rather per worker, as this is the basis for the growth accounting in Baier, Dwyer and Tamura (2002)) are investigated in Section 5.3 (human capital) and Section 5.4 (technological change).

Here, it is timely to mention that Solowian growth models (e.g. Solow 1956) predict that cross country differences in $\frac{100\% * investment}{GDP}$ should not affect long run economic growth rates; investment rates only affect income level but not steady-state growth. A permanent increase in $\frac{100\% * investment}{GDP}$ is theoreticized to yield higher medium-term growth. However, the growth benefits of higher investment rates are ultimately balanced by higher capital depreciation. Cross country human capital differences are also expected to increase only medium-term, and not long-term, growth in the Solowian framework. In contrast, differences in technological change rates translate into long-run growth differences.

However, it should also be mentioned that other types of growth models than the much used Solow model indicate that differences in investment levels for human and/or physical capital also affect long run growth rate differences (for reviews,

see Barro and Sala-i Martin 2004; Acemoglu 2008). Below, I investigate whether democracy impacts on growth rates via affecting capital investment, based on a data material with quite long time series for many countries.

The long time series models described in Chapter 4 are used, and Table 5.4 shows the three different models for regressions using 2-year lags on the independent variables.[12] All three models show a negative estimated effect of democracy on physical capital-induced economic growth. However, none of the models show a significant effect, and the hypothesis that democracy reduces economic growth rates via the physical capital investment channel is thus not corroborated. The data material is quite extensive both in terms of number of countries and the length of the time series. For example, Models I and II in Table 5.4 are based on 7141 observations from more than 100 countries. The results reported in Table 5.4 go contrary, for example, to the results (strong negative effect of democracy on physical capital-induced economic growth) in Tavares and Wacziarg (2001), whose results were based on a cross-section specification drawing on data from fewer countries (65) and a shorter time interval (1970–1989).

However, the model specification used above, drawing heavily on cross country variation, may generate estimates of democracy's effect on growth that are influenced by omitted variable bias. I therefore run various panel data models, both random and fixed effects models, to check the robustness of the above results. Independent of model specification, the panel data models indicate a negative effect of democracy on physical capital-induced economic growth. Table 5.5 shows fixed effects models applying 2-year and 5-year lag specifications, and these models draw on about 7000 country-year observations. In these models, the PI-coefficients are significant at the 1% level, and the estimated effect of going from 10 to -10 on the PI is 1.2 percentage points extra annual physical capital-induced economic growth in the model where the independent variables are lagged with five years. In the 2-year lag model, the estimated effect is 0.8 percentage points.[13] The results are qualitatively similar in random effects models; models with these results are reported in Tables A.13 and A.14 in the Appendix.

Thus, even the very restrictive fixed effects models controlling for country-specific factors, in addition to ln GDP per capita, ln regime duration, ln population and decade dummies, indicate that democratic regimes' economic growth rates are reduced substantially relative to those of dictatorships because of dictatorships' capital

[12]The results are very similar for models using 5-year lags on the independent variables. These results are reported in Table A.12 in the Appendix.

[13]These point estimates are relatively similar to the estimates reported in Tavares and Wacziarg (2001).

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	-0.007	-0.71	-0.008	-0.74	-0.007	-0.65
Ln GDP pc	0.248	1.20	0.203	0.88	0.089	0.35
Ln popul.	-0.079	-0.86	-0.111	-1.16	-0.143	-0.91
Ln reg. dur.	0.036	1.05	0.034	0.99	0.019	0.55
Ethn. fr.	-0.458	-1.06	-0.582	-1.52	-0.570	-0.93
E.E.-Soviet	0.518	1.36	0.234	0.64	0.682*	1.71
Africa	-0.145	-0.23	0.315	0.39	-0.349	-0.44
Asia-Pac.	1.256**	2.35	0.385	0.37	-0.086	-0.08
MENA	0.380	0.64	-0.262	-0.34	-1.479*	-1.73
Lat. Am.	0.074	0.18	0.110	0.10	-0.065	-0.06
1830s	1.239	1.17	1.107	1.05	0.779	0.71
1840s	-0.163	-0.16	-0.307	-0.30	-0.611	-0.57
1850s	0.116	0.14	-0.026	-0.03	-0.324	-0.36
1860s	0.430	0.58	0.290	0.38	-0.010	-0.01
1870s	0.419	0.59	0.290	0.40	-0.010	-0.01
1880s	0.449	0.65	0.327	0.46	0.026	0.03
1890s	0.732	1.10	0.623	0.92	0.319	0.43
1900s	0.742	1.16	0.644	0.99	0.336	0.47
1910s	0.345	0.56	0.261	0.42	-0.046	-0.07
1920s	0.228	0.37	0.170	0.28	-0.136	-0.20
1930s	0.373	0.62	0.319	0.53	0.024	0.04
1940s	1.179*	1.95	1.134*	1.87	0.897	1.36
1950s	1.712***	2.93	1.683***	2.88	1.488**	2.39
1960s	1.651***	2.96	1.644***	2.94	1.504**	2.56
1970s	1.075**	2.21	1.067**	2.19	0.990*	1.95
1980s	0.463	1.27	0.457	1.26	0.432	1.15
British			0.034	0.11	0.289	0.76
French			-0.104	-0.25	-0.003	-0.01
Portuguese			-0.706	-0.66	-0.368	-0.35
Spanish			-0.380	-0.39	0.055	0.06
Belgian			-3.010	-1.62	-2.184	-1.29
Sunni			-2.144	-1.59	-2.580*	-1.87
Shia			1.393	0.82	1.249	0.70
Catholic			-1.839	-1.26	-3.306**	-2.11
Protestant			-2.342*	-1.69	-3.600**	-2.35
Orthodox			-1.790	-1.12	-3.206*	-1.81
Hindu			-2.072	-1.13	-3.103	-1.63
Buddhist+			-0.894	-0.70	-1.594	-1.23
Indigenous			-3.399**	-2.37	-4.147***	-2.79
Abs. lat.					0.009	0.48
Frankel-Romer					-0.060	-0.21
Constant	0.267	0.13	3.153	1.09	5.710	1.44
N	7141		7141		6838	

Table 5.4: OLS with PCSE results. Physical capital-induced economic growth as dependent variable. 2-year lag on independent variables. Long sample.

accumulation advantage. One may therefore argue that there is a likely positive effect on economic growth from having a dictatorial regime, via the physical capital accumulation channel. Yet, this proposition is still hefted with a great deal of un-

certainty, as the estimated effect is not robust when OLS with PCSE is used instead of panel data models (on the issue of lacking robustness of this effect, see also the result from the meta analysis in Doucouliagos and Ulubasoglu 2008). Nevertheless, the results in Tables A.13 and A.14 in the Appendix and Table 5.5 are based on very long time series for many countries, and it is noticeable that analysis based on these data yield such a strong effect, given the transitional effect on income growth of physical capital accumulation predicted by Solow-type growth models.[14]

	2-year lag		5-year lag	
	b	*t*	*b*	*t*
PI	-0.040***	-4.52	-0.060***	-6.54
Ln GDP pc	1.123***	7.19	0.149	0.90
Ln popul.	-1.245***	-6.86	-1.819***	-9.69
Ln reg. dur.	0.142***	3.69	0.088**	2.24
1830s	1.341	0.77	-3.606**	-2.03
1840s	-0.304	-0.36	-3.405***	-4.47
1850s	0.178	0.30	-2.937***	-4.85
1860s	0.103	0.19	-2.831***	-5.07
1870s	0.312	0.61	-2.844***	-5.43
1880s	-0.092	-0.19	-2.499***	-5.13
1890s	0.868*	1.96	-1.710***	-3.74
1900s	0.807**	1.96	-1.434***	-3.40
1910s	0.454	1.18	-1.986***	-4.99
1920s	-0.143	-0.41	-2.213***	-6.17
1930s	-0.453	-1.41	-1.769***	-5.34
1940s	1.032***	3.37	0.136	0.44
1950s	2.445***	9.93	1.416***	5.52
1960s	2.617***	13.81	1.748***	8.74
1970s	1.850***	12.06	0.644***	3.90
1980s	-0.259**	-1.97	-0.448***	-3.05
Constant	3.814	1.61	17.951***	7.31
N	7141		6918	

Table 5.5: Fixed effects results. Physical capital-induced economic growth as dependent variable. 2- and 5-year lags on independent variables. Long sample.

A brief summary of the results

To briefly sum up the results from this section, the hypothesis that dictatorships have a physical capital accumulation advantage receive *some*, but far from unequiv-

[14]However, as will be discussed closer in Section 5.4, the growth accounting procedure may bias the results, and one should consider the possibility that estimates of physical- and human capital induced growth may be fraught with serious systematic and unsystematic measurement errors (Verspagen 2005; Nelson 2005; Rodrik 1997*b*; Barro and Sala-i Martin 2004; Baier, Dwyer and Tamura 2002, see e.g.).

ocal support. For the short time series analysis of regime types' effect on investment rates, the results were quite mixed, with some models even showing a democracy advantage. But, when investigating the effect of regime type on savings rates, the main determinant of investment rates, the results in favor of a "dictatorship advantage" were somewhat more robust. This, of course, means that citizens in dictatorships on average consume a smaller share of their incomes than their brethren in democracies. However, higher savings rates may according to various economic growth models translate into higher medium-term, and possibly even long-term, growth rates. The analyses based on the long time series with physical capital-induced economic growth as dependent variable produced mixed results. But, the relatively stringent panel data models indicated a significant, and sizeable, negative effect of democracy. However, as I will show below, democracies have other economic advantages, which more than balance this (possible) negative effect of democracy on economic growth.

5.3 Democracy's effect on human capital

5.3.1 Theoretical arguments, previous empirical literature and some anecdotal evidence

As discussed in Chapter 3, the positive effect of democracy on human capital is relatively well established empirically, and well described theoretically. Let me recapitulate some of the main contributions:

The results reported in Lake and Baum (2001), showing a strong positive effect of democracy on human capital, measured by various proxies, are quite convincing. Despite the lack of extensive time series data, which forces the authors to use cross-country regressions for many of their measures, the effect of democracy on human capital is positive independent of whether literacy rates, persistence of students to fourth grade, pupil-teacher ratio, various school enrollment ratios, health care access, clean water access, population per physician, percentage of births attended by health personnel, infant mortality rates or life expectancy, are used as proxies. As Lake and Baum (2001) note, democracy tends to generate political dynamics that lead to the adoption of policies extending the coverage of, improving the funding of, and enhancing the quality of education and health care, as a democratic regime provides specific incentives and constraints on politicians that lead to the adoption of such policies. More specifically, their core theoretical argument is that:

> states possess a natural monopoly within their core areas of production. Nonetheless states produce within a contestable market. That is, although only one state exists within a given territory, it (or its management, the senior politicians) can be displaced more or less easily, depending on the barriers to exit for potential competitors and the costs of political participation to citizens. When barriers to exit and costs of participation are low, as in democracy, the state will produce as a regulated monopoly, provide relatively larger quantities of goods at relatively lower prices, and thereby earn fewer supernormal profits or monopoly rents. When barriers to exit and costs of political participation are high, as in autocracy, the state will exercise its monopoly power, provide fewer public services and greater rents (Lake and Baum 2001, 590).

As education and health care are two core areas where the state either directly or indirectly provides services, one would expect more, better and cheaper (in terms of lower taxes per unit produced) education and health care provision in democracies.

However, the model in Lake and Baum (2001) is not the only explanatory model proposed to illuminate why democracies invest more heavily in human capital than dictatorships do. The model in Bueno de Mesquita et al. (2003) points out that education and health care systems can be characterized as relatively broadly based public goods, and investing in such systems are thus relatively cheap ways of gathering political support for leaders with large winning coalitions, and relatively expensive for leaders with small winning coalitions. Also Acemoglu and Robinson's model (Acemoglu and Robinson 2006*b*) indicate that the relatively poor majority will push for universal schooling under democracy, where they are in political power, whereas rich elites in dictatorships will try to avoid such expensive systems also benefitting the non-elites. Moreover, if dictators believe in Lipset's argument that a highly educated citizenry is conducive to democratization (Lipset 1959), perhaps because a better educated citizenry has more firm "democratic values" or are better able to coordinate collective action against the regime, the dictators will even have direct incentives to reduce school enrollment, independent of education's monetary costs. I will get back to this kind of argument in Chapter 7.

Furthermore, Stasavage (2005) develops a simple game theoretic model explaining why democratically elected leaders are likely to invest more resources in primary education than dictators are, with a focus on the African context. Stasavage's argument is that relatively populous rural groups in African countries have a strong preference for spending public resources on primary education. These groups face much lower costs of organizing collective action under democracy than under dictatorship,

and thus transform their numbers into political strength (see also Bates 1981) under democracy. This forces incumbent, democratic politicians to divert resources away from private rents towards primary education, and the share of resources spent on primary education is higher under democracy than under dictatorship, both relative to public spending and relative to total education spending.

Another relevant, and plausible (endogenous growth) model, is presented in Saint-Paul and Verdier (1993). In this model, education spending, and more generally policies that tend to increase human capital, are considered to have a redistributive element. The main implication from the models is that democracies may have higher endogenous growth, because of more investment in human capital. As the model in Meltzer and Richards (1981) indicates, political systems with relatively poor decisive agents (the median voter under democracy) are likely to experience more politically induced redistribution. As North, Wallis and Weingast (2009) note, in accordance with the theoretical argument in Saint-Paul and Verdier (1993), redistribution through human capital generating policies and other productivity-enhancing public policies have been the historical norm in Western democracies, rather than zero-sum, or even negative-sum, types of redistribution.[15] Examples of the latter are large-scale redistribution of property and large lump sum transfers of financial resources (see also Lindert 2005; Acemoglu and Robinson 2006*b*).

The *empirical* results in Baum and Lake (2003); Tavares and Wacziarg (2001); Doucouliagos and Ulubasoglu (2008) show that democracy enhances growth through human capital accumulation, as the theoretical model in Saint-Paul and Verdier (1993) predicts. Democracy positively affects several dimensions of human capital related to health care and schooling, and this in turn seems to be one of the more important channels through which democracy enhances economic growth (see Tavares and Wacziarg 2001; Doucouliagos and Ulubasoglu 2008). However, as Baum and Lake (2003) point out, and find evidence for, the types of policies that contribute the most to economic growth via enhancing human capital may be context dependent. More specifically, Baum and Lake (2003) find that democracy contributes to higher growth rates particularly through increasing secondary school enrollment rates in rich countries and through increasing life expectancy in relatively poor countries.[16] This latter analysis draws on data from 128 countries for the time period from 1967

[15]This does of course not imply that there has not been variation in the extent and types of redistribution pursued by democratic Western governments, both between countries (for example, on different models of redistributive policies in different Western democracies, see e.g. Esping-Andersen 1990) and across time (for example, on the general increase in income inequality in Western democracies since 1980, see e.g. Lambert 2001).

[16]As Baum and Lake (2003) discuss, the results are particularly strong when using data for the female population only.

to 1997.

There are also other empirical studies indicating a strong effect of democracy on schooling and health care. Various case studies, small-n comparative studies and statistical studies of specific countries and regions indicate that democracy, and political participation in particular, expands access to and improves funding of health care and schooling (Acemoglu and Robinson 2006*b*; Lindert 2005; Go and Lindert 2007; Engerman, Mariscal and Sokoloff 2009; Stasavage 2005). The expansion of access to health care and schooling in for example the US, UK and Scandinavian countries seem to follow more or less directly from the expansion of political participation rights (see Lindert 2005).

However, there are exceptions to the general relationship described above; some dictatorial regimes have historically produced policies that has ensured broad access to high-quality education and health care. The Warsaw-pact countries, including the former Soviet Union, provided extensive education coverage, also on the secondary and tertiary level. The education provided was also of relatively high quality, especially in mathematics, the natural sciences and engineering (Boesman 1993; Balzer 1993; Chengze, Overland and Spagat 1999). At least up until recent years, Communist Cuba, despite its low GDP level, has also posited a high-quality health care system (see e.g. Nayeri 1995). Some casual comparisons could also indicate that the positive relationship between democracy and human capital is far from deterministic: For example, Chinese citizens have longer life expectancy than Indian citizens living under a relatively democratic regime (see the discussion in Sen 1999).

Not only Communist dictatorships have provided broad-coverage, well-functioning education and health care systems. The Asian Tiger dictatorships of South Korea and Taiwan are two other examples. These countries not only had extensive education coverage, but their students have scored top scores on cross-national tests in mathematics and the natural sciences, both in recent history (see e.g. Stiglitz 1997, 884) and today, after democratization (see OECD 2007). In Knutsen (2010*b*) I even find that dictatorship enhances primary schooling rates in Asia, but this result is based on a small number of observations.[17] Prussia in the 19th century is another historical example of a relatively dictatorial regime that provided extensive education coverage at all levels, combined with a high-quality system that was even emulated by several other countries (see e.g. Lindert 2005; Clarke 2006).

Despite the examples above, the general result in the literature is that democracy improves human capital accumulation. However, there may be nuances to the

[17]However, democracy significantly enhances secondary and tertiary schooling, even in Asia (Knutsen 2010*b*).

proposition that democracy enhances human capital through improving education and health care systems. For example, there may be strong incentives for dictatorial regimes to provide high-quality education and specialized health care for selected elites. A high-quality extensive (in terms of share of population) public school system, however, is more likely to be found in democracies.[18] Stasavage (2005) for example argues and finds moderate support for the proposition that African dictatorial regimes invest *relatively* much, and about equal to democracies in absolute numbers, in tertiary education, while neglecting primary education systems. Moreover, education systems and opportunities may be structured so that they mainly benefit the capital or regions from which a dictator draws his support. Nigeria is one such example where education opportunities have been geographically skewed (Mustapha 2006). In Europe, Vienna was known as a cultural, academic and intellectual center around 1900 within the relatively poor authoritarian dual monarchy of Austria-Hungary.

Below, I run a number of regression models testing the effect of democracy on human capital to see if the results from earlier studies are further corroborated or if there are reasons to question these findings. As discussed in Chapter 4, human capital is a difficult concept to measure, and most available cross-national operationalizations with broad coverage have severe validity problems. Nevertheless, I first use primary, secondary and tertiary gross school enrollment ratios as proxies for human capital. The data on enrollment ratios are collected from the World Development Indicators (WDI). As school enrollment ratios are restricted variables, I use random effects Tobit models. This is, as noted in the previous section on physical capital, necessary in order to achieve unbiased estimates in the case of restricted dependent variables. This point has been missed by previous empirical studies on democracy and human capital. Second, I estimate regressions on democracy and human capital-induced economic growth, based on data from (Baier, Dwyer and Tamura 2006). These are the longest time series on human capital-induced growth that I know of, and despite concerns about serious measurement errors, the expansion of data points make such an investigation worthwhile.

[18]Dictators and their supporters might even neglect spending on high quality elite schools, and rather send their children abroad. One example is Kim Jong Il's third son, expected to take over power in North Korea, who was sent to an expensive private school in Switzerland (Guardian 2009).

5.3.2 Statistical analysis

Democracy and school enrollment ratios

First, I run the short time series regression models presented in Chapter 4, and used above in the analysis of investment and savings rates, to investigate the effect of regime type on gross school enrollment ratios. The preliminary analysis is once again based on OLS with PCSE.

The time series from the WDI for enrollment data are quite short, and far shorter than for savings and investment. For the non-lagged series of primary education enrollment, the maximum length of the time series is only eight years, and the average time series length is only 6.8 years. In order to calculate the variance-covariance matrix in OLS with PCSE regressions, I therefore assume that the contemporaneous correlation of standard errors is 0, and take into account only AR1 autocorrelation and heterogenous standard errors across panels. Moreover, I show only the non-lagged results, as lagging the independent variables with two years means shaving off almost $\frac{1}{3}$ of the observations. At last, I do not run fixed effects regressions, as time series of around 5 to 8 years are too short to use for inference from intra-national variation alone. Thus, inferences concerning the effect of democracy on human capital from these short time series samples are mainly, but not completely, based on cross-sectional variation. The short time series and quite limited data material (although 142 countries are represented for example in Models I-III for primary education) should also make me a bit careful of drawing too strong conclusions from these results.

The OLS with PCSE models with primary education enrollment ratios as dependent variable are presented in Table B.1 in Appendix B. The results are quite mixed when it comes to the effect of regime type. This *may* reflect a combination of a weak effect of regime type and the low number of observations. Moreover, the generally very high enrollment ratios for primary education in the 1990s and 2000s, with most countries having ratios above 90 percent, makes it hard to differentiate human capital accumulation between countries based on this proxy (see also the discussion in Klenow and Rodriguez-Clare 1997). Only some countries, like Djibouti (37 percent) and Niger (35 percent), have average primary enrollment ratios below 50 percent. As will be noted below, the linear model specification may also lead to biases, as long term enrollment ratios should have an upper bound of 100. In the data, some countries, like for example Portugal and Uganda, have enrollment ratios above 120 on average over the short time series.

In any case, Model I in Table B.1 finds no significant effect of regime type,

whereas Model II (10% level) and Model III (5% level) actually find a positive effect of dictatorship. The point estimate in Model III indicates a 7.7 percentage point decrease in primary enrollment ratio when going from least to most democratic on the FHI. Model IV, however, finds a positive and significant effect (5% level) of democracy on primary enrollment ratios. According to this point estimate, going from least to most democratic increases the primary enrollment ratio with 8.7 percentage points, when holding all other variables in Model IV constant.

It is thus impossible to conclude on the effect of regime type from this preliminary analysis, and the varying results here contrast somewhat with the results from previous, and more thorough, studies on democracy and human capital, although also these studies find that results vary somewhat with choice of indicator. However, the RET analyses below, using the same control variables, show much clearer results, indicating a positive effect of democracy on primary enrollment ratios. I will come back to this, but first I will have a look also at the estimated effect of democracy on secondary and tertiary enrollment ratios based on OLS with PCSE models. The results from these models are reported in Tables B.2 and B.3 in Appendix B.

The results in Table B.2, showing models with secondary education enrollment ratio as dependent variable, are very different from those in Table B.1 where primary enrollment ratio was the dependent variable. The results in Table B.2 unequivocally point to a positive, significant effect of democracy. The FHI coefficient is significant at the 1% level in Models I, II and III, and at the 5% level in Model IV. The point estimates indicate an estimated effect of going from least to most democratic of between 8.7 percent and 10.9 percent increased enrollment ratios in secondary education.

Secondary education enrollment ratios show much more variation between countries than primary enrollment ratios (see e.g. Klenow and Rodriguez-Clare 1997), and is the preferred human capital proxy in several empirical studies (for example in Mankiw, Romer and Weil 1992). Thus, although most countries at present provide extensive education coverage for the youngest children, democracy seems to widen the coverage substantially for the older children, and is thereby likely increasing the human capital of the workforce relative to dictatorship.

As was the case for secondary enrollment ratios, the OLS with PCSE results for tertiary enrollment ratios, reported in Table B.3, show a significant, positive and substantially large effect of democracy. All models have FHI coefficients that are significant at the 1% level. The point estimates indicate an increase in tertiary enrollment ratios when going from 7 to 1 on the FHI of between 7.2 and 10.2 percentage points. This is a quite substantial effect, particularly given that the

average tertiary enrollment ratio recorded in the World Development Indicators data material is 26.3 percent.

However, as discussed several times above, OLS with PCSE models may yield biased results for restricted dependent variables such as enrollment ratios (e.g. Long 1997; Greene 2003). Moreover, this problem is likely larger when investigating enrollment ratios than when investigating investment and savings ratios, because of different distributions. More specifically, there is a more profound clustering of observations at the bounds for enrollment ratios. Although there are countries that score higher than 100% on primary enrollment in a given year, the long term natural ceiling for such ratios are 100% and the lower bound is, of course, 0. The problem is likely smaller in practice for tertiary, and even secondary, than for primary ratios, as fewer countries are close to the upper bound. For example, very few countries have scores above 50 percent for tertiary ratios. However, several countries, particularly poor countries, have scores close to the lower bound (0), and it is thus advisable to use RET also for this dependent variable.

Hence, RET models should yield more credible results than OLS with PCSE models when studying the effect of regime type on enrollment ratios. The RET results for primary, secondary and tertiary enrollment ratios are reported in Table 5.6 and Appendix Tables B.4 and B.5, respectively. I set the censoring values to 0 (lower bound) and 100 (upper bound). As for investment and savings ratios, I first run a preliminary analysis using only ln GDP per capita as independent variable, to obtain starting values; 5000 iterations are used in this preliminary analysis. The coefficients from this analysis are kept, and the main analysis is conducted by running 20 000 iterations.

The results for the RET models on secondary and tertiary enrollments ratios, which are presented in Tables B.4 and B.5 in Appendix B, confirm the picture from the OLS with PCSE analysis: There seems to be a positive effect of having a democratic regime on the share of children and young adults in secondary and tertiary education. The positive effect of democracy is always statistically significant at the 10% level, and is significant at the 1% level in Models I, II and III for both secondary and tertiary education.

In contrast to the results from the OLS with PCSE models, democracy also has a robust positive effect on primary education enrollment ratios according to the RET models presented in Table 5.6. The effect is significant at the 1% level for all models, with absolute t-values ranging from 4.0 to 6.1. Thus, there are indications that democracy indeed also expands access to primary education, although the short time series and the OLS with PCSE results should lead us to conclude with some

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-2.611***	-5.51	-2.231***	-4.61	-1.872***	-3.95	-3.092***	-6.06
Ln GDP pc	2.954**	2.44	1.248	1.02	-0.299	-0.25	-0.536	-0.31
Ln reg. dur.	0.929**	2.20	0.965**	2.28	0.353	0.84	0.132	0.28
Ln popul.	2.908***	2.87	2.538***	2.67	1.389	1.55	2.820***	2.86
Ethn. fr.	-4.931	-0.77	-2.186	-0.36	-2.611	-0.44	-9.493	-1.37
Africa	6.692	1.03	5.610	0.85	-2.083	-0.33	15.597*	1.89
Asia	14.463**	2.38	12.303	1.47	8.584	1.07	28.042***	2.97
Lat. Am.	16.929***	3.12	5.440	0.74	0.350	0.05	13.373	1.54
E.E.-Soviet	12.929**	2.27	11.052*	1.92	5.310	0.95	-1.471	-0.22
MENA	13.428**	2.34	20.748***	3.19	18.183***	2.90	40.089***	5.40
British			1.665	0.43	2.301	0.61	0.932	0.23
French			-5.925	-1.27	-6.716	-1.49	-4.040	-0.77
Spanish			7.161	1.01	7.188	1.05	-9.938	-1.20
Portuguese			-7.179	-0.84	-6.269	-0.76	-12.983	-1.55
Belgian			-14.571	-1.46	-17.757*	-1.84	-25.276**	-2.52
Sunni			-8.019	-0.75	-10.450	-1.02	1.535	0.11
Shia			-1.795	-0.14	-5.478	-0.45	4.956	0.31
Catholic			8.316	0.76	8.343	0.79	37.998***	2.61
Protestant			4.289	0.38	4.250	0.39	29.294**	2.03
Orthodox			3.224	0.28	1.497	0.14	39.154**	2.41
Hindu			4.013	0.29	3.241	0.24	21.948	1.37
Buddhist+			5.476	0.42	4.628	0.37	14.596	0.96
Indigenous			5.849	0.49	3.880	0.34	23.974	1.62
1990s					-3.976***	-7.10	-3.130***	-4.96
Abs. lat.							-0.199	-1.13
Urbaniz.							0.207**	2.28
Trade							0.037*	1.65
Constant	27.606	1.25	43.522*	1.86	81.336***	3.62	25.260	0.87
σ_u								
Constant	15.215***	15.25	13.629***	14.74	13.101***	15.29	12.228***	13.55
σ_e								
Constant	7.615***	40.00	7.646***	39.82	7.468***	40.11	7.377***	36.72
N	959		959		959		809	

Table 5.6: Random effects tobit analysis. Gross primary education enrollment ratio as dependent variable. No lag on independent variables. Short sample.

caution on this effect. Nevertheless, the latter finding from the RET models are also in line with previous, and methodologically thorough, statistical studies discussed above on the effects of democracy on education access.

Previous empirical studies have as mentioned investigated the effect of democracy on a wide variety of human capital proxies, and the result that democracy enhances human capital seems quite robust (see particularly Lake and Baum 2001). The results from this section generally also point to a positive effect of democracy on human capital. Moreover, a point not often discussed in quantitative studies of democracy and human capital is that such studies might actually underestimate the effect of democracy. Conceptually when investigating human capital, one is

interested in actual economically relevant learning outcomes rather than quantitative measures such as enrollment ratios and spending.

The reason why the effect of democracy on human capital may be underestimated in analyses such as those above, is that dictatorial regimes may have strong incentives to use the schooling system for other purposes than educating the citizenry for various forms of production. Productivity hinges on a range of mental skills, including the ability to think creatively and independently. Dictators may instead of educating creative and free-thinking citizens have incentives to use the schooling system rather as an indoctrination device. In other words, schooling in countries such as North Korea, Turkmenistan, Nazi-Germany and Communist East Germany may instrumentally be structured to impose ideologies and particular beliefs in young people's minds, in order to make them more receptive and less hospitable to the regime. Extensive quantitative cross country – time series data on the content taught in education systems are hard to come by. Nevertheless, this is a very interesting area for future research.

Democracy and human capital-induced economic growth, long samples

As for physical capital accumulation, I investigate the effect of democracy on the economic growth induced by human capital accumulation. I do this by using the data from Baier, Dwyer and Tamura (2006). Baier, Dwyer and Tamura (2006) draw their human capital data from among others the extensive data set created by Barro and Lee (1993), and from Mitchell (1998*a*,*b*,*c*). Their operationalization of human capital was discussed in Chapter 4. To quickly sum up, the measure incorporates both workers' average years of schooling and their work experience.

The most extensive analyses presented below include more than 7000 observations. Some of these observations are, as was the case for physical capital-induced economic growth, based on interpolation assuming constant growth rates in time periods between two reported observations in the Baier, Dwyer and Tamura (2006) data. Nevertheless, by extending the time series for some countries back into the first half of the 19th century, and by including up to 135 countries, this is very extensive data material compared to those used previously in the literature.

As for physical capital, it is not unequivocally clear from economic growth theory that democracy will increase long term growth rates, *even if* democracy increases human capital accumulation. The revised neo-classical Solow model presented in Mankiw, Romer and Weil (1992) predicts no effect on steady-state growth rates from human capital accumulation. However, other models, such as the model presented

in Lucas (1988), do predict such effects. Nevertheless, there is relatively broad agreement that human capital affects income *levels*.

Although the result was not robust, the analysis of physical capital-induced growth pointed to a potential negative effect of democracy. Are there empirical indications that this is countered by a positive effect of democracy on human capital-induced economic growth? Quite surprisingly, the estimates below indicate that this is not the case.

Before presenting the results, I once again remind the reader that the growth accounting method used for generating the data on the dependent variable is fraught with several methodical problems, and that particularly the early data on physical and human capital levels are likely plagued by large measurement errors. Moreover, the particular operationalization of human capital may have validity problems. As Klenow and Rodriguez-Clare (1997) show, different operationalization of human capital may yield very different empirical estimates of how human capital affects income levels and growth. Nevertheless, the results below stand in stark contrast with previous studies' results, which indicate that human capital is one of the main channels through which democracy enhances economic growth (e.g. Tavares and Wacziarg 2001; Baum and Lake 2003; Doucouliagos and Ulubasoglu 2008). As I describe in the next section, I rather find that democracy mainly enhances economic growth through increasing efficiency and enhancing technological change.

As for physical capital induced growth, I first run OLS with PCSE models. The results for models using 2-year lags are shown in Table 5.7, and the results for the 5-year lag models are shown in Appendix B in Table B.6. The results clearly indicate that there is no positive effect of democracy on human capital-induced economic growth. Indeed, the PI coefficient is negatively signed in all models, independent of the lag structure. Moreover, the negative effect of democracy is actually significant at the 10% level in Model II when lagging the independent variables with two years. However, taken together, the most plausible interpretation of these results is that there is no clear effect of regime type on human capital-induced growth.

The hypothesis that regime type affects human capital-induced economic growth was also tested using random effects models. These results are reported in Tables B.7 (2-year lags) and B.8 (5-year lags) in Appendix B. Again, there is no significant, positive effect of democracy on human capital-induced growth. The PI coefficients are always negative, but small in size and never significant, even at the 10% level. These results reinforce the OLS with PCSE results; there seems to be no effect of regime type on human capital-induced growth. At last, I applied fixed effects models, thus investigating the effect of democracy on human capital-induced growth when

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	-0.003	-1.50	-0.003*	-1.72	-0.002	-1.28
Ln GDP pc	0.112**	2.52	0.074*	1.67	0.084*	1.87
Ln popul.	-0.064***	-2.65	-0.063***	-2.85	-0.032	-0.86
Ln reg. dur.	-0.003	-0.54	-0.003	-0.60	-0.006	-1.00
Ethn. fr.	-0.004	-0.04	0.130	1.35	0.010	0.09
E.E.-Soviet	0.071	0.98	0.103*	1.77	0.053	0.97
Africa	0.218*	1.96	0.299**	2.22	0.421**	2.55
Asia-Pac.	0.726***	4.34	0.627***	3.63	0.738***	3.81
MENA	0.612***	4.69	0.848***	5.98	1.051***	7.71
Lat. Am.	0.291***	4.35	0.124	0.91	0.194	1.19
1830s	-0.339	-1.59	-0.415*	-1.91	-0.379*	-1.73
1840s	-0.137	-0.71	-0.214	-1.08	-0.175	-0.87
1850s	-0.186	-1.02	-0.260	-1.40	-0.218	-1.15
1860s	-0.221	-1.32	-0.292*	-1.70	-0.251	-1.43
1870s	-0.231	-1.42	-0.297*	-1.79	-0.258	-1.52
1880s	-0.307*	-1.96	-0.371**	-2.32	-0.336**	-2.05
1890s	-0.329**	-2.20	-0.390***	-2.58	-0.360**	-2.31
1900s	-0.339**	-2.38	-0.398***	-2.77	-0.375**	-2.52
1910s	-0.273**	-2.04	-0.330**	-2.44	-0.313**	-2.22
1920s	-0.199	-1.63	-0.251**	-2.03	-0.239*	-1.83
1930s	-0.142	-1.24	-0.194*	-1.67	-0.187	-1.53
1940s	-0.081	-0.77	-0.125	-1.18	-0.121	-1.09
1950s	0.005	0.05	-0.023	-0.24	-0.017	-0.18
1960s	0.095	1.06	0.081	0.90	0.087	0.96
1970s	0.151*	1.88	0.143*	1.79	0.147*	1.83
1980s	0.066	1.06	0.062	1.00	0.063	1.03
British			-0.016	-0.14	-0.020	-0.17
French			-0.119	-1.07	-0.073	-0.57
Portuguese			-0.296*	-1.78	-0.300	-1.52
Spanish			0.151	0.93	0.089	0.52
Belgian			-0.295	-1.14	-0.482*	-1.72
Sunni			-0.046	-0.12	-0.045	-0.12
Shia			0.079	0.18	0.162	0.36
Catholic			0.261	0.65	0.499	1.24
Protestant			0.294	0.72	0.552	1.36
Orthodox			0.225	0.56	0.574	1.45
Hindu			0.185	0.43	0.326	0.75
Buddhist+			0.338	0.75	0.415	0.89
Indigenous			0.092	0.22	0.212	0.51
Abs. lat.					-0.003	-0.95
Frankel-Romer					0.066	0.89
Constant	0.538	1.24	0.594	0.97	-0.067	-0.08
N	7141		7141		6838	

Table 5.7: OLS with PCSE results. Human capital-induced economic growth as dependent variable. 2-year lag on independent variables. Long sample.

controlling for country-specific factors. These models' results, shown in Table B.9 in Appendix B, are quite similar to the results from the OLS with PCSE and random effects models: there is no detectable human capital-induced economic growth effect

of political regime type. The coefficients are again negatively signed, but they are small and statistically insignificant at conventional levels.

Summing up, the analysis on democracy's effect on human capital induced-growth generates a quite different result from the prevailing accepted result in the literature, namely that human capital is an important channel through which democracy enhances economic growth. Above, I found evidence for the proposition that democracy widens access among citizens to various forms of education, but this does not seem to translate into higher growth rates according to the analysis based on the long time series sample.

Given the result that democracy reduces economic growth via the physical capital channel, one may then think that democracy also reduces economic growth rates overall. However, this is not true according to the results obtained from the analysis in Chapter 6; there is quite robust evidence for the hypothesis that democracy enhances GDP per capita growth.

One explanation for why this may be the case is suggested, investigated and established in Przeworski et al. (2000); dictatorial regimes produce higher population growth rates. Population growth may, at least according to standard Solowian growth models (e.g. Solow 1956; Mankiw, Romer and Weil 1992), reduce growth in GDP per capita, although "new growth models", such as the model in (Romer 1990), indicate that a larger population size may have positive effects on both income level and long-run economic growth. However, as noted in Chapter 1, the effect of democracy on economic growth via demographic factors will not be investigated empirically in this thesis.

Another reason for why dictatorship is detrimental to economic growth rates is presented in the subsequent section (Section 5.4); democracy has higher Total Factor Productivity (TFP) growth. In other words, democracies are better at improving the efficiency with which they use productive inputs like labor, physical capital and human capital. One reason is likely that dictatorial regimes have strong incentives to conduct various policies that are detrimental to technological change.

5.4 A model and empirical analysis of democracy, dictatorship and technological change

This section investigates how democracy and dictatorship affect technological change. As discussed above in this chapter and in Chapter 3, the literature on democracy's economic effects, both theoretical and empirical, has mostly focused on how democ-

racy affects growth through physical capital accumulation (see e.g. Przeworski and Limongi 1993; Tavares and Wacziarg 2001) and human capital accumulation (see e.g. Baum and Lake 2003; Stasavage 2005). There are some exceptions. Przeworski et al. (2000) conducted growth accounting on data from 1950 to 1990, and their results indicated that democracies may do better on technological change, but only among rich countries. Pinto and Timmons (2005) also investigated the relationship, but relied on problematic proxies of technological change, like foreign direct investment and trade.

In the economic growth literature, however, technological change is generally viewed as *the* central determinant of long run growth (see e.g. Solow 1957; Nelson and Winter 1982; Romer 1990; Aghion and Howitt 1992; Grossman and Helpman 1991; Klenow and Rodriguez-Clare 1997; Helpman 2004; Nelson 2005).[19] Therefore, even if there is only a weak effect of democracy on technological change, this may be very important for economic development over time.

Technological change is not exogenous, as new growth economists (e.g. Romer 1990; Aghion and Howitt 1992) and evolutionary economists (e.g. Verspagen 2005; Nelson 2005) have recognized. Technological change is among others endogenous to institutional factors. New growth theory has mostly focused on economic institutional factors like business-structures and patent rights, and economic policies. However, as political economists recognize, economic institutions and policies are endogenous to deeper political structures, such as regime type (e.g. North 1990; Rodrik 2000). This section argues that democracy affects the dissemination of ideas and technologies into and within an economy, thus affecting technological change.

More specifically, this section presents a model that shows how self-interested dictators may restrict civil liberties for political survival purposes. In an imperfect world where dictators can not fine-tune policies so that all political dangerous information is blocked and all economically productive information allowed, such restrictive policies also inhibit dissemination of economically relevant ideas and technologies. The model also predicts that dictatorial regimes with better bureaucratic quality, or higher institutional capacity more generally, should mitigate democracy's technology advantage. The hypotheses from this model are tested, using Total Factor Productivity (TFP) data as a proxy for technological change.

An extensive cross country–time series data set is used, with data going back to the 19th century for some countries. As in some of the analyses in Sections 5.2 and 5.3, data from (Baier, Dwyer and Tamura 2006) are used for the dependent

[19] But, see Mankiw, Romer and Weil (1992).

variable (TFP growth). The empirical analysis corroborates the main hypothesis: Dictatorship reduces technological change relative to democracy. However, the hypothesis that dictatorships with higher institutional capacity mitigate democracy's technological advantages finds only weak support. Section 5.4.1 discusses the assumptions underlying the model, and thereafter presents, solves and discusses the model. Section 5.4.2 presents the empirical analysis.

5.4.1 Theoretical discussion

In Section 3.2.4, I presented the literature on technological change and economic growth. Briefly summed up, several empirical studies have estimated that technological change, broadly defined, is the main determinant of economic growth in relatively rich Western countries (e.g. Solow 1957; Denison 1968) and is possibly the most important determinant of growth also in relatively poor countries (e.g. Klenow and Rodriguez-Clare 1997; Easterly 2001). Particularly the diffusion of new ideas and technologies developed outside the country's borders are likely vital for growth in poor countries (and in small countries) (see particularly Romer 1993). Empirical studies on technological change as a source of economic growth have been supplemented by several different types of economic growth models focusing on the role of innovation and diffusion of technologies for long-run economic growth (see e.g. Nelson and Winter 1982; Lucas 1988; Romer 1990; Aghion and Howitt 1992; Grossman and Helpman 1991).

Hence, technological change is a very important "immediate source" of economic growth. However, as noted above, political factors may again be important determinants of technological change. Let me now reintroduce and expand on the argument that democracy enhances technological change, which was introduced in Section 1.3.

Civil liberties, information flows and technological change

Civil liberties are better protected in democracies than in dictatorships. In chapter 2, I even argued that civil liberties (along with political rights) make up one important second-level dimension of democracy. In the model below, dictators restrict information flows by curbing civil liberties. This, in turn, reduces technological change. The dictator's reason for restricting civil liberties is to increase his probability of staying in power.[20] Before presenting the model, I expand on the role of

[20]However, if the dictator can manipulate patent rights and university systems in a way that enhances his survival probability, but which reduces the rate of technological change, this is perfectly in line with the logic of the model.

civil liberties and open information flows for technological change.

Technology, must either be created nationally or adopted from abroad. Thereafter, it must diffuse throughout the economy to bring about sizeable technology-induced economic growth. A broad diversity of ideas generally improves economic efficiency, especially when economic actors easily learn of the new ideas and select the most efficient. Civil liberties arguably enhance both "selection" and "variety" of ideas and technology, which according to evolutionary economists are the cornerstones of a dynamic economy (e.g. Verspagen 2005).

Selection reduces variety since more efficient techniques are adopted through learning and drive out older, inefficient production methods. In order to keep up *variety*, the economy needs continuous introduction of novel ideas. Civil liberties, such as freedoms of speech, press and travel allow for such introduction of new ideas and improved idea diffusion within the wider economy. Especially, open debate and free communication is important for introducing and diffusing new ideas.

Civil liberties, and electoral competition (see North, Wallis and Weingast 2009), also allow for comparison of different ideas, thus allowing for the *selection* of the more efficient ideas. Evaluating and changing old ways of doing things, thus achieving progress by trial and error, are important factors for economic dynamism. With power concentration and limits to freedoms of speech and press, people at the top of the hierarchy, because of limited knowledge or self-interest, may suppress ideas that are essentially correct (see Mill 1974). These ideas may be of both economic and political relevance. Civil liberties therefore enhance both variety and selection, as the introduction of new ideas from abroad or from national entrepreneurs, but also learning processes, rely on the possibility of collecting and processing information in a fairly unrestricted manner.

Variety and selection of ideas are not only important in the marketplace, but also in politics, for example when it comes to economic policy making and organizational issues. As North (1990) and Greif (1993) note, improvements in economic efficiency are not only generated by product innovations, but also by changes to institutions and organizations. One could add that the introduction of new economic policies may also enhance efficiency.

North (2005) argues that the inherent uncertainty concerning the effects of policies and organizational structures necessitates a process of trial and error, with proper feedback from society on these effects. Open systems, associated with democratic government and civil liberties, are crucial for information flows that allow such efficiency enhancing trial and error and feedback processes. The openness of

political processes in democracies could lead to a more flexible approach to economic policies, both in terms of getting rid of old policies that prove to be inefficient and in terms of trying out new and promising policies (see Halperin, Siegle and Weinstein 2005). In other words, "open access orders more readily generate a range of solution to problems; they more readily experiment with solutions to problems; and they more readily discard ideas and leaders who fail to solve them" (North, Wallis and Weingast 2009, 134). The opportunity for actors outside the government to freely voice their opinion on political reforms therefore likely improves organizational and policy efficiency; politicians and bureaucrats must receive information signals by local actors to implement economic policies efficiently (see e.g. Evans 1995).

The "dictator's dilemma" is a relevant insight in this regard (Mueller 2003, 416–417). Because of fear of falling out with the dictator or others in the regime, individuals and organizations might not be forthcoming with their most accurate information. This reduces the quality of information the regime draws upon when making policy decisions. Moreover, freedom of speech contributes to actors "assessing and disseminating ideas from abroad, discourages insular thinking and stimulates vigorous debate" (Halperin, Siegle and Weinstein 2005, 13). Restrictions on freedom of speech and media therefore hurt efficiency, as important problems are not reported and alternative viewpoints on economic policies, organizational issues and different structural problems are not forthcoming to the political rulers, or maybe even the bureaucracy. In the last instance, this is likely to have implications also for productivity growth.

The arguments proposed by von Hayek (1944) on utilization of decentralized knowledge was mainly focused on the relative benefits of price-based markets over central planning. However, these arguments bear relevance for civil liberties' effect on economic efficiency. As von Hayek argues, one must be attentive to "the unavoidable imperfection of man's knowledge and the consequent need for a process by which knowledge is constantly communicated and acquired" (von Hayek 1945, 530). Different actors possess only partial knowledge about economic and political processes. Open debate and free idea flows are crucial for efficient decision-making by firms, bureaucrats and politicians, as "the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess" (von Hayek 1945, 519). Also North, Wallis and Weingast (2009), argue that open competition in both the economic and political spheres are crucial for adaptive efficiency: "Open access and free flow of ideas generate a range of potential ways to understand and resolve new problems . . . The

free and open expression of ideas means that many ideas will be heard. In their quest to maintain or to regain power, competing parties will draw on this competition for solution" (North, Wallis and Weingast 2009, 133–134). The interaction of civil liberties and political competition among self-interested elite in "open access orders" generate an increased flow of ideas which enhances efficiency. This contrasts with dictatorships, where dictators seek to limit idea flows and the variety of ideas in order to retain power.[21]

Political economic models of self-interested leaders and inefficient policies

Why would dictators want to curb information flows if they are beneficial for economic growth? Generally, dictators may, because of preferences for private consumption or political survival, have incentives to take actions that have negative consequences for their national economies (e.g. Wintrobe 1990; Olson 1993; Robinson 2001; Bueno de Mesquita et al. 2003; Acemoglu and Robinson 2006*a*). This general topic was briefly discussed in Chapter 3, and will be revisited and expanded upon in Chapter 7. Let me also here very briefly mention some of the main contributions to the literature on self-interested rulers and policy selection, in order to place the model below in a broader context:

Olson (1993) discusses and McGuire and Olson (1996) formalize a model where dictators, especially those with short time horizons, expropriate property to maximize personal consumption, thereby reducing the incentives for citizens to work or invest. In the models developed in Robinson (2001) and Acemoglu and Robinson (2006*a*), dictators also maximize discounted utility from consumption. In these models, public investment and economic development more generally, strengthen opposition groups and reduce leaders survival probability. Leaders may thus reduce the overall size of the economy, among others through manipulating public investment levels, to maximize expected utility from (discounted) private consumption. Bueno de Mesquita et al.'s (2003) model assumes that political leaders are interested in surviving in office, and shows how dictators, especially those with small winning coalitions and large selectorates, under-invest in growth-conducive public goods. For

[21] Another mechanism may contribute to a positive effect of democracy on technological change: To Mill, the stifling of debate and the intellectual conformism that followed restrictions in freedom of speech could have far-reaching consequences, as "the price paid for such intellectual pacification is the sacrifice of the entire moral courage of human mind" (Mill 1974, 94). Restrictions on freedom of speech leads to an environment where conformist behavior dominates, and where new thoughts, alternative ways of doing things and experimentation suffer. This again impacts negatively on invention, technological innovation and economic dynamism. Psychological-experimental studies could investigate whether this mechanism is relevant, for example by studying the creativity of individuals in different environments.

these leaders, it is rational to expropriate or tax heavily and redistribute resources as private goods to their relatively small winning coalitions.

A political economic model of information flows and technological change

The model presented here draws on the general logic of the political economic models mentioned above; self-interested dictators have incentives to conduct policies that hurt the overall economy. The model presented here is fairly simple, and simpler than those presented above, since the focus here is relatively specific: The model shows how dictators have incentives for restricting information flows, thus crippling diffusion of technology. The model thus focuses on political institutional characteristics that "frame the struggle between the proponents of change and their opponents, and thereby affect the ability of countries to innovate and to implement new technologies" (Helpman 2004, 112).

The economy: I use an adjusted neo-classical production function, as in Mankiw, Romer and Weil (1992): $Y = F(TL, K, H)$, where Y is output, T technology level, L labor input, K physical capital input and H human capital input. F is increasing, but concave, in all inputs. Moreover, $\frac{\partial Y}{\partial T} = L \cdot \frac{\partial F}{\partial TL} > 0$: Output increases in technological efficiency. For simplicity, I use a Cobb-Douglass specification:

$$Y = F(K, L, H, T) = K^{\alpha} H^{\beta} (TL)^{1-\alpha-\beta}. \tag{5.1}$$

Technology is here treated as endogenous. But, the endogeneity is quite simple; this model does not analyze firms' incentives to generate new technology as in "new growth theory" (Romer 1990; Grossman and Helpman 1991; Aghion and Howitt 1992). The generation of cutting-edge technology in increasing-returns-to-scale sectors is mostly relevant for large and rich developed countries. However, for most countries the global technological frontier is largely exogenous, and the diffusion (and local adaptation) of international technology is key for technological efficiency. Thus, one can focus on technology diffusion when modeling cross country differences in technology-induced economic growth.

In the model presented here, national technological change is a function of how many new techniques national economic actors adopt annually, denoted A_t. More specifically, the rate of change in technology is $\frac{\dot{T}}{T} = \omega(A_t)$. The number of new techniques developed each year globally is A_t^*, and treated as exogenous. In accordance with the discussion above, national information flows, i, determine the degree to which a country utilizes new, globally developed ideas to produce technological

change. i comes in two pure types, politically and economically relevant information, i_p and i_e. However, there is also non-pure information, i_{ep}, of both economic and political relevance. Only i_e and i_{ep} affect technological change. I thus have that, A_t is a function of A_t^* , i_e and i_{ep}. I normalize so that $i_e + i_{ep}$ varies between 0 and 1, with 0 indicating a country that restricts all economic information flows and 1 indicating a country that allows for the free flow of economic information. I assume, in the simplest of models, that $A_t = (i_e + i_{ep})A_t^*$. This means that

$$\frac{\dot{T}}{T} = \omega((i_e + i_{ep})A_t^*). \tag{5.2}$$

It can be shown, through taking logarithms and differentiating the production function, that

$$\frac{\dot{Y}}{Y} = (1-\alpha-\beta)\frac{\dot{T}}{T} + \alpha\frac{\dot{K}}{K} + \beta\frac{\dot{H}}{H} + (1-\alpha-\beta)\frac{\dot{L}}{L} \tag{5.3}$$

This again implies that

$$\frac{\dot{Y}}{Y} = (1-\alpha-\beta)\omega((i_e + i_{ep})A_t^*) + \alpha\frac{\dot{K}}{K} + \beta\frac{\dot{H}}{H} + (1-\alpha-\beta)\frac{\dot{L}}{L} \tag{5.4}$$

Equation 5.4 shows that GDP growth rates depend on growth rates of physical capital, human capital and labor, changes in the global technological frontier and the information flows in national economies. If countries are in their steady states (see e.g. Barro and Sala-i Martin 2004), income in countries with free information flows will grow with the rate of change in the global technology frontier. If information flows are only restricted by the curbing of civil liberties, all "perfect democracies" will according to the model grow with the global technology frontier in steady state. However, in other regimes, steady state growth rates will be weighted down with a factor related to the degree of information flow-restrictions. A country where very little information is allowed, North Korea is a suitable empirical example (see e.g. Kihl and Kim 2006), will have very low long-run growth rates. This model therefore not only predicts income level divergence, but also income growth divergence.

Political decision making: Let me endogenize the political decision to restrict information flows. First, I simply assume that in democracies, all types of information are allowed.[22] Let me therefore consider a dictator, D, in a two-period model, who maximizes a utility function $U = U(c, q)$ dependent on both personal consumption, c, and political survival in the second period, q. $U(c, q)$ is increasing

[22]Although this is not necessarily true, the assumption could be weakened to an assumption that democratic leaders restrict civil liberties less than dictators.

and concave in both arguments. D receives a fixed share, λ, of total economic output, and therefore, ceteris paribus, wants to increase the economy's size to increase personal consumption. D's consumption is given by

$$c_t \leq \lambda Y_t = \lambda K_t^{\alpha} H_t^{\beta} (T_t L_t)^{1-\alpha-\beta} \tag{5.5}$$

Since there is no saving in the model and $U'(c) > 0$, Equation 5.5 will hold with equality. I manipulate the utility function, to analyze the dictator's preferences for consumption growth rates instead of levels. I assume an exogenously given Y_0, and thus c_0, in period 0, before the model's action starts. Change in consumption, Δc, is therefore given by

$$\Delta c_t = c_t - c_0 = \lambda K_t^{\alpha} H_t^{\beta} (T_t L_t)^{1-\alpha-\beta} - \lambda K_0^{\alpha} H_0^{\beta} (T_0 L_0)^{1-\alpha-\beta} \tag{5.6}$$

For simplicity, and without loss of generality, I can assume that $K_t = K_0$, $H_t = H_0$, $L_t = L_0$, so that Δc is only a function of changes in T. Further, if I use the equation for growth rates in GDP, I find that D's consumption growth rate $\frac{\dot{c}}{c} = \frac{\Delta c}{c_0}$, denoted g_c, is given by

$$g_c = (1 - \alpha - \beta)\omega((i_e + i_{ep})A_t^*) \tag{5.7}$$

if I hold λ constant.

Since c_0 is exogenous, and $U'(c) > 0$, $U'(\Delta c)$, and therefore $U'(g_c)$ must also be > 0.

D starts out in power and sets policy $(i_e; i_p; i_{ep})$ in the first period. D has a probability $(1 - q)$ of losing power in the second period. Before the revelation of whether D loses power or not, he receives his income which is used for consumption. I assume that D consumes, whether he loses power or not. D could, for example, transfer his resources to a foreign bank account, and move into exile if ousted. I discuss this assumption more closely below.

D's probability of staying in power, q, is endogenous to the policy parameters (information flows). Information flows are affected by policies such as restrictions on freedom of speech and media, communication-infrastructure policy, freedom of travel within and outside the country and openness to foreigners. These are the actual policies set by a dictator, but I model their consequence, i, as choice variable to simplify. More specifically, probability of dictatorial survival is decreasing in i_p and i_{ep}, but is unaffected by i_e. That is $\frac{\partial q}{\partial i_p} < 0$, $\frac{\partial q}{\partial i_{ep}} < 0$ and $\frac{\partial q}{\partial i_e} = 0$. I model the relationship with the simple, linear function:

$$q = (1 - (\gamma i_p + \eta i_{ep})) \tag{5.8}$$

Here, $\gamma > 0$, $\eta > 0$ and $0 \leq \gamma i_p + \eta i_{ep} \leq 1$. Thus, survival probability varies between 1 when no political and mixed political economic information is allowed, and 0, which results from a high level of political and/or mixed political economic information flow. Generally, it is difficult for dictatorial governments to screen every act of communication, travel and meeting, and governments therefore need to establish some general rules. Thus, information activities are banned under uncertainty of their contents, and such information is often of i_{ep} type. General restrictions on civil liberties will not only reduce political communication, but also economically relevant communication. Thus, disallowing general free and open exchange of information and debate will have effects not only in terms of stifling political opposition, but also economic dynamism.

One way to model the relationships between q and i_p and i_{ep} more thoroughly would be assuming an opposition consisting of several individuals, all desiring to overthrow D. The probability of the opposition being able to overthrow D, $(1-q)$, depends on coordination abilities. If one individual attempts to overthrow D, $(1-q)$ will be small. But, as collective action problems are solved and opposition-members coordinate, $(1-q)$ increases. The ability of the opposition to coordinate depends on their ability to use communication tools, assemble without harassment or detention, gain access to media and travel freely in the country. Therefore, restrictions on civil liberties that reduce politically relevant information flows, i_p and i_{ep}, reduce the opposition's ability to coordinate and thus $(1-q)$.

Solving the model Let me return to D's transformed utility function, $U(g_c, q)$. If I insert for Equations 5.7 and 5.8, I get:

$$U(g_c, q) = U((1 - \alpha - \beta)\omega((i_e + i_{ep})A_t^*), (1 - (\gamma i_p + \eta i_{ep}))) \tag{5.9}$$

One may immediately see from Equation 5.9 that D minimizes i_p and maximizes i_e. D cracks down on all information flows that are politically dangerous for him but are irrelevant for economic efficiency, and he opens up for information that only improves economic efficiency but is irrelevant for his political survival. I can show this more stringently by taking the first-order derivatives of U with respect to i_p and i_e:

$$\frac{\partial U}{\partial i_p} = -\gamma \frac{\partial U}{\partial q} < 0 \tag{5.10}$$

$$\frac{\partial U}{\partial i_e} = \frac{\partial U}{\partial g_c} \cdot (1 - \alpha - \beta) A_t^* \omega'(A_t) > 0 \tag{5.11}$$

Equations 5.10 and 5.11 show it is always rational for the dictator to increase i_e, as $\frac{\partial U}{\partial i_e} > 0$ and reduce i_p as $\frac{\partial U}{\partial i_p} < 0$. Thereby i_e and i_p will be set at their maximum and minimum levels respectively. The interesting trade-off in the model relates to i_{ep}. D on the one hand wants to allow i_{ep} because it increases efficiency and thus private consumption growth. But, on the other, he wants to restrict i_{ep} because it puts his political survival at risk. I calculate the marginal effect of i_{ep} on D's utility. The first-order condition is given by:

$$\frac{\partial U}{\partial i_{ep}} = \frac{\partial U}{\partial g_c} \cdot (1 - \alpha - \beta) A_t^* \omega'(A_t) - \eta \frac{\partial U}{\partial q} \tag{5.12}$$

Since in optimum $\frac{\partial U}{\partial i_{ep}} = 0$, Equation 5.12 implies that the dictator will set i_{ep}, so that[23]:

$$\frac{\partial U}{\partial g_c} \cdot (1 - \alpha - \beta) A_t^* \omega'(A_t) = \eta \frac{\partial U}{\partial q} \tag{5.13}$$

Equation 5.13 shows that in optimum, the dictator will balance the increase in marginal utility from consumption against the expected decrease in marginal utility stemming from reduced survival probability, when setting i_{ep}. Thus, some i_{ep} is restricted in dictatorships, whereas all i_{ep} is allowed in democracies. Since $\frac{\partial \frac{\dot{T}}{T}}{\partial i_{ep}} > 0$, I can conclude that:

Proposition 1 *Democracies will experience more rapid technological change than dictatorships.*

Since $U(g_c, q)$ is increasing and concave in the two arguments, one may see from Equation 5.12 that the optimal amount of i_{ep} decreases in α and β, the physical capital and human capital shares of the economy. Hence:

Proposition 2 *The higher the physical and human capital shares are in a country's production processes, the larger is the difference in civil liberties protection, and steady-state growth rates, between democracies and dictatorships.*

[23]This equation can also be written in marginal rate of substitution form to $\frac{\frac{\partial U}{\partial g_c}}{\frac{\partial U}{\partial q}} = \frac{\eta}{(1-\alpha-\beta)A_t^* \omega'(A_t)}$.

Optimum i_{ep} also increases with $\omega'(A_t)$, which implies that an economy where adopting new ideas is more important for TFP-growth will set a higher level of i_{ep}, quite naturally. The optimal amount of i_{ep} also increases with the global technology frontier's growth rate, as $\frac{\partial U}{\partial i_{ep}}$ depends positively on A_t^*: It is rational for D, because of personal consumption reasons, to open up for more information when the world's leading economies are generating more new technology. One empirical implication from the model is therefore:

Proposition 3 *Dictators will loosen restrictions on civil liberties in times of rapid technological change globally, and thus absorb a higher share of new global ideas.*

However, the optimal i_{ep} decreases when η increases. η reflects how strongly the flow of i_{ep} affects D's survival probability. If D is relatively insensitive to such information flows, for example because of high legitimacy, a weak opposition or the existence of an efficient repression apparatus, D will allow more i_{ep}. Hence, a dictator with safe grip on power can allow more i_{ep} to increase personal consumption:

Proposition 4 *When a dictator has a safe grip on power because of exogenous reasons, dictatorships will experience higher rates of technological change and less restrictions on civil liberties.*

The optimality condition in Equation 5.13 holds if the dictator realizes consumption before it is decided whether he keeps or loses office. If I alter the sequence and let the possible realization of a revolution or coup happen before the dictator's consumption, D would have extra incentives to curb civil liberties because expected value of consumption for a given i_{ep} is reduced; D receives no consumption with a probability $1 - q$.

I could have used this sequence and assumed that dictators were only interested in consumption, and not office for its own sake. This would bring the model's logic closer to those of Robinson (2001) and Acemoglu and Robinson (2006*a*). In these models, rulers conduct inefficient policies because they increase future expected private consumption through reducing the probability of being thrown out of office; but, office in itself has no value. The main result from the model in this section related to lower technological change in dictatorships, is therefore relatively insensitive to the assumptions of rulers' motivation. However, if the ruler is both interested in consumption and office *and* a potential revolution wipes out the ruler's earnings, the incentives for inefficient policies are the strongest. Compared to this situation,

leaders only interested in consumption, or office- and consumption motivated leaders who can hide away resources in foreign banks, provide relatively more efficient policies. Hence:

Proposition 5 *Rulers that are motivated both by office and personal consumption will reduce technological change more than rulers only motivated by consumption.*

Proposition 6 *Rulers that are able to consume wealth earned while in office, after they are deposed, will reduce technological change less than leaders who are unable to consume such earnings.*

Evans (1995) analyzed the importance of public–private informational linkages for policy decisions, bureaucrats' ability to implement policies efficiently and the ability for private and public actors to cooperate. One important aspect in this regard is informational feedback on public policies. Although dictatorships in general are likely outperformed by democracies on this dimension, as discussed above, some dictatorships may be better able than others to mitigate informational problems. Even with limitations on freedom of speech and press, some dictatorships may perform adequately because of better abilities for absorbing and interpreting weak information signals. This ability is likely related to bureaucratic quality, and the capacity of state institutions more in general. Dictatorships with better bureaucratic and institutional qualities may also be better able to design policies that enable separation of politically and economically relevant information. For example, a high-quality bureaucracy may be able to fine-tune its internet policies so that only politically problematic webpages are blocked.

In the model's terms, i_{ep} likely decreases as bureaucratic quality, b, increases: $i_{ep} = i_{ep}(b)$, where $i'_{ep}(b) < 0$. As $i_e + i_{ep} = 1$, $i'_e(b) > 0$. In democracies, where all information, also all i_{ep}, is allowed, b will not matter for technological change. When restrictions on civil liberties are put in place however, b will matter for technological change, as i_{ep} is restricted under such systems. A high b will allow dictatorial regimes to separate better between politically and economically relevant information. As i_e is always allowed by the dictator, a high b will increase technological change in dictatorships. In a hypothetical case where the bureaucracy is able to perfectly separate between political and economic information, and i_{ep} is zero, democracies and dictatorships will have equal rates of technological change, even if dictatorships ban all politically relevant information:

Proposition 7 *Dictatorships with higher institutional capacity will have higher rates of technological change than dictatorships with lower institutional capacity, and the*

difference in technological change between democracies and dictatorships decreases in institutional quality.

Discussion

Open diffusion and use of technologies can in principle coexist with limited political debate. However, this is difficult in practice. Good examples are related to modern communication technologies, like the cell phone and the Internet. Hachigian recognizes the dictator's conundrum:

> The Internet presents a dilemma to leaders of authoritarian states and illiberal democracies. It promises enticing commercial advantages, such as transaction cost reductions, e-commerce possibilities, and foreign trade facilitation. Yet, by giving citizens access to outside information and platforms for discussion and organization, the Internet can also help politically empower populations and potentially threaten regimes (Hachigian 2002, 41).

Hachigian indicates that different regimes have struck different balances regarding Internet policies. The expectation from the model above is that regimes with relatively high institutional capacity, like China, would pursue a more refined and differentiated approach than for example a country like Uzbekistan, which would be less able to filter politically from economically relevant information. Cell-phone technology also presents both political problems and potential economic gains to dictators. Whereas cell-phone usage has exploded in China in recent years, bans on cell-phones have been imposed in Cuba and Turkmenistan, for example. Cell-phones are "dangerous" coordination devices for the political opposition, but restrictions on phone communication also cripple the efficiency of businesses. Freedom of travel, into and out of a country, may also be restricted in dictatorships because of political reasons. North Korea is one example; even travel into Pyongyang is restricted for North Koreans. Although strict regulation of international travel may enhance political survival, it severely affects North Koreans' ability to learn new and productive foreign technologies.

A different example comes from the Soviet Union, where the Polit-bureau banned foreign economics journals, which were seen as spreading potentially dangerous ideas in opposition to the governing ideology (Greenspan 2007). However, econometric journals were allowed, probably because they were seen as less politically dangerous. In terms of the model presented above, the Polit-bureau likely tried to separate

between i_e and i_{ep} information. More generally, although there were debates in the 1930s and 40s on the relative efficiency of price-based markets versus central planning, historical experiences, especially from the 1970s and onwards, showed that central planning was statically and dynamically inefficient. A more open political system than the Soviet system would perhaps have experienced intense debates among the elites and with the citizenry on how to pursue efficiency-enhancing policy reform. Ironically, when Gorbatschev at last opened up the political and economic sphere, it arguably contributed to the regime's downfall some years later, illustrating another main point of the model above: allowing information flows in a dictatorship is dangerous for regime survival.

Another dictatorial regime generating technological and economic stagnation was imperial China. China experienced a dramatic relative economic decline compared to Western Europe, especially from the 19th century (see e.g. Landes 2003). The Chinese empire was characterized by the ruling dynasty's concentration of power and its closed nature in terms of foreign relations. Political rulers neglected and even outlawed new and more effective organization techniques and production technologies. Especially foreign ideas were espoused. A letter from Emperor Ch'ien Lung to George III of England in 1793, who wanted to trade with the Chinese, illustrates that dictatorship can be obstructive to the adoption of foreign ideas: When denying the British overtures, the Chinese Emperor wrote that the "Celestial Empire possesses all things in abundance. We have no need for barbarian products" (Ch'ien Lung cited in Murphey Murphey 2000, 245). According to Landes, "even the obvious lead of Western technology in the modern period was insufficient to disabuse [the Chinese] of this crippling self-sufficiency" (Landes 2003, 28).

The Imperial Chinese regimes' desires for technological and economic self-sufficiency would likely not have been as crippling to the economy had society been more pluralistic. Within a more open society, new technologies and organizational ideas could have found foothold somewhere in the economy, although its rulers despised them. If much more efficient, these technologies would likely have won out in the longer run. However, Chinese dealing with foreigners and their ideas "always ran the risk of being denounced, or worse, as a traitor" (Landes 2003, 28). As Joel Mokyr puts it, China's

> absence of political competition did not mean that technological progress could not take place, but it did mean that one decision maker could deal it a mortal blow. Interested and enlightened emperors encouraged technological progress, but the reactionary rulers of the later Ming period clearly preferred a stable and controllable environment. In-

> novators and purveyors of foreign ideas were regarded as troublemakers and were suppressed (Mokyr 1990, 231).

Another interesting observation, also discussed above, is that the dictatorships with the greatest economic successes after WWII, South Korea, Taiwan and Singapore, have not had very high rates of TFP growth (Young 1995). Technology, the main driver of economic growth in most OECD countries after WWII, was not the main source of these Tigers' economic growth. Instead, accumulation of physical and human capital and mobilization of labor were the main sources of growth. Singapore is the most extreme example, where Young (1995) finds that TFP growth only accounted for 0.2% annual growth in GDP between 1966 and 1990; a minuscule fraction of the 8.7% GDP growth rate. TFP growth rates were higher in South Korea and Taiwan, but nevertheless accounted for only about $\frac{1}{5}$ of economic growth. Although these authoritarian Asian Tigers have rightly been described as economic success stories, their successes cannot be attributed to extreme improvements in technological efficiency.

5.4.2 Statistical analysis

Main analysis

One regime-proxy which can be used for testing the relationship modeled above is the Civil Liberties (CL) index by Freedom House, which, as shown in Chapter 2, explicitly taps protection of civil liberties like freedom of speech, media and assembly.[24] Countries with the worst protection of civil liberties are scored 7 on the CL, and countries with the strongest protection of civil liberties are scored 1. However, the CL only has data back to 1972, which yields relatively few observations. I therefore mainly rely on the PI, which has extensive time series. Although the PI does not explicitly capture civil liberties, the correlation between CL and PI in the time period from 1972 to 2003 was -.86.

Technological change is not only a function of regime type. The pre-existing level of TFP is likely important to TFP growth. Idea-gaps (Romer 1993) may create convergence effects analogous to those for capital stocks (Barro and Sala-i Martin 2004). I therefore, as mentioned in Chapter 4, run the same long time series models as those used elsewhere in this thesis, except that I substitute ln GDP per capita with ln TFP.

[24] One problem with using CL, indicated by the model above, is that dictators adjust civil liberties partly as a response to for example global technology growth. This makes CL endogenous. This is not the case for the PI.

I first run OLS with PCSE models, which, as mentioned previously, take into account heterogeneous standard errors and contemporaneous correlation between panels, and AR(1) autocorrelation within panels. The first models utilize the PI and the interpolated data on TFP growth, with some time series going back to the 19th century.

The effect of PI on TFP growth is statistically insignificant when using models with 2-year time lags, although the estimated effect is always positive, with t-values ranging between 1.11 and 1.58. These results are presented in Table C.1 in Appendix C.

However, as discussed above, there are very good theoretical reasons to expect that the effects of political institutional structures on technology-induced growth come with a quite substantial time lag. Hence, lagging the independent variables by only two years may be insufficient to capture a potential effect of regime type on TFP growth. Table 5.8 shows the OLS with PCSE results for models using 5-year lags on the independent variables, and Table C.2 in Appendix C shows the results for the 10-year lag models. The empirical results reported in Tables 5.8 and C.2 provide support for the hypothesis that democracy enhances TFP growth rates. In other words, there is generally very good support for Proposition 1: dictatorial governments reduce TFP growth.

In all models, the regime coefficient has the expected sign. The models using 5-year lags yield the strongest results, with all models showing significant positive effects of democracy at the 1% level. However, also the models with 10-year time lags yield a positive effect of democracy that is significant at least at the 10% level, independent of choice of control variables. Models I and II, also for this lag-specification, show a positive effect of PI at the 5% level. The sizes of the estimated effects in Table 5.8 are quite substantial. The models' point estimates indicate an effect of going from most dictatorial to most democratic of between 0.6 and 0.7 percent extra TFP growth per year.

The PI regressions utilized data back to the first half of the 19th century. However, the theoretical model presented above pointed to the specific importance of civil liberties for technology-induced economic growth. Hence, I also ran regression models using CL, as mentioned above. The main drawback with using this measure, also mentioned above, is that it extends only back to 1972; the data material used for inference is thus much smaller for the models using CL as dependent variable. Nevertheless, the positive effect of having more extensive protection of civil liberties on TFP-growth is quite, but not completely, robust.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.035***	3.97	0.029***	3.42	0.030***	3.66
TFP	-2.378***	-4.55	-2.345***	-4.45	-2.415***	-4.95
Ln popul.	-0.140*	-1.79	-0.118	-1.48	-0.429***	-3.34
Ln reg. dur.	0.019	0.69	0.013	0.49	-0.004	-0.16
Ethn. fr.	-1.044*	-1.89	-0.935*	-1.80	-0.502	-0.87
E.E.-Soviet	-2.839***	-4.62	-2.049***	-4.03	-1.119**	-2.41
Africa	-2.504***	-4.48	-1.659**	-2.47	-2.028***	-3.11
Asia-Pac.	-1.685***	-3.62	-1.658**	-2.11	-1.680**	-2.22
MENA	0.368	0.85	1.365*	1.74	0.404	0.58
Lat. Am.	-0.949**	-2.02	-1.726**	-2.01	-1.848**	-2.26
1830s	.	.	.	.	17.269***	5.28
1840s	-0.049	-0.13	-0.074	-0.20	17.187***	5.30
1850s	-0.061	-0.13	-0.084	-0.19	17.144***	5.32
1860s	-0.029	-0.06	-0.041	-0.08	17.147***	5.33
1870s	0.184	0.34	0.193	0.36	17.331***	5.41
1880s	0.384	0.68	0.398	0.70	17.517***	5.46
1890s	0.576	0.99	0.597	1.02	17.670***	5.49
1900s	0.724	1.21	0.775	1.30	17.821***	5.51
1910s	0.847	1.41	0.930	1.55	17.958***	5.53
1920s	1.048*	1.74	1.133*	1.88	18.159***	5.57
1930s	1.193**	1.98	1.276**	2.12	18.317***	5.58
1940s	1.526**	2.54	1.626***	2.71	18.760***	5.67
1950s	1.708***	2.81	1.836***	3.02	19.106***	5.70
1960s	1.614***	2.62	1.763***	2.86	19.132***	5.65
1970s	1.243**	1.99	1.382**	2.22	18.865***	5.53
1980s	0.922	1.49	1.058*	1.71	18.680***	5.51
1990s+	0.613	0.97	0.768	1.22	18.526***	5.46
British			0.154	0.47	-0.011	-0.03
French			0.178	0.70	0.185	0.73
Portuguese			-0.670	-0.74	-0.511	-0.58
Spanish			0.418	0.55	0.611	0.80
Belgian			-2.781**	-2.35	-1.665	-1.35
Sunni			-0.486	-0.50	-0.946	-0.97
Shia			-1.546	-1.34	-2.039*	-1.85
Catholic			1.067	0.89	-0.443	-0.40
Protestant			0.456	0.43	-1.177	-1.23
Orthodox			-1.380	-1.27	-1.183	-1.10
Hindu			-0.123	-0.11	-1.376	-1.31
Buddhist+			0.637	0.59	-0.117	-0.12
Indigenous			-0.963	-0.88	-2.060**	-2.06
Abs. lat.					0.026**	2.45
Frankel-Romer					-0.700***	-3.53
Constant	12.931***	5.10	11.800***	3.96	.	.
N	6636		6636		6407	

Table 5.8: OLS with PCSE models on interpolated data. TFP growth as dependent variable. 5-year lag on independent variables. Long sample.

I report OLS with PCSE models using 5- and 10-year lags in Appendix C, in Tables C.3 and C.4, respectively. The coefficients have the expected signs in all models. However, only the models in Table C.4 show a significant effect, at the 1%

level in Models I and II and at the 5% level in Model III. The estimated effect of going from weakest protection (7) to strongest protection (1) is very large in these models; 0.9 percentage points extra annual TFP growth in Model I, 0.7 percentage points in Model II and 0.5 percentage points in Model III. The number of observations, despite larger than in most studies on the economic effects of political regime types (see e.g. the overview of studies in Doucouliagos and Ulubasoglu 2008), is far lower than in most regression models applied in this study. For example, the models in Table C.4 draw on between 2076 and 2153 country-year observations. Despite the relatively low number of observations, the results yield some extra support to one of the above theoretical model's main implications: constraining civil liberties lead to a reduction in technological change and thus reduced dynamic efficiency.

However, there may be country-specific characteristics biasing the results above. I therefore ran random and fixed effects models to check the results' robustness. Indeed, the random effects results, shown in Tables C.5, C.6 and C.7 in Appendix C, indicate an even stronger effect of the PI on TFP growth than what was found in similar OLS with PCSE models. As in the OLS with PCSE analysis, there is no significant positive effect of democracy when utilizing 2-year lags on the independent variables, although the PI coefficient is always positive and the t-values are above 1.3. However, for the 5- and 10-year lag specifications, all models show a positive effect that is significant at least at the 1% level, with t-values ranging from 5.83 to 6.15. Moreover, the sizes of the coefficients are larger than for corresponding estimates from the OLS with PCSE models, indicating that changing from -10 to 10 on the PI increases TFP growth rates with around 0.8 percentage points per year.

Also the results from the fixed effects models, shown in Table 5.9, are very strong. The 5- and 10-year lag fixed effects models find a significant effect of democracy on TFP growth at the 1% level. The point-estimates are quite large, indicating an effect of "full democratization" of about 0.7 to 0.8 percent extra annual TFP growth. Democracy thus matters for prosperity in the long run; a country with a 0.8 percentage point higher TFP growth rate than another otherwise equal country would be twice as rich as the other after a period of circa 88 years, if starting out equally rich.

Robustness checks

The results above are relatively robust to controlling also for other variables, and for other model specification choices (see Knutsen 2012).[25] Moreover, the results

[25] All results that are not provided in tables are available on request.

	2-year lags		5-year lags		10-year lags	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.006	0.90	0.036***	5.40	0.039***	5.61
TFP	-1.204***	-7.80	-3.961***	-24.74	-4.291***	-25.10
Ln popul.	-1.878***	-12.62	-2.792***	-18.70	-2.425***	-15.55
Ln reg. dur.	-0.014	-0.49	-0.126***	-4.36	-0.198***	-6.69
1830s	.	.	-0.063	-0.05	.	.
1840s	-0.323	-0.23	.	.	0.688	0.52
1850s	-0.217	-0.16	-0.621	-0.93	-0.299	-0.24
1860s	-0.178	-0.13	-0.264	-0.41	0.055	0.05
1870s	0.038	0.03	-0.348	-0.55	0.005	0.00
1880s	0.573	0.44	0.253	0.40	0.492	0.41
1890s	0.819	0.63	0.542	0.86	0.613	0.51
1900s	1.155	0.88	0.703	1.12	0.276	0.23
1910s	0.364	0.28	0.866	1.38	1.753	1.45
1920s	1.908	1.46	1.893***	3.03	1.785	1.48
1930s	1.661	1.27	2.355***	3.77	2.670**	2.21
1940s	2.584**	1.98	3.564***	5.69	3.774***	3.13
1950s	3.505***	2.68	4.830***	7.69	4.952***	4.10
1960s	4.167***	3.18	5.640***	8.87	5.020***	4.14
1970s	3.181**	2.42	5.149***	7.98	4.730***	3.89
1980s	2.559*	1.94	4.888***	7.47	4.928***	4.03
1990s+	2.829**	2.14	4.808***	7.25	4.784***	3.86
Constant	20.474***	9.85	41.269***	23.79	39.860***	19.34
N	7138		6737		6072	

Table 5.9: Fixed effects models on interpolated data. TFP growth as dependent variable. Various lags on independent variables. Long sample.

are relatively, but not completely, robust to using different lags on the independent variables than those applied above. For example, the significant positive effect of democracy holds when using 3-year lags. Furthermore, the theoretical model above indicated that dictators' survival probability, and thus regime duration, is endogenous to technologically relevant policies (see also Feng 1997, 2005). I therefore left out ln regime duration from the regression models, but the significant results are not weakened because of this operation; some models even showed larger PI coefficients and t-values.

But, the interpolation conducted on the sample above may be problematic, as it expands the number of data points and introduces additional measurement error. I therefore calculated the average annual TFP growth rates for the periods between time points where Baier, Dwyer and Tamura (2006) have provided TFP estimates. Some of these periods are as short as four years, and I include periods of up to twenty years. However, the large majority of periods are ten years in duration (581 out of 795; an additional 82 periods are either nine or 11 years, and only 17 are above 15 years). One period counts as one observation. For the control variables,

I use the values at the start of the time period as proxies. However, for political regime type, I construct a variable that takes the average of the PI over the five years prior to the period and all years within the period, except the five latest years, in order to take into account the effect's time lag.

Also according to the results based on these non-interpolated data, democracy enhances TFP growth. The results are reported in Tables C.8 and C.9 in Appendix C. The effect of democracy is not very far from significant at the 10% level in the FE model, with a t-value of 1.52, and it is significant at the 1% level in all the OLS with PCSE and RE models. The point estimates are about equal to those obtained above, although a bit higher. A change from harsh dictatorship to full democracy is estimated to increase annual TFP growth with between 0.9 and 1.5 percent. Of course, I can only strictly claim that the effect is significantly positive. But, if one is to believe the point estimates, the effect is also quite large.

However, TFP growth is criticized as a problematic measure of technological change. I thus investigated whether democracy affects the ArCo index, which presumably captures technological capabilities (Archibugi and Coco 2004). This index consists of three components; a technology creation index, a technology infrastructure index, and a human skills index.[26] However, the index only has values for the years 1990 and 2000.

I ran OLS regressions and tobit regressions, using the year 2000 values of the ArCo index. Model I is chosen, but the decade dummies are dropped, as these regressions are purely cross-sectional. Moreover, I substituted TFP level with ln GDP per capita (PPP-adjusted) from Maddison (2006). I tested three different versions of the democracy measures; one simply using the year 2000 value, one using the average score for the 1990s, and one using the average score from the 1980s and 1990s. Tables C.10 and C.11 in Appendix C show the results from various models using the aggregate ArCo index as dependent variable.

These results also indicate that democracy enhances technological capabilities, although the results are not entirely robust. When using the CL as democracy indicator, not only the aggregate measure but also the three components of the ArCo (when used as dependent variables) show a robust positive effect of democracy. These results are reported in Table C.10. The effect, as seen from Table C.11, is however not robust when using Polity-based measures, although the point estimate is always positive.

[26]See Archibugi and Coco (2004) for the various subcomponents underlying the three main components, and for a discussion on the aggregation rules. See also Archibugi and Coco (2005) for methodological discussions.

However, the ArCo index is restricted between 0 and 1. I take this into account by running tobit regressions (with 0 and 1 as censoring values, using 16 000 iterations) rather than OLS. All models using CL-based measures as dependent variable show an effect that is significant at least at the 5% level. However, the results are not robust when using the PI-based measures, with t-values varying between 1.51 and 1.72. The tobit results are also reported in Tables C.10 and C.11. Thus, the regressions on the ArCo index also provide some support to the hypothesis that democracy enhances technological capabilities, although the relationship is not robust to choice of democracy measure.

Does institutional capacity mitigate democracy's technology advantage?

It was argued above that dictatorships with high institutional capacity may mitigate democracy's technology advantage by better separating between politically dangerous and economically productive information. I test this hypothesis by constructing an interaction term between CL and a proxy for institutional capacity, the ICRG data set's Bureaucratic Quality Index (BQI). On the BQI, "high points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services... [and where] the bureaucracy tends to be somewhat autonomous from political pressure and to have an established mechanism for recruitment and training" (ICRG N.d.). The time series for the BQI unfortunately start in 1984, and several countries lack data. The lowest score is 0 and the highest is 4, with differentiation allowed also on the decimals.

A strict interpretation of the theoretical model would lead me to include only the democracy measure and the interaction term, but not a linear BQI term, as institutional capacity only affects technological change in dictatorships in the model. When testing the models with interpolated data above (but now including an interaction term), I find some evidence for Proposition 7. In the OLS with PCSE models, both when using 5- and 10-year lags, the linear CL coefficient and the interaction term are both significant at the 1% level, and with expected signs. The estimates even indicate that dictatorships with high institutional capacity outperform democracies in terms of TFP growth. However, this finding is not robust to choice of estimation technique. The interaction term is insignificant, even at the 10% level, when utilizing random and fixed effects models.

The robustness of the OLS with PCSE finding is cast further in doubt when I alter the econometric models by incorporating a linear BQI term. Although the

theoretical model above did not include any linear effect of institutional capacity, there may be non-modeled mechanisms that allow also democracies with high institutional capacity to achieve higher TFP growth. Indeed, the OLS with PCSE model with 10-year lags on the independent variables, show significant coefficients for both the CL (5% level), the BQI (10% level) and the interaction term (5% level), with the expected signs. However, the RE model with 5-year time lags has a significant interaction term at the 10% level with the "wrong" sign. Moreover, the other models find no significant interaction terms. Thus, there is only weak evidence for the postulated relationship in Proposition 7. However, one should remember that I utilize data from a very short period of time here.

5.4.3 Conclusion

This section focused on how democracy and dictatorship affect the most important determinant of long-run economic growth, namely technological change. In dictatorships, diffusion of economically relevant ideas and technologies is likely slowed down because dictators manipulate civil liberties and promote policies that inhibit idea diffusion. Although dictators in an "optimal world" may want to promote technological change to increase their own personal consumption, dictators in practice have to trade off increased growth against increased probability of being thrown out of office. This is the case because, in practice, dictators are unable to perfectly separate politically dangerous from economic efficiency-enhancing information when setting their policies. The empirical results above, based on a very extensive data material, corroborated this hypothesis. Democracies have higher TFP growth rates than dictatorships have, indicating more rapid technological change in democracies.

A second hypothesis, that dictatorships with high-quality institutional apparatuses could mitigate democracy's technology advantage, found less empirical support, although the data material used to test this hypothesis was scant. This section's theoretical model produced several other propositions that may be empirically investigated in the future, for example through thorough case studies or small-n comparative studies. Future research could for example investigate Propositions 3 and 4, indicating that dictatorships reduce their restrictions on civil liberties in times of rapid, global technological advances and that dictators with a secure grip on power allow for more technological change.

Since several studies conducted by economists have found that TFP growth is the most important determinant of long-run growth rates, the robust and sizeable effect of democracy on TFP growth presented in this section could lead us to expect

that democracy also has a positive effect on GDP per capita growth. Indeed, the analysis in the next chapter, Chapter 6, presents quite strong empirical support for this expectation.

Chapter 6

Democracy's effect on economic growth

This chapter presents empirical analyses of the effect of democracy on economic growth. The chapter tests several different model specifications and applies a number of statistical techniques, including OLS with PCSE, random effects, fixed effects, matching and 2SLS. Analyses are conducted on various samples including the largest sample yet used in the literature, which incorporates data from more than 150 countries with the time series for some countries going back to 1820. Although the result is not completely robust, this chapter finds quite strong evidence for the hypothesis that democracy enhances GDP per capita growth.

6.1 Is there a net effect of democracy on economic growth?

Is democracy, in general, better at generating economic growth than dictatorship? The theoretical arguments briefly surveyed in Chapters 1 and 5, the literature surveyed in Chapter 3, and the empirical analyses of the "immediate sources of growth" in the previous chapter do not give any unequivocal answer to the question. In Chapter 5, there were indications that dictatorship may increase economic growth rates through enhancing physical capital accumulation. However, the chapter also reported evidence supporting the hypothesis that democracy enhances economic growth due to technological change and other improvements in efficiency. Although the chapter did not find evidence for the hypothesis that democracy increases human capital-induced economic growth, other statistical studies have found results indicating that this is the case (Tavares and Wacziarg 2001; Baum and Lake 2003; Doucouliagos and Ulubasoglu 2008). Moreover, as I will discuss in Chapter 7, various theoretical arguments and empirical evidence indicate larger variation in growth rates among dictatorships than among democracies. I have also previously shown that the effect of democracy on growth may vary with the level of state capacity (Knutsen 2009), and the time period under study (Knutsen 2011*a*). Aggregate effects do thus not exhaust the complex nature of the relationship.

Nevertheless, the theoretical arguments and empirical evidence *seem to lean in* the direction of a general democracy advantage when it comes to economic growth. The general question of whether democracy enhances or retards economic growth is an important one, and one which draws much attention. "Does a higher degree of democracy produce more economic growth in general?" is maybe an imprecise question, but one can still seek to provide a rough answer. This chapter provides a thorough *empirical* evaluation of this question. As seen from Chapter 3, several previous studies have been conducted on whether there is an effect of democracy on economic growth, with different studies giving different answers. The lack of consensus on the issue (see e.g. Przeworski and Limongi 1993; Doucouliagos and Ulubasoglu 2008) warrants a new statistical investigation into this important topic.

What can this chapter possibly contribute with to the already large volume of research? First, it provides econometric models that are well specified; it controls for relevant prior causal variables, and leaves out variables that should be excluded.[1] Second, it utilizes new data, and thereby extends the sample period when compared

[1] All results discussed in this chapter that are not represented in tables are available on request.

with previous research. Third, the chapter presents analyses that relax the assumption that democracy's effect on growth is linear (non-parametric matching), and presents analyses that explicitly deal with the possibility of democracy being endogenous to economic growth. The endogeneity of democracy is taken into account through using the innovative instrument for democracy presented in Chapter 4 (see also Knutsen 2011*b*).

The reminder of the chapter will offer little new in terms of theoretical arguments connecting democracy and growth, and will not spend time illustrating various mechanisms connecting regime type and growth with historical experiences from particular countries. Theoretical arguments on how regime type may affect growth are presented in Chapters 1, 3, 5 and 7, and brief presentations of illuminating historical cases are included in Chapters 1 and 7. This chapter, on the other hand, contributes to the literature by presenting a vast amount of statistical models, investigating the net effect of democracy on economic growth.

First, in Section 6.2, pooled cross section time series (PCSTS) and panel data models are applied on the relatively short sample described in Chapter 4, based exclusively on data from after 1960. Using this sample allows me to test the relationship for various democracy indicators, like the Freedom House Index (FHI) which was argued to be the most appropriate operationalization of a substantive democracy concept in Chapter 2. The combinations of various democracy measures and GDP measures, presented in Chapter 4, yield somewhat different spatial and temporal extensions of the data samples. About 140–150 countries are typically included, and the data are largely from the 1970s, 1980s, 1990s and early 2000s. However, when AREG (the dichotomous regime measure from the Alvarez, Cheibub, Limongi and Przeworksi data set) or the Polity Index (PI) are used in combination with exchange rate-adjusted GDP data, observations from the 1960s are also included. The general result from this analysis is that the positive effect of democracy on growth is quite robust to using different democracy measures, measures of economic growth and specifications of time lag on the independent variables.

Then, in Section 6.3, PCSTS and panel data analysis are applied on a more extensive data sample. This sample also includes about 150 countries but has far longer time series, incorporating data from 1820 – when James Monroe was President of the United States and the Quing-dynasty ruled China – to 2003. The analyses based on this sample constitute the most extensive study so far of the relationship between democracy and growth. The models based on this extensive sample find a relatively robust positive effect of democracy on economic growth.

Thereafter, in Sections 6.4 and 6.5, I apply matching and 2SLS models to both

the short and long time series samples. Generally, I find that democracy significantly increases economic growth rates even when taking the potential non-linearity of the effect and the endogeneity of democracy into account. Hence, this chapter presents quite strong evidence for the hypothesis that democracy enhances growth.

As discussed in Chapter 1, several academics and policy makers seem to believe in the so-called Lee Thesis, the hypothesis that democracy hurts prospects for economic development. The Lee Thesis does not find any support from the results presented in this chapter. Moreover, according to these results, also "agnostics" who doubt whether there is any effect of democracy on economic growth should reevaluate their beliefs.

6.2 Pooled cross section - time series and panel data analysis, short sample

6.2.1 OLS with PCSE

To start with, I want to use as much information as possible to obtain a baseline estimate of the effect of democracy on economic growth. Therefore, I estimate OLS with PCSE models, which utilize both cross-sectional variation and intra-national variation over time as basis for inference (see Beck and Katz 1995).[2]

As discussed in Chapter 2, there are good reasons for using the FHI as an indicator when operationalizing a substantive democracy concept. There are also good reasons for choosing PPP-adjusted rather than exchange rate-adjusted GDP per capita as a measure of income, as PPP-adjusted GDP takes into account local price levels. Table 6.1 shows various models using the FHI as democracy indicator, and using PPP-adjusted GDP per capita growth, taken from the World Development Indicators (WDI), as the dependent variable. As mentioned above, the drawback with using the FHI and PPP-adjusted GDP are the resulting relatively short time series. Nevertheless, the number of observations in Table 6.1 exceed 3500 country-years for some models, which is far higher than many, if not most, previous studies on the subject (see e.g. Przeworski and Limongi 1993; Doucouliagos and Ulubasoglu 2008). Model I, for example, draws on data from 145 countries for the time period

[2] As discussed in Chapter 4, there are alternative PCSTS techniques available, the most common being FGLS with correlated disturbances. However, as Beck and Katz (1995) argue, drawing on Monte Carlo simulations, OLS with PCSE performs better in a data structure where the cross section units are relatively many and the time-series are relatively short. To be more specific, FGLS-based techniques tend to underestimate the size of standard errors in these contexts, thereby making it easier to claim that coefficients are significantly different from zero.

from 1972 to 2005.

Preliminary analysis

To repeat the model specification from Chapter 4, Model I, includes the following control variables: log GDP per capita (PPP), log regime duration, log population, the ethnic fractionalization index from Alesina et al. (2003) and region dummies as independent variables. In addition to these control variables, Model II adds dummies for historical colonizer and plurality religion, to control for political-historical and cultural factors that are correlated with these dummies. Model III further adds to Model II by including decade dummies to control for time-specific effects on regime type and economic growth. Model IV expands on Model III by including absolute latitude, percentage of population living in urban areas and trade as percentage of total GDP as control variables.

In Model I in Table 6.1, the estimated FHI coefficient is -0.21, which indicates an estimated increase of about 1.2 percentage points extra GDP per capita growth when going from least (7) to most democratic (1) on the FHI. The effect is significantly different from zero at the 5% level. The point estimate thus indicates a quite substantial positive growth effect of having a democratic regime. Although most studies on the effect of democracy on growth produce lower point estimates, this is not the first study to yield estimates of this size. To take one example, Papaioannou and Siourounis (2008) find that in the long run, democratization improves economic growth rates by about 1 percentage point extra annual GDP per capita growth. Papaioannou and Siourounis' methodologically thorough study used information only from episodes of *regime transitions* (and pre- and post growth rates); it is noteworthy that their analysis gives estimates in the same ballpark as the analysis here, which incorporates also cross-section information.

The estimated effect of democracy is even larger in Model II in Table 6.1, and the effect is still significantly different from zero at the 5% level. The point estimate indicates an effect of going from 7 to 1 on the FHI of about 1.6 percentage points extra annual GDP per capita growth. In Model III, which includes decade dummies, the point estimate is similar to that in Model I, and the effect falls just short of the 5% significance level with an absolute t-value of 1.91. However, in the even more extensive (in terms of control variables added) Model IV, the effect of democracy on growth is significant even at the 1% level. Hence, these models indicate a positive and quite large effect of democracy on economic growth, even when controlling for a large set of other factors.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.210**	-2.00	-0.259**	-2.30	-0.209*	-1.91	-0.257***	-2.65
Ln GDP pc	0.695*	1.81	0.622	1.60	0.515	1.30	0.841**	2.16
Ln reg. dur.	0.480***	3.26	0.604***	4.03	0.633***	4.48	0.449***	3.40
Ln popul.	0.291***	3.20	0.313***	3.28	0.296***	2.97	0.426***	3.49
Ethn. fr.	-2.163***	-2.69	-2.126***	-3.03	-2.269***	-3.14	-0.913	-1.53
Africa	2.940***	2.88	3.363***	3.13	2.985***	2.76	1.426	1.57
Asia	4.351***	4.91	3.923***	3.33	3.577***	3.08	2.147**	2.16
Lat. am.	1.348*	1.71	1.085	1.02	0.786	0.72	0.652	0.68
E.E-Soviet	1.156	0.60	1.297	0.81	0.759	0.49	0.927	1.10
MENA	2.140***	2.89	1.684**	2.04	1.415*	1.74	0.922	1.29
British			-0.984**	-2.21	-0.957**	-2.00	-0.541	-1.11
French			-0.704	-1.55	-0.731	-1.58	-0.093	-0.20
Spanish			0.202	0.21	0.218	0.22	0.741	0.95
Portuguese			0.014	0.02	0.037	0.04	0.698	0.83
Belgian			-0.972	-0.73	-1.240	-0.92	-0.111	-0.08
Sunni			1.297	1.34	0.770	0.69	0.431	0.47
Shia			2.601	1.33	2.064	1.04	1.164	0.80
Catholic			0.823	0.71	0.431	0.34	-0.219	-0.17
Protestant+			0.680	0.76	0.169	0.17	-0.195	-0.19
Orthodox			0.242	0.21	-0.091	-0.08	0.001	0.00
Hindu			0.679	0.59	0.167	0.12	-0.695	-0.63
Buddhist+			1.835**	2.05	1.382	1.27	0.950	0.97
Indigenous			0.493	0.47	-0.005	-0.00	-0.268	-0.29
1970s					-0.067	-0.10	0.057	0.10
1980s					-1.681***	-2.77	-1.294***	-2.72
1990s					-1.247*	-1.91	-0.893*	-1.91
Abs.lat.							0.023	1.30
Urban							-0.045***	-3.81
Trade							0.009*	1.71
Constant	-10.894**	-2.39	-11.385**	-2.35	-8.652*	-1.69	-11.808***	-2.93
N	3544		3544		3544		3179	

Table 6.1: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. No lag on independent variables. Short sample.

Robustness check: alternative GDP measures

However, the results presented in Table 6.1 may be sensitive to some of the particular specifications made. I therefore test several alternative specifications. First, I check whether the results are sensitive to substituting PPP-adjusted with exchange rate-adjusted GDP per capita. Table D.1 in Appendix D shows these results. The regressions in this table include about 400 extra observations, because the World Bank has more data available for exchange rate-adjusted GDP. The results in Table D.1 are qualitatively similar to those in Table 6.1, with the positive effect of democracy always being significant *at least* at the 10% level. The point estimates indicate that a change of regime from least to most democratic increases annual GDP per capita growth by between 1.1 and 1.4 percentage points, which is approx-

imately similar to the improvement in growth experienced in Bangladesh after the country's democratization in 1991. The five year post-democratization growth rate in Bangladesh was about 1.3 percentage points higher than the country's five-year pre-democratization growth rate (Knutsen 2006, 507).

Robustness check: alternative lag structures

However, as I will discuss and analyze more in depth below, the estimated effects of democracy on growth reported in both Tables 6.1 and D.1 may be biased because of economic growth systematically affecting regime type (for good discussions on this problem, see also e.g. Przeworski and Limongi 1993; Przeworski et al. 2000), although it should be noted that the regressions above control for income level. The models in Tables D.2 (in Appendix D), 6.2 and D.3 (in Appendix D), drawing on the FHI and PPP-adjusted GDP, lag all independent variables with two, three and five years respectively, in order to utilize the fact that cause comes before effect in time.

The results presented in Tables D.2, 6.2 and D.3 indicate, although there are statistically insignificant FHI coefficients in some models, that the positive effect of democracy is not particularly sensitive to choice of lag specification. The results based on 3-year lags on the independent variables are particularly robust. This should not be surprising, as Papaioannou and Siourounis (2008) find that the positive effect on economic growth of a democratization experience peaks and stabilizes after "year three". There seem to be growth benefits from becoming and being a democracy, but the full effect does not materialize at once (see also Clague et al. 2003; Doucouliagos and Ulubasoglu 2008; Rock 2009*a*).[3] The largest estimated effect, that from Model I in Table D.2, indicates a boost in the GDP per capita growth rate of almost 1.8 percentage points. As Figure 1.1 from Chapter 1 shows, this is approximately equal to the difference in average growth rates from 1970 to 2000 between relatively democratic Australia or Germany on the one hand, and relatively dictatorial Ethiopia or Chad on the other.

[3] As is discussed in Clague et al. (2003), Doucouliagos and Ulubasoglu (2008) and Rock (2009*a*), this may be due to various reasons. For example, foreign and domestic investors may be uncertain about the investment policies that will be pursued by the new regime, and may withhold new investments or even disinvest. There may also be social and political turmoil in the wake of a regime change, and such an environment may not be conducive to productive activities. As was discussed in Chapter 4, there are also several other potential sources for a lag in the effect of regime type on growth: the effect is to a large extent transmitted via regime type affecting economic institutions and the legislation and implementation of economic policies, which again has to affect the more immediate sources of growth such as accumulation of physical and human capital and technological change. None of these processes can be expected to materialize instantaneously.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.296***	-2.92	-0.282***	-2.64	-0.181*	-1.77	-0.173*	-1.73
Ln GDP pc	-0.524	-1.50	-0.820**	-2.40	-0.925***	-2.65	-0.917**	-2.24
Ln reg. dur.	-0.118	-1.00	-0.048	-0.36	-0.059	-0.47	-0.213	-1.58
Ln popul.	0.099	1.22	0.170*	1.88	0.100	1.07	0.369***	3.14
Ethn. fr.	-2.409***	-3.42	-2.383***	-4.45	-2.357***	-4.37	-1.689***	-2.92
Africa	-1.150	-1.36	-1.360	-1.40	-2.079**	-2.26	-2.543***	-2.90
Asia	1.701**	2.00	1.105	0.90	0.546	0.47	-0.481	-0.43
Lat. Am.	-1.078	-1.52	-2.361**	-2.18	-2.738**	-2.46	-2.088**	-2.21
E.E.-Soviet	0.610	0.45	0.828	0.65	-0.224	-0.18	-0.007	-0.01
MENA	0.215	0.34	-0.046	-0.06	-0.470	-0.66	-1.200*	-1.66
British			0.146	0.36	0.194	0.49	0.240	0.51
French			0.012	0.03	0.009	0.02	0.269	0.55
Spanish			0.958	0.84	0.840	0.72	0.278	0.34
Portuguese			0.706	0.82	0.636	0.74	0.631	0.77
Belgian			-1.745	-1.16	-1.953	-1.26	-0.266	-0.17
Sunni			-2.225***	-3.32	-2.829***	-3.87	-1.675**	-2.21
Shia			-0.332	-0.27	-1.313	-1.05	-0.899	-0.67
Catholic			-1.573**	-2.44	-1.965***	-3.17	-1.562	-1.43
Protestant+			-1.923***	-3.39	-2.397***	-4.09	-1.579*	-1.72
Orthodox			-2.872***	-3.62	-3.293***	-4.29	-2.289**	-1.98
Hindu			-3.534***	-3.42	-3.763***	-3.43	-2.316*	-1.94
Buddhist+			-1.106	-1.30	-1.752*	-1.94	-0.663	-0.64
Indigenous			-2.797***	-3.86	-3.356***	-4.40	-2.142**	-2.49
1970s					-2.451***	-3.93	-1.959***	-3.67
1980s					-2.425***	-4.27	-1.904***	-4.03
1990s					-1.794***	-3.10	-1.416***	-3.07
Abs. lat.							0.011	0.68
Urban							0.004	0.29
Trade							0.012**	2.54
Constant	6.771*	1.79	10.012***	2.66	14.512***	3.62	7.879**	2.07
N	3377		3377		3377		3048	

Table 6.2: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Short sample.

Robustness check: alternative democracy measures

The results above indicate that the positive effect of democracy on growth is robust to the inclusion of various control variables, the choice of PPP-adjusted or exchange rate-adjusted GDP and the choice of time lag on the independent variables. However, the results may be influenced by the choice of democracy measure. As discussed in Chapter 2, the PI is an alternative democracy measure to the FHI. The PI incorporates indicators only from what I labeled the Competition, Participation and Horizontal accountability dimensions of democracy, and this is problematic. However, as was mentioned in Chapter 2, the more narrow PI also carries some benefits relative to the FHI (see also e.g. Munck and Verkuilen 2002; Strand 2007). For example, the FHI may incorporate elements that are not part of a democracy

concept. Most problematic is the possibility that the FHI may incorporate "outcome" variables related to economic performance (for example on questions related to corruption and property rights), and thus generate an a priori relation between democracy and economic variables that have an effect on growth. Thus, using the PI as an alternative democracy indicator is an important robustness check, as it tests whether our results are driven by problematic aspects with the FHI or not.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
PI	0.103***	3.90	0.102***	3.69	0.065***	2.63	0.051**	2.08
Ln GDP pc	-0.477	-1.30	-0.758**	-2.13	-0.829**	-2.33	-0.763*	-1.86
Ln reg. dur.	0.063	0.50	0.099	0.73	0.054	0.42	-0.143	-1.07
Ln popul.	0.074	0.83	0.114	1.26	0.082	0.89	0.391***	3.49
Ethn. fr.	-2.277***	-3.14	-2.429***	-4.33	-2.450***	-4.32	-1.760***	-3.07
Africa	-0.763	-0.96	-1.018	-1.09	-1.674*	-1.90	-2.238***	-2.75
Asia	1.953**	2.38	1.604	1.34	1.021	0.89	-0.177	-0.17
Lat. Am.	-0.784	-1.15	-2.140**	-2.00	-2.482**	-2.27	-1.853**	-2.00
E.E.-Soviet	0.936	0.79	1.212	1.12	0.308	0.30	0.125	0.20
MENA	0.704	1.16	0.619	0.80	0.041	0.06	-0.827	-1.15
British			0.137	0.35	0.181	0.46	0.244	0.52
French			0.241	0.55	0.137	0.32	0.466	0.94
Spanish			1.085	0.94	0.973	0.83	0.548	0.69
Portuguese			1.009	1.05	0.835	0.87	0.944	1.08
Belgian			-1.687	-1.09	-1.888	-1.19	-0.100	-0.07
Sunni			-1.549**	-2.40	-2.287***	-3.33	-1.361*	-1.81
Shia			-0.008	-0.01	-0.923	-0.78	-0.578	-0.44
Catholic			-0.927	-1.27	-1.505**	-2.17	-1.307	-1.14
Protestant+			-1.116*	-1.75	-1.773***	-2.84	-1.130	-1.14
Orthodox			-2.388***	-2.76	-2.916***	-3.59	-1.888	-1.57
Hindu			-2.759***	-2.65	-3.256***	-2.98	-1.873	-1.51
Buddhist+			-0.621	-0.75	-1.342	-1.55	-0.402	-0.39
Indigenous			-2.099***	-2.97	-2.717***	-3.76	-1.667**	-1.99
1970s					-2.147***	-3.16	-1.660***	-3.00
1980s					-2.333***	-3.74	-1.763***	-3.63
1990s					-1.869***	-2.95	-1.485***	-3.18
Abs. lat.							0.015	0.90
Urban							-0.000	-0.01
Trade							0.014***	3.01
Constant	4.634	1.10	7.726*	1.92	11.979***	2.87	4.557	1.23
N	3266		3266		3266		2954	

Table 6.3: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Short sample.

As seen in Table 6.3, which shows the results for models using 3-year lags on the independent variables, this is not the case.[4] The estimated effect of going from least (-10) to most (10) democratic on the PI varies between 1.0 and 2.1 percentage

[4]The results were quite similar in models lagging the independent variables with two years (see Table D.4 in Appendix D), and the results were almost equally strong for models using no lags or 5-year lags.

points extra annual GDP per capita growth (PPP-adjusted). The latter estimate indicates that when considering two otherwise equal countries, one democracy and one dictatorship, we should expect the democracy to be about twice as rich after 35 years, if the countries start out equally rich. Moreover, all four coefficients from Table 6.3 are significant at least at the 5% level. The positive effect of democracy on growth indicated by the FHI-based models is thus made further credible by models using the PI. Hence the positive effect of democracy on growth does not seem to hinge on the choice of using "maximalist" (Munck and Verkuilen 2002) democracy concepts and measures, such as the FHI.

However, there are democracy measures that are based on even fewer second-level dimensions of democracy than the PI. In Chapter 2, I discussed the dichotomous democracy concept promoted in Przeworski et al. (2000), which is based on what I termed the competition dimension; democracy is defined as a regime that holds contested elections. I also discussed the operationalization of this democracy concept (see Alvarez et al. 1999). I use this dichotomous variable, *AREG* (0=democracy; 1=dictatorship), in regression models similar to those that were used above.

The positive effect of democracy on growth is less robust when using AREG than when using the FHI and PI. Table 6.4 show results for models using PPP-adjusted GDP and 3-year lagged independent variables.[5] Briefly summed up, there is a positive and significant effect of democracy on economic growth in Models I and II, but not in Models III and IV, which include extra control variables. One interpretation of this result is that the significant effect found in the more parsimonious models is due to omitted variable bias, for example tied to global trends in output growth and democratization, as decade dummies are not included in Models I and II. However, one should notice that most FHI and PI models that include all control variables, also decade dummies, find significant effects of democracy on growth.[6] The point estimates are generally larger when using the PI and FHI than when using AREG; even in Models I and II in Table 6.4, the effect of going from a dictatorship to a democracy is below 1 percentage point extra GDP per capita growth.

The lack of a *robust* positive effect in Table 6.4 may be due to the fact that AREG is an operationalization of a narrower, competition-based democracy concept. Both the PI and FHI include indicators that tap the Participation dimension, for example.

[5]The results are relatively similar for models using no lags, 2-year lags (see Table D.5 in Appendix D) or a 5-year lag.

[6]This result is analogous to the result from Hadenius and Teorell (2005), which showed that analysis based on the FHI indicated a positive effect of income level on probability of democratization, whereas analysis based on AREG did not (see also Boix and Stokes 2003; Inglehart and Welzel 2006).

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
AREG	-0.907***	-2.72	-0.900**	-2.54	-0.395	-1.13	-0.059	-0.18
Ln GDP pc	-0.444	-1.23	-0.750**	-2.15	-0.870**	-2.46	-0.864**	-2.08
Ln reg. dur.	-0.136	-1.13	-0.075	-0.58	-0.083	-0.66	-0.252*	-1.89
Ln popul.	0.065	0.78	0.136	1.48	0.089	0.94	0.376***	3.19
Ethn. fr.	-2.310***	-3.21	-2.323***	-4.29	-2.318***	-4.24	-1.716***	-2.98
Africa	-1.463*	-1.89	-1.809**	-2.02	-2.450***	-2.85	-3.083***	-3.64
Asia	1.463*	1.84	0.684	0.57	0.172	0.15	-1.016	-0.93
Lat. Am.	-1.358**	-1.98	-2.921***	-2.69	-3.084***	-2.76	-2.308**	-2.45
E.E.-Soviet	0.161	0.11	0.484	0.36	-0.509	-0.40	-0.358	-0.54
MENA	-0.079	-0.14	-0.491	-0.70	-0.858	-1.31	-1.836***	-2.62
British			0.307	0.80	0.290	0.75	0.366	0.79
French			0.147	0.34	0.063	0.15	0.290	0.59
Spanish			1.310	1.13	1.014	0.86	0.319	0.39
Portuguese			0.876	1.00	0.677	0.78	0.605	0.74
Belgian			-1.670	-1.10	-1.967	-1.26	-0.264	-0.17
Sunni			-2.203***	-3.30	-2.973***	-4.05	-2.127***	-2.90
Shia			-0.440	-0.36	-1.561	-1.25	-1.533	-1.18
Catholic			-1.696***	-2.64	-2.165***	-3.50	-2.098*	-1.94
Protestant+			-2.046***	-3.60	-2.589***	-4.38	-2.117**	-2.35
Orthodox			-3.224***	-3.99	-3.633***	-4.65	-2.963***	-2.58
Hindu			-3.376***	-3.26	-3.740***	-3.42	-2.525**	-2.11
Buddhist+			-1.154	-1.37	-1.874**	-2.09	-1.019	-1.01
Indigenous			-2.969***	-4.16	-3.568***	-4.77	-2.595***	-3.13
1970s					-2.447***	-3.93	-2.043***	-3.81
1980s					-2.426***	-4.29	-1.971***	-4.18
1990s					-1.796***	-3.13	-1.443***	-3.15
Abs. lat.							0.013	0.83
Urban							0.004	0.33
Trade							0.012**	2.54
Constant	6.246	1.56	9.736**	2.51	14.201***	3.49	7.614*	1.96
N	3378		3378		3378		3049	

Table 6.4: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Short sample.

This dimension has been argued to be particularly important for the expansion of education opportunities, health services and other human capital generating policies (see e.g. Lindert 2005). It was not before participation rights were extended to a large bulk of the population, and not only to the rich, that education opportunities and funding were substantively extended and increased for example in a country such as Britain where competitive elections had long been in place (see e.g. Lindert 2005; Acemoglu and Robinson 2006*b*). As discussed in the previous chapter, human capital is considered crucial to income level and at least medium-term growth rates by many economists (see e.g. Lucas 1988; Mankiw, Romer and Weil 1992; Helpman 2004). Moreover, Bueno de Mesquita et al. (2003) show that the size of the winning coalition, which is obviously a function of how broadly participation rights are distributed in competitive systems, is vital for economic performance, much because it

shifts the incentives of politicians towards providing productive public goods. Thus, the stronger results for the PI and FHI than for AREG is perhaps not surprising.

It is worth noting that perhaps the most cited and recognized results in the literature on democracy's effect on growth, those from Przeworski et al. (2000), are based on using AREG as democracy measure. As noted in Chapter 3, Przeworski et al. (2000) found no robust effect of democracy on total GDP growth, but the analysis indicated a small, positive effect on GDP per capita growth. The results above indicate that the choice of AREG as democracy measure may have contributed to these relatively weak results regarding democracy's effect on growth. For those who are prone to accept broader democracy definitions, and thus measures, it may be relevant to question the validity of Przeworski et al.'s results, although their analysis is otherwise methodologically very sound. Moreover, other very thorough studies have more unequivocally indicated a positive effect of democracy on growth (e.g. Baum and Lake 2003). Part of the reason for why these studies' results differ somewhat from the results in Przeworski et al. (2000) *may* therefore be that other democracy dimensions than competition have a positive effect on growth. Participation may be one such dimension, and civil liberties were discussed in the previous chapter as an important determinant of technological diffusion.

Choice of democracy measure may thus impact on the estimated relation between democracy and growth, although it is worth noticing that AREG had a positive and significant effect on growth in some of the models above. Moreover, there is a plausible alternative explanation of the divergent results to the one presented above: When running OLS with PCSE regressions using FHI as democracy measure, but only using observations that have values both on AREG and FHI, the FHI results are much weaker. Thus, it may well be sample characteristics that generate the weaker results for the regressions based on AREG.

6.2.2 Random effects and fixed effects

As discussed in Chapter 4, it may be argued that OLS with PCSE is improper to use as an estimation technique when investigating democracy's effect on growth, because it does not take into account country-specific factors that may affect both regime type and economic performance. I therefore also tested panel data models, more specifically random effects (RE) models and fixed effects (FE) models.

Random effects

I start by discussing the results from the RE models.[7] Only models using 3-year lagged independent variables and PPP-adjusted GDP are shown in Tables D.6 (using the FHI), D.7 (using the PI) and D.8 (using AREG) in Appendix D. These results, even more unequivocally than the OLS with PCSE results, show a positive significant effect of democracy on growth. This is also the general picture for models using different lag-specifications (not reported in tables).[8] The RE point estimates are generally larger than the OLS with PCSE point estimates, and so are the absolute t-values. For example, when considering the results based on the FHI the effect is significant at the 1% level in Models I, II and III, and at the 5% level in Model IV. The estimated effect of going from least to most democratic on the FHI varies between 1.3 and 2.8 percentage points extra annual GDP per capita growth; these are quite large estimated effects, implying great differences in income levels between democracies and dictatorships in the long run.

Also the results from Table D.7, based on the PI as a measure of democracy, show large estimated positive effects. Moreover, the PI is significant at least at the 1% level for all models. According to the RE results, there is little reason to doubt that democracy, as operationalized by PI, improves economic growth rates. The largest estimates indicate growth effects when going from lowest to highest on the PI of about 3.2 percentage points extra annual growth. This is not far from the dramatic increase in growth rates experienced in the Philippines when comparing the 5-year period after Marcos' fall with the five last years of the Marcos regime (Knutsen 2006, 507). Neither is it far from the difference in average growth rate between fast-growing and democratic Mauritius on the one hand and stagnant and dictatorial Guinea or Cameroon between 1970 and 2000 on the other hand, as seen from Chapter 1's Figure 1.1.

As seen above, the PI yielded quite strong results also for the OLS with PCSE

[7] To sum up the points from Chapter 4, FE analysis assumes that each country has its own specific intercept in the regression. RE analysis moderates this assumption. RE, like FE, postulates a different intercept for each cross-section unit, "but it interprets these differing intercepts in a novel way. This procedure views the different intercepts as having been drawn from a bowl of possible intercepts, so they may be interpreted as random . . . and treated as though they were part of the error term" (Kennedy 2003, 304). Under the assumption that the intercept is randomly selected, that is they will have to be uncorrelated with the independent variables, RE estimators are more efficient than FE estimators. However, RE will be biased if the error term is correlated with any of the independent variables. In my case, there might be reason to believe that for example region, democracy and income level will be correlated with the error term (if we have country-specific factors that generate higher than predicted growth from our model, and that these countries are systematically clustered along one or more of our independent variables), and that results from RE could therefore be biased.

[8] As all other results not reported in tables, these results are available on request.

models. It is thus perhaps more surprising to observe the results in Table D.8, which are based on AREG. Above, AREG yielded weaker results than the other democracy indicators, both regarding the size of point estimates and level of significance. When using RE, however, the point estimates of the effect of going from dictatorial to democratic on AREG in Models I, II and III vary between 0.7 and 1.6 percentage points extra growth. Moreover, the effect is significant at the 1% level in I and II, and at the 5% level in III. Only in Model IV is the effect of AREG insignificant at conventional levels. Thus, even for the most minimalist operationalization of democracy, there seems to be a positive effect of democracy on growth, when using RE models, even if the effect is not completely robust.[9]

1.6 percentage points extra GDP per capita growth, the total estimated effect of democracy from Model II in Table D.8 might not seem like a large number at first glance, but let me illustrate with the following example: Two countries, A and B are initially equal countries in terms of GDP per capita. Country A, a democracy, is growing at a 1.6 percentage point higher annual rate than country B, a dictatorship. This implies that over a 15-year period, A has become 27% wealthier in per capita terms than B, and that A is more than twice as rich as B after 44 years. These are dramatic differences in welfare for the next generation of A- and B citizens. Hence, if one believes in the results from Table D.8 the economic consequences of having a democratic regime are not only of academic interest.

Fixed effects

However, the assumptions underlying RE, discussed in Chapter 4, are most likely not satisfied in a strict sense. Thus, it may be more appropriate to rely on consistent, but less efficient (see e.g. Beck and Katz 2001; Kennedy 2003), FE models. As discussed above, FE models introduce dummies for all countries, and thus only draw on within-nation variation. Earlier analyses drawing on such assumptions have either found no negative (Rodrik and Wacziarg 2004), or a positive (Papaioannou and Siourounis 2008), effect of democratization on growth. However, applying FE models has proved to alter well-established results in political science earlier. For example, evidence for the hypothesis that a high income level increases the probability of having a democracy tends to disappear when including country-fixed effects (Acemoglu et al. 2008; Robinson 2006). Also the effect of democracy on growth becomes far less robust when applying FE models, although the changes to these results are not as dramatic as the changes to the results on income's effect on regime type.

[9]There are no large changes to any of the RE results reported in Tables D.6, D.7 or D.8 when I use robust standard errors.

	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III
	b/(t)	*b/(t)*	*b/(t)*	*b/(t)*	*b/(t)*	*b/(t)*	*b/(t)*	*b/(t)*	*b/(t)*
FHI	-0.293**	-0.094	-0.052						
	(-2.12)	(-0.78)	(-0.43)						
Polity				0.125***	0.055*	0.038			
				(3.42)	(1.76)	(1.18)			
AREG							-1.291***	-0.554	-0.382
							(-2.97)	(-1.55)	(-1.03)
Ln GDP pc	-6.094***	-8.084***	-9.074***	-6.241***	-8.258***	-9.283***	-6.115***	-8.072***	-9.067***
	(-6.46)	(-7.34)	(-8.07)	(-6.31)	(-7.11)	(-7.62)	(-6.57)	(-7.37)	(-8.09)
Ln reg. dur.	0.279	0.293*	0.267	0.467**	0.383**	0.353**	0.282	0.301*	0.276
	(1.51)	(1.73)	(1.62)	(2.33)	(2.13)	(2.06)	(1.50)	(1.74)	(1.63)
Ln popul.	3.455***	-3.128***	-4.860***	2.785***	-2.910***	-4.414***	3.099***	-3.168***	-4.894***
	(4.57)	(-3.27)	(-4.36)	(3.38)	(-2.90)	(-3.81)	(3.87)	(-3.33)	(-4.40)
1970s		-5.629***	-5.072***		-5.394***	-4.851***		-5.531***	-5.002***
		(-8.55)	(-7.82)		(-7.78)	(-7.10)		(-8.70)	(-7.97)
1980s		-4.874***	-4.438***		-4.785***	-4.330***		-4.799***	-4.384***
		(-9.37)	(-8.93)		(-8.83)	(-8.16)		(-9.47)	(-9.03)
1990s		-2.783***	-2.630***		-2.785***	-2.620***		-2.763***	-2.616***
		(-9.12)	(-8.96)		(-8.61)	(-8.46)		(-9.22)	(-9.04)
Urban			0.131***			0.121***			0.130***
			(3.39)			(3.03)			(3.41)
Trade			0.022***			0.024***			0.022***
			(2.67)			(2.76)			(2.62)
Constant	-2.922	121.794***	149.484***	7.403	119.247***	144.133***	2.507	122.201***	149.942***
	(-0.22)	(5.95)	(6.85)	(0.51)	(5.46)	(6.06)	(0.18)	(6.00)	(6.88)
N	3531	3531	3455	3413	3413	3340	3532	3532	3456

Table 6.5: Fixed effects models. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Short sample.

Table 6.5 shows three types of FE models. These models include the various control variables from the models above except for the time-invariant variables, which are perfectly collinear with the country dummies. Although all the point estimates show a positive effect of democracy, only the models excluding decade dummies show robust, significant effects of democracy on growth. The effect is significant at the 1% level for the PI and AREG models without decade dummies, and at the 5% level for the FHI model. These models yield point estimates that indicate a comparable growth effect (in size) of democracy, to those of the largest estimates from the OLS with PCSE and RE models discussed above. When it comes to the models including decade dummies, these rely on a very strict procedure for inference, controlling for both country- and time-specific effects, and one may therefore easily conduct Type II errors by relying on these results. Nevertheless, the main conclusion from the FE analysis is that the effect of democracy on growth is not robust, and that I can not conclude with certainty that democracy enhances economic growth rates.

6.3 Pooled cross section - time series and panel data analysis, long sample

Above I mainly relied on data from the time period between 1970 and 2005, or from even more limited time intervals. There were indications of a positive effect of democracy on economic growth, but the effect was not completely robust. I can however, as indicated in Chapter 4, test whether there is an effect of democracy on economic growth with a basis in a much larger data sample. Below, I utilize the (PPP-adjusted) GDP data, and population data, from Angus Maddison's dataset to extend the time series all the way from 1820 to 2003 for some countries.

There are some drawbacks with using the long time series. First, two control variables, $\frac{TotalTrade}{GDP}$ and $\frac{UrbanPopulation}{TotalPopulation}$, do not have data for such long time series. Second, I can only utilize the PI as democracy indicator for analysis going back before WWII. Third, there are several reliability problems with the GDP and population estimates for the older data, as discussed in Chapter 4. Nevertheless, extending the time series is likely important to the validity of the estimate of democracy's growth effect, as estimates of this effect have proven to be sensitive to sample characteristics (e.g. Przeworski and Limongi 1993; Doucouliagos and Ulubasoglu 2008). More particularly, analysis based on larger samples seem to yield more credible results (Doucouliagos and Ulubasoglu 2006), and the models below include far more

observations than previous models used in the literature have included.

With data going back to 1820, when income levels were generally low in all countries, one is able to incorporate data from a period of time (between 1820 and 1945) when several relatively democratic countries grew very rich and when most dictatorships, with a couple of exceptions, remained poor. Including only the period of time after several democracies in the West had already industrialized, accumulated vast amounts of capital, built infrastructure and expanded primary education, may bias the result in favor of dictatorships.

I thus run various models, both OLS with PCSE, RE and FE on the large sample. In Chapter 4, I specified three types of models to be used for the long time series sample: Model I controls for ln GDP per capita (PPP-adjusted), ln population, ln regime duration, ethnic fractionalization, region dummies and decade dummies. Model II includes, in addition to the controls from Model I, dummies for plurality religion and identity of colonizer. Model III expands on Model II by also including a control for absolute latitude and the logarithm of the Frankel-Romer trade instrument, which functions as a proxy for trade intensity in these regression models.

The results in this section generally reinforce the main result reported from the analysis of the short sample in the section above; democracy has a positive effect on economic growth.

6.3.1 OLS with PCSE

Main specifications

As I did for the short sample, I start with presenting results from OLS with PCSE analysis. Table 6.6 shows the OLS with PCSE analysis when using 2-year lags on the independent variables. The estimated effect of going from -10 to 10 on the PI varies between 0.8 and 1.0 percentage point extra GDP per capita growth, and all models show a significant effect at the 1% level. Thus, there is very strong evidence in favor of an effect of democracy on economic growth when utilizing the longest possible time series. Models I and II in Table 6.6 are based on data from 150 countries, whereas 119 countries are represented in Model III. Model I and II draw on 9295 country-year observations, which is for example more than twice the number of observations in the models presented in Przeworski et al. (2000).

When holding all the other variables included in the models constant, Models I and II predict that going from most dictatorial to most democratic on the PI in-

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.051***	3.82	0.050***	3.62	0.039***	2.63
Ln GDP pc	-0.485**	-2.15	-0.728***	-3.01	-0.801***	-3.33
Ln popul.	0.052	0.93	0.035	0.58	-0.105	-1.32
Ln reg. dur.	-0.061	-0.96	-0.044	-0.71	-0.096	-1.57
Ethn. fr.	-1.275***	-3.68	-0.910**	-2.54	-0.367	-0.92
E.E.-Soviet	-0.016	-0.04	-0.125	-0.28	-0.272	-0.62
Africa	-1.581***	-3.01	-1.490**	-2.54	-1.818***	-3.25
Asia-Pac.	-0.409	-0.91	-1.184	-1.55	-0.701	-1.02
MENA	0.014	0.03	0.777	1.44	0.346	0.60
Lat. Am.	-0.664**	-2.27	-2.124***	-3.63	-1.410***	-2.85
1820s	3.748**	2.01	5.706***	2.76	-1.199	-1.05
1830s	5.090***	2.72	7.036***	3.40	0.173	0.16
1840s	4.824**	2.56	6.817***	3.27	.	.
1850s	4.759**	2.57	6.728***	3.27	-0.055	-0.05
1860s	5.150***	2.78	7.121***	3.46	0.370	0.36
1870s	4.987***	2.70	6.986***	3.38	0.248	0.25
1880s	4.992***	2.68	7.011***	3.37	0.330	0.33
1890s	5.471***	2.90	7.511***	3.57	0.866	0.88
1900s	5.694***	2.98	7.772***	3.65	1.165	1.17
1910s	4.249**	2.19	6.359***	2.95	-0.189	-0.19
1920s	5.644***	2.91	7.741***	3.58	1.298	1.29
1930s	5.922***	3.01	8.028***	3.67	1.460	1.45
1940s	6.595***	3.33	8.731***	3.96	2.202**	2.21
1950s	6.910***	3.51	9.168***	4.21	2.748***	2.89
1960s	7.374***	3.67	9.769***	4.36	3.458***	3.66
1970s	6.727***	3.28	9.156***	4.00	2.946***	3.06
1980s	4.965**	2.40	7.397***	3.21	1.224	1.25
1990s+	6.038***	2.87	8.470***	3.61	2.332**	2.40
British			0.089	0.31	-0.031	-0.10
French			-0.525*	-1.77	-0.593*	-1.72
Portuguese			0.810	1.55	0.102	0.21
Spanish			1.180**	2.18	0.439	0.98
Belgian			-0.674	-0.64	-0.119	-0.11
Sunni			-0.915	-1.28	-1.376*	-1.80
Shia			-1.972*	-1.87	-2.325*	-1.86
Catholic			-0.019	-0.02	-0.690	-0.75
Protestant			-0.208	-0.26	-0.934	-1.08
Orthodox			-0.241	-0.24	-0.562	-0.50
Hindu			-0.521	-0.59	-1.745*	-1.85
Buddhist+			0.888	0.97	0.285	0.31
Indigenous			-1.630**	-2.07	-2.016**	-2.44
Abs. Lat.					0.020*	1.88
Frankel-Romer					-0.288*	-1.82
Constant	.	.	.	.	9.059***	3.88
N	9295		9295		8513	

Table 6.6: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 2-year lag on independent variables. Long sample.

creases annual growth in GDP per capita with about one percentage point. Assume that we have two identical countries in terms of scores on the control variables in 1820. The only difference between them is that one country is a perfect democracy and the other a harsh dictatorship. If the estimates in Table 6.6 are correct, the democratic country will be more than six times richer than the dictatorship in 2003, if the countries start out equally rich in 1820.[10] Or, take the comparison of China and the US as an example of the long run impact of democracy on income. According to the model's estimates, if China had democratized in 1820 and followed the political trajectory of the US in terms of PI score instead of experiencing a sequence of dictatorial regimes (China's PI score was almost 16 points lower than the US' score on average), China would have had a GDP per capita of about 19 000 dollars instead of 4803 dollars in 2003. The US started out with a PPP adjusted GDP per capita of 1257 dollars in 1820 and ended up with 29 037 dollars in 2003. The autocratic nature of the regimes ruling China, from the Quing dynasty in 1820 and onwards, thus explains a large proportion of the economic divergence between that country and the more democratic West from the early 19th century and onwards (at least until 1979).

Robustness check: alternative lag structures

As for the short sample, I check the robustness of the results by trying out different lag structures on the independent variables. Tables D.9 and D.10 in Appendix D show the OLS with PCSE results when using 3-year and 5-year lags. Models I and II report PI coefficients significant at the 1% level for both lag-specifications. Model III shows statistically insignificant PI coefficients for both lag-specifications, although the p-values are just above 0.10. Thus, although the models controlling for latitude and the Frankel-Romer instrument do not yield significant results, there is relatively solid evidence for the hypothesis that democracy increases growth also from the models in Tables D.9 and D.10.

Is there a curvilinear effect of democracy on growth?

Robert Barro (1991; 1997) found no significant linear relationship between democracy and economic growth, but claimed that the relationship was inversely u-shaped,

[10]This number is strictly speaking too high. The reason is that I have not taken into account the conditional convergence effect (Barro and Sala-i Martin 2004); rich countries grow at a slower speed, ceteris paribus, and this effect will pull down the economic growth differential as the democracy steadily grows richer than the dictatorship. The empirical analyses conducted in this chapter indeed find evidence of such a convergence effect. For example the models in Table 6.6 show a negative significant (at least 5% level) effect of ln GDP per capita on GDP per capita growth rates.

indicating that an intermediate level of democracy is conducive to high economic growth. Barro offers an interpretation:

> In the worst dictatorships, an increase in political rights tends to increase growth and investment because the benefit from limitations on governmental political power is the key matter. But in places that have already achieved a moderate amount of democracy, a further increase in political rights impairs growth and investment because the dominant effect comes from the intensified concern with income redistribution (Barro 1997, 59).

A combination of two differently signed mechanisms *can* lead to an inversely u-shaped overall effect, for example if the two mechanisms are concave. But, the theoretical rationale for concavity here is not very solid. One relevant analogy comes from the literature on the determinants of civil war. Hegre et al. (2001) found that intermediate levels of democracy produced a higher probability of civil war onset, and it is quite plausible that such "incoherent regimes" may also be bad for economic growth. Incoherent regimes may be prone to political instability (Gates et al. 2006), and may for example not have a sufficient level of democracy to secure property rights or provide a well-functioning education system. On the other hand, these regimes may not be autonomous enough (from the general populace) to conduct tough economic reforms or generate very high savings rates. Thus, the theoretical rationale for a u-shaped relation between democracy and growth seems equally strong as the rationale for an inversely u-shaped relation.

A squared PI term is added to the OLS with PCSE models tested above on the long sample. All specifications show an estimated positive coefficient for both the linear and squared PI terms. The estimated marginal effect of democracy on growth is thus always positive and increasing in level of democracy. However, the squared term is insignificant at conventional levels, and I can therefore not reject a linear specification. In any case, Barro's claim of an inverse u-relationship between democracy and growth, based on OLS applied on cross-sectional averages, does not hold up to empirical scrutiny when more data and a PCSTS method that incorporates also temporal variation is used.

6.3.2 Random effects and fixed effects

Random effects

I also tested RE and FE models on the long sample. The RE models mostly find statistically significant effects at conventional levels. More specifically, Tables D.11, D.12 and D.13 in the Appendix show that the PI is significant at the 1% level in Model I, independent of whether 2-, 3- or 5-year lags are used. In Model II the PI is significant at the 5% level, and this result is also independent of lag-specification. The coefficients are generally smaller than those obtained in the various analyses above, indicating effects of going from -10 to 10 on the PI of around 0.6 to 0.8 percentage points extra annual GDP per capita growth. However, in Model III the PI is only significant at the 10% level, and then only for the 5-year lag specification. The RE results are thus not completely robust. [11]

Fixed effects

Finally, I run FE analysis on the large data sample. I leave out all time-invariant variables, and control for ln GDP per capita, ln population and ln regime duration in addition to the country dummies. The results, for various lag-specifications, are reported in Table 6.7. The results for models using decade dummies, as was used in the OLS with PCSE and RE analysis above, indicate a non-significant effect of democracy on growth, although the estimated coefficient is always positive. However, models using four time period dummies (1870–1913, 1914–1945, 1946–1972 and 1973–2003) rather than decade dummies always find statistically significant effects at least at the 5% level. For example, the estimated effect of going from least to most democratic on the PI is 0.7 percentage point extra annual growth in the models using 2- and 3-year time lags, and 1.0 percentage point in the 5-year lag model.

Nevertheless, the insignificant results from the decade-dummy models show that the effect of democracy is not robust, and there may be time-specific effects generating omitted variable bias in the more lenient models using the four time period dummies. Moreover, Hausman tests comparing the consistent FE models with similar (efficient) RE models, indicate that hypotheses of similar coefficients can be rejected at least at the 5% level for all lag-specifications; the decade dummies FE models should not be substituted with similar RE models (which yield significant effects of PI), according to the Hausman tests.

[11] Adding to this, the results in most models are weakened, and loose statistical significance, when I use robust standard errors.

	2-year lag *b/(t)*	2-year lag *b/(t)*	3-year lag *b/(t)*	3-year lag *b/(t)*	5-year lag *b/(t)*	5-year lag *b/(t)*
PI	0.035**	0.020	0.036**	0.017	0.050***	0.020
	(2.47)	(1.33)	(2.53)	(1.10)	(3.43)	(1.33)
Ln GDP pc	-2.043***	-3.067***	-2.148***	-3.173***	-2.081***	-3.054***
	(-10.01)	(-13.46)	(-10.43)	(-13.80)	(-9.83)	(-12.85)
Ln popul.	-0.433**	-1.531***	-0.437**	-1.617***	-0.220	-1.608***
	(-1.98)	(-6.11)	(-1.98)	(-6.41)	(-0.97)	(-6.21)
Ln reg. dur.	0.014	0.010	0.004	0.004	0.014	-0.012
	(0.22)	(0.16)	(0.06)	(0.06)	(0.23)	(-0.19)
1870-1913	1.387***		1.320***		0.788**	
	(4.09)		(3.90)		(2.32)	
1914-1945	2.770***		2.645***		2.318***	
	(6.98)		(6.66)		(5.78)	
1946-1972	5.785***		5.668***		5.052***	
	(11.94)		(11.66)		(10.22)	
1973-2003	5.079***		5.161***		4.186***	
	(8.49)		(8.60)		(6.88)	
1820s		-12.329***		.		.
		(-11.49)		.		.
1830s		-10.821***		0.791		0.888
		(-10.76)		(0.91)		(1.01)
1840s		-10.201***		2.072**		1.917**
		(-10.33)		(2.30)		(2.14)
1850s		-9.726***		2.377***		2.436***
		(-11.17)		(2.86)		(2.93)
1860s		-9.139***		3.087***		2.924***
		(-11.28)		(3.86)		(3.67)
1870s		-8.520***		3.389***		3.107****
		(-11.68)		(4.37)		(4.01)
1880s		-8.106***		3.885***		3.458****
		(-11.64)		(4.92)		(4.38)
1890s		-7.365***		4.701***		4.560***
		(-11.14)		(5.92)		(5.74)
1900s		-6.641***		5.621***		4.660***
		(-10.69)		(7.03)		(5.82)
1910s		-7.572***		4.906***		5.485***
		(-12.76)		(5.99)		(6.68)
1920s		-5.594***		5.716***		5.489***
		(-10.57)		(6.96)		(6.66)
1930s		-4.970***		7.598***		6.501***
		(-10.00)		(9.11)		(7.75)
1940s		-3.747***		8.278***		8.338***
		(-7.93)		(9.65)		(9.67)
1950s		-2.608***		9.717***		9.396***
		(-6.76)		(11.10)		(10.65)
1960s		-0.560*		11.757***		11.214***
		(-1.85)		(12.66)		(11.95)
1970s		-0.642**		11.393***		10.317***
		(-2.52)		(11.57)		(10.35)
1980s		-1.761***		10.627***		10.140***
		(-7.78)		(10.34)		(9.74)
1990s+		.		12.504***		12.158***
		.		(11.67)		(11.22)
Constant	17.327***	42.411***	18.226***	31.806***	16.417***	31.385***
	(8.13)	(12.93)	(8.49)	(12.30)	(7.47)	(11.86)
N	9438	9438	9277	9277	8956	8956

Table 6.7: Fixed effects models. PPP-adjusted GDP per capita growth as dependent variable. Various lags on independent variables. Long sample.

Summing up, there is still room for some skepticism regarding a positive effect of democracy on growth, although the main bulk of the evidence analyzed so far in this chapter indicates that a positive effect is likely. The PCSTS and panel data analyses find a positive and relatively, although not completely, robust effect of democracy on economic growth. Even if the different models use different samples, democracy measures, lag-specifications and draw on different assumptions regarding incorporation of cross-sectional information and error-specifications, we most often find an effect that is statistically significant at least at the 5% level, and *all* models show a positive estimated effect.

6.4 Matching

Recently, there has been some interest in matching techniques among researchers studying political economic topics, although the usage is still far from widespread. Notably, Persson and Tabellini (2003) use matching in their seminal study of the economic effects of different forms of constitutional rules. As discussed in Chapter 4, matching is a so-called non-parametric estimation technique, which relaxes assumptions on functional form. However, relaxing strict assumptions on functional form bears with it a cost in terms of reduced efficiency in the estimates; that is, one tends to get relatively large standard errors. Nevertheless, I apply matching analysis both to the short and long time series samples below.[12]

6.4.1 Model specifications

There are several specifications that need to be made regarding the matching models. One is the number of matches I want to compare a unit with when estimating the Average Treatment Effect (ATE) of democracy. A second specification relates to whether and how I adjust for possible biases (Abadie and Imbens 2002). A third relates to how I calculate standard errors.

Regarding the number of matches, I explore different specifications below and investigate whether the results differ between the specifications. More specifically, I match units with the one, two, four and ten most similar observations in the different models below. Using several cases as matches increases the amount of information I base inferences upon, but it also increases the risk of comparing units with country-years that are relatively dissimilar.

[12] I use the "nnmatch" (nearest neighbor match) command in STATA.

Regarding bias adjustment, I explore models without such adjustment, and models using a bias-adjustment procedure specified by Abadie and Imbens (2002). Regarding the calculation of standard errors, I use robust standard errors as there are good reasons to believe that the standard errors are heteroskedastic (and also autocorrelated). STATA calculates such robust standard errors by running through a second matching process, and one match is used in this operation. In this second stage, matching is conducted with observations that have *similar* values on the treatment variable (democracy or dictatorship). The resulting standard errors are heteroskedasticity-consistent.[13]

The unit of analysis is country-year. This mean that we incorporate variation that is due to a country going from non-democratic to democratic, or vice-versa, in the estimation procedure, as well as information from relatively similar countries that differ on the treatment variable (cross-sectional information). The inferences are therefore based on a very large amount of data.

6.4.2 Analysis based on the short sample

First, I investigate the ATE of democracy in the short sample, using my favored democracy measure, the FHI. In order to run matching analysis, I need to dichotomize the democracy – dictatorship continuum into two more or less arbitrarily selected categories. In order to check the robustness of the results, I use two different cut-off points for the FHI in different models. The most lenient democracy operationalization includes as democracies country-years that have an FHI score lower than or equal to 3.5. The more restrictive operationalization classifies country-years that receive a score lower than or equal to 2.5 on the FHI as democracies. The AREG measure is already dichotomous, and is therefore particularly suitable for matching analysis. I use this measure in addition to the FHI-based dichotomies.

The baseline models referred to in Tables 6.8 and 6.9 have GDP per capita level, ln population, and region, colonizer, and plurality religion dummies as control variables. The extended models include also energy production as share of GDP per capita (from the WDI), ln regime duration, urban population as share of total population and a linear time trend as controls. A time trend is natural to include instead of discrete time period dummies in a matching analysis, as it is plausible to assume that observations decrease in similarity the farther away they are from each other in time.

[13]However, autocorrelation of residuals may still pose a problem to the analysis, as there is a panel structure in the data.

Table 6.8 presents the results from the analyses based on FHI-constructed dummies, and Table 6.9 shows the results when using AREG. In contrast with the models reported above, the regime dummies are reversed, so that 'democratic' is the highest value.

The results in Table 6.8 generally support the hypothesis that there is a positive effect of democracy on economic growth. The estimated ATE on growth for a country when going from the (relatively) dictatorial to the (relatively) democratic category varies between extra annual growth of 0.3 and 1.1 percentage points. 14 of the 16 models reported in Table 6.8 show significant effects at the 5% level, and 11 of the models show effects that are significant at the 1% level. All models utilizing more than one match yield significant effects at the 5% level. The results in Table 6.9, however, are a bit more ambiguous. All specifications using AREG show an estimated positive effect of democracy on economic growth, but only half of the estimated ATEs are significant at the 5% level. The divergence between models using the FHI and AREG, when it comes to the robustness of the effect of democracy on growth, closely resembles the pattern found in the linear models above and discussed in Section 6.2.1. When AREG is used, the estimated effect on annual growth rate of going from a democratic to a non-democratic regime varies between 0.36 and 0.77 percentage points. When AREG is used as treatment variable, the extended models that include more control variables are generally the ones with the highest t-values.

The sign of the ATE is always positive also when I apply the bias-corrected version of the estimation technique developed by Abadie and Imbens (2002). However, the results are not robust as the significant coefficients whither away. Hence, I can not conclude unequivocally on the ATE of democracy on economic growth.

I used so-called replacement when I estimated the ATEs above. This implies that several observations can have the same match. According to Abadie and Imbens (2002), "matching with replacement allows us to reduce biases, since it produces matches of higher quality than matching without replacement. . . In addition, matching with replacement allows us to consider estimators that match all units, treated as well as controls, so that the estimated effect is the average treatment effect" (Abadie and Imbens 2002, 3). However, there is one problem associated with replacement when matching is applied on my data material. Some of the observations might excessively drive the results, as they are used a very large number of times as the best match. This also points to the benefit of using more matches in the analysis, as some single observations are less likely to drive the results.

I investigated the observations used as matches in the extended one-match FHI

Model	FHI cut-off	Matches	Coefficient	t-value	Observations
Baseline	3.5	1	1.08	2.54**	4473
Baseline	2.5	1	1.10	3.42***	4473
Extended	3.5	1	0.48	1.06	3016
Extended	2.5	1	0.30	1.00	3016
Baseline	3.5	2	0.92	3.04***	4473
Baseline	2.5	2	1.11	4.15***	4473
Extended	3.5	2	0.59	1.98**	3016
Extended	2.5	2	0.60	2.59***	3016
Baseline	3.5	4	0.75	2.79***	4473
Baseline	2.5	4	0.95	3.50***	4473
Extended	3.5	4	0.69	2.88***	3016
Extended	2.5	4	0.59	2.51**	3016
Baseline	3.5	10	0.74	3.66***	4473
Baseline	2.5	10	0.71	3.31***	4473
Extended	3.5	10	0.86	4.09***	3016
Extended	2.5	10	0.83	4.41***	3016

Table 6.8: Results from the matching estimation based on FHI. PPP-adjusted GDP per capita growth as dependent variable. Coefficients show average treatment effect of going from dictatorship to democracy. Short sample.

Model	Matches	Coefficient	t-value	Observations
Baseline	1	0.36	0.98	3983
Extended	1	0.45	1.25	2783
Baseline	2	0.47	1.51	3983
Extended	2	0.77	2.56**	2783
Baseline	4	0.45	1.52	3983
Extended	4	0.71	2.82***	2783
Baseline	10	0.50	2.26**	3983
Extended	10	0.60	2.69***	2783

Table 6.9: Results from the matching estimation based on AREG. PPP-adjusted GDP per capita growth as dependent variable. Coefficients show average treatment effect of going from dictatorship to democracy. Short sample.

model with a cut-off point of 3.5 on the FHI. Indeed, some of the observations are used a very large number of times as matches, with Spain in 1976 being the obvious outlier (a good match for democratic, Western country-years!). Spain was the favored match in a total of 421 instances. No other match came even close, with Zimbabwe 1980 registering as a match in 146 instances, Portugal 1975 in 114 instances Tonga 1982 in 98 instances and South Africa 1981 in 82 instances. Few other observations were used as matches more than 50 times, and the majority of matches were used a far lower number of times (many of the matches are only used in one or two instances). These considerations point to a "lack of observable data" that can be used as decent counterfactuals: There are few relatively rich, modernized countries that are dictatorial. In earlier years, there were also few relatively poor countries that could be classified as democracies. This problem becomes extra obvious when relying on matching techniques, but it likely also affects any regression-based technique estimating the effect of democracy.

In order to check the robustness of the results, I first dropped Spain (all years) from the sample. I then reran the analyses on the extended, one-match, FHI models, which previously showed insignificant ATEs. Indeed, after removing Spain (which was the match for about 10% of the observations), the ATE was significant at the 5% level for both models. The estimated ATEs were far higher than before, with the coefficient for the 3.5 cut-off specification now being 1.98, indicating an almost 2 percentage point increase in annual growth rate when going from a relatively dictatorial to a relatively democratic regime. This latter result could of course be taken as evidence for the hypothesis that democracy increases growth, but it could also be taken as a sign that the matching technique utilized here is not very robust, given the sample's structure (this is already obvious from the relatively large standard errors I generally obtain).

I then proceeded by deleting the other influential observations mentioned above, Portugal, South Africa, Tonga and Zimbabwe (all years). For the 3.5 cut-off specification, the estimated size of the coefficient now drops somewhat to 1.65, but the t-value actually increases from 2.31 to 4.97 as the standard errors decrease substantially. The positive effect of democracy is now significant at the 1% level. When I investigate models using the 2.5 cut-off for FHI, the results are very similar; the ATE drops from 1.89 (only Spain out) to 1.38 (Spain, Zimbabwe, Portugal, South Africa and Tonga out), but the t-value increases from 2.41 to 3.50.

6.4.3 Analysis based on the long sample

I also investigated the ATE of democracy on growth based on the long sample. For this purpose, the PI was dichotomized. I chose two different cut-off points to check the robustness of the results. The first specification scored all countries with a PI score of 0 or better as democracies, and the second used a PI score of 4 or more as the cut-off for democracy. The control variables in this model were similar to those used in Model II in the linear models for the long samples above, but with a linear time trend instead of decade dummies. Both the treatment variable and the control variables are lagged with two years. I also here explored how robust the results are by allowing for different numbers of matches (one, three, five and ten closest matches) in different models. Replacement is once again allowed in the estimation procedure.

Polity cut-off	Matches	ATE	T-value	Obs.
0	1	2.21***	4.01	9438
0	3	1.37***	3.99	9438
0	5	1.05***	3.98	9438
0	10	0.74***	3.73	9438
4	1	1.39***	3.23	9438
4	3	0.88***	3.00	9438
4	5	0.77***	3.26	9438
4	10	0.65***	3.58	9438

Table 6.10: Results from the matching estimation based on the PI. PPP-adjusted GDP per capita growth as dependent variable. Coefficients show average treatment effect of going from dictatorship to democracy. Long sample.

The results from the long sample matching models triangulate well with the results presented above from the linear models based on the long sample. All the democracy-coefficients from the eight models reported in Table 6.10 are positive and significant at the 1% level. The ATE of democracy is also substantial in size, varying between 0.65 and 2.21 percentage points extra annual growth. However, the largest estimates come from models using one match, and the standard errors are also generally large in these specifications, implying very uncertain point estimates. The models using a larger number of matches generate lower point estimates, but also lower standard errors. Generally, the models where fewer country-years are accepted into the democracy category generate lower estimated ATEs. However, independent of classification, these models indicate a substantial "democracy advantage" when it comes to generating economic growth.

6.5 Taking endogeneity of democracy into account

In the analysis above, I assumed that democracy is exogenous. However, regime type may be endogenous to economic growth. Therefore, as discussed in Chapter 4, the models used in the previous sections of this chapter *may* generate biased estimates of the effect of democracy on economic growth.

As discussed in Chapter 3, there is a well-established literature within political science considering income as a cause of democracy, although the recent study by Acemoglu et al. (2008) casts serious doubt on this relationship. However, even *if* income enhances the probability of being a democracy, as Lipset (1959) suggested, this should not bias the results above. The reason is simply that I control for income level (ln GDP per capita) when I estimate the effect of democracy on economic growth. But, it may be that short- to medium-run growth rates (in addition to income level) affects the probability of democratization or democratic breakdown. This *may* affect the estimates presented above, although I lagged the independent variables to mitigate this problem.

Indeed, as noted in Chapter 3, Przeworski and Limongi (1997) find evidence for the proposition that various regimes die or survive with different probabilities, depending on prior short-term growth rates. Particularly poor democracies seem to be little resilient to economic crises, although all regimes experience reduced survival probability when an economic crisis hits. If democracies are more likely to break down in periods of low growth, it *may* be that the results above are biased in favor of democracy's positive effect on growth, as many countries should then tend to become dictatorial in periods with low growth caused by exogenous reasons.[14] However, economic crises are short-term phenomena, and it may be that a regime falls after the economy has experienced the main bulk of the recession. As business cycle recoveries imply higher than trend growth, it may be that the proposed pattern above generates a bias in favor of dictatorship's positive effect on growth. Put differently, dictatorial regimes may take over when the economy, because of exogenous reasons, start to recover, thus making it look *as if* dictatorial regimes are responsible for the high growth.[15]

[14]Remember that I also control for time period effects above, which should mitigate the likelihood that the results are driven by global economic trends that affect growth, and thus maybe indirectly regime type.

[15]This argument presents one hypothetical pattern that could lead to a bias in the results. However, other patterns may also lead to biases. For example, the discovery of vast amounts of natural resources may lead both to an, at least temporary, higher economic growth rate and increased incentives for different elites to challenge the existing regime, independent of whether it is a democracy or a dictatorship, and subsequently establish a dictatorship to control the resource flow. If so, the estimated effect of democracy on growth may be biased downwards. See Przeworski

Even if it is difficult to predict the direction of the bias in the estimated effect of democracy on growth, regime type may be endogenous to growth. I should therefore use techniques that take the endogeneity of regime type into account to check the robustness of the effect reported above. However, this comes at a cost, as techniques such as 2SLS often are poor in terms of efficiency. Despite generating consistent estimators, 2SLS tends to produce large standard errors and may therefore lead me to more often conduct type II errors (e.g. Kennedy 2003).

6.5.1 Granger tests

As noted in Chapter 4, one simple way to investigate endogeneity is through conducting Granger tests. The simplest of all Granger tests is to control for the dependent variable measured in $t-1$ and investigate the effect of the independent variable of interest. Using the long time series based on the PI and Maddison's GDP data, I find that democracy in $t-1$ is estimated to have a positive effect on growth in t when controlling for growth in $t-1$, and the result is significant at the 1% level. When democracy in t is entered as a function of democracy in $t-1$ and growth in $t-1$, the estimated effect of growth is actually *negative* and significant at the 5% level. According to this analysis, one should actually expect that the coefficients reported for the various models above *underestimate* a positive effect of democracy on economic growth.

	GDPpc gr. t	FHI t	GDPpc gr. t	AREG t	GDPpc gr. t	PI t
	b/(t)	*b/(t)*	*b/(t)*	*b/(t)*	*b/(t)*	*b/(t)*
GDPpc gr. $t-1$	0.306***	-0.001	0.297***	0.001*	0.337***	-0.004
	(6.54)	(-0.48)	(5.98)	(1.77)	(6.62)	(-0.82)
FHI $t-1$	-0.206***	0.966***				
	(-3.35)	(122.17)				
AREG $t-1$			-0.771***	0.895***		
			(-3.45)	(41.14)		
PI $t-1$					0.056***	0.949***
					(4.39)	(87.97)
Constant	1.681***	0.092***	1.201***	0.025*	0.773***	0.230***
	(6.19)	(2.95)	(6.02)	(1.80)	(4.47)	(3.66)
N	4200	4369	3875	3713	3579	3395

Table 6.11: Granger tests, short sample. Dependent variable shown in top row.

Table 6.11 shows similar Granger tests on the short samples, for all the three democracy indicators used in this chapter. These results clearly confirm the results from the long sample. Democracy in $t-1$ Granger causes growth in t (always

and Limongi (1993) and Przeworski et al. (2000) for more thorough discussions on patterns that may generate endogeneity in the effect of democracy on growth.

significant at 1% level), and the effect is positive. There is no such positive Granger effect of growth on democracy. Actually, the effect of growth in $t-1$ on AREG in t is significant at the 10% level, but the sign indicates that high growth affects the probability of having a democracy negatively. Thus, the effect of democracy on economic growth may actually be underestimated in the short sample models using AREG as a democracy measure. This adds another potential explanation to those discussed in Section 6.2.1 of the positive effect of democracy on growth being less robust for models using this particular democracy measure.

All in all, the Granger tests conducted in this section do not indicate that the positive relation between democracy and growth found in most models above is due to economic growth enhancing the probability of having a democracy. Rather, these tests indicate that the relation is due to democracy increasing growth rates.

6.5.2 2SLS analysis based on the short sample

However, there are other ways of dealing with the endogeneity problem than through Granger tests. As I have already mentioned several times, one proposed solution is to find so-called instruments, or instrumental variables, for endogenous independent variables, and run 2SLS. The 2SLS method and the proposed instrument for democracy, WAVE, were discussed in Chapter 4. In that chapter, I also reported first-stage regressions for some of the models used in this section and conducted various tests on the validity of the instrument. The main conclusion from these tests was that WAVE is a strong and valid instrument for democracy (see also Knutsen 2011*b*), and WAVE is thus suitable for usage in 2SLS analysis of democracy's effect on growth.

Here, I am only going to focus on the main result from the 2SLS models, namely whether democracy seems to affect economic growth or not. I utilize a panel data version of 2SLS based on random effects (RE2GSLS). Tables D.14 and D.15 in Appendix D show the second-stage regressions for 2SLS models based on the shor time series sample, with the FHI as democracy measure. These models draw on data from the 1970s and onwards, and use a 2-year lag on the independent variables. I also ran 2SLS models using 3- and 5-year lagged independent variables and models using the PI and AREG as democracy indicators, but the results were not very different from those showed in Tables D.14 and D.15.

Tables D.14 and D.15 show various models, corresponding to those used in the OLS with PCSE and RE analysis above, for different choices of instruments; the models in Table D.14 use only WAVE as instrument, and Table D.15 shows results

from models using both WAVE and 15-year lagged FHI values (relative to the already 2-year lagged FHI values) as instruments. As discussed in Chapter 4, Helliwell (1994) used lagged democracy values to instrument for present values when investigating democracy's effect on growth. In Chapter 4, I concurred that plausible theoretical arguments can be made to question the validity of this instrument. More specifically, an independent effect of a country's "democratic history" on growth could lead to this instrument violating the exclusion restriction.

However, I conducted overidentification tests on models using both WAVE and lagged democracy scores, and these tests indicated that the exclusion restriction was *not* violated. Hence, the estimates of democracy's effect on growth in 2SLS models using WAVE and lagged democracy measures as instruments may not be inconsistent after all. In any case, independent of democracy indicator and choice of instruments, there is no statistically significant effect of democracy on economic growth from the 2SLS analyses based on the short sample.

Despite the insignificant democracy coefficients from the 2SLS analysis, the point estimates are quite substantial in size, and they are often larger than in the panel data and OLS with PCSE models presented above. Some of the FHI models using 2-year lags, for example, yield an estimated effect of going from most dictatorial to most democratic of just below 3 percentage points extra annual GDP per capita growth. Therefore, I ran Hausman tests to evaluate whether there is a significant difference between the consistent, but inefficient, RE2GSLS estimates, and the corresponding estimates from efficient, but inconsistent, RE models. There is little evidence of significant differences between coefficients, also for models using AREG and PI. For most models, the hypothesis of similar coefficients can not be rejected, even at the 10% level. One common practice in econometrics is then to opt for the more efficient RE estimates (see e.g. Greene 2003), and these, in most cases, show a significant and positive effect of democracy on economic growth.

6.5.3 2SLS analysis based on the long sample

I also ran 2SLS regressions on the sample with long time series, using the PI and data from Maddison. The results, for 2-, 3- and 5-year lagged independent variables respectively, are shown in Table 6.12, and in the Appendix Tables D.16 and D.17, respectively. These models include only WAVE as instrument. The tables show some barely significant (10% level) and some nearly significant PI coefficients.

Despite these non-robust results, the estimated effect of PI on growth is always positive. Moreover, the point-estimates are either larger than or relatively similar in

size to those found in the OLS with PCSE and RE models in Sections 6.2 and 6.3. The estimated effect of going from -10 to 10 on the PI is often around 1 percentage point extra GDP per capita growth rate, although the effect is not always significant. Hausman tests never reject the hypothesis of similar coefficients between the RE and RE2GSLS models. Thus, one may argue that the endogeneity problem is not severe, and that one should rather opt for the more efficient RE estimates. These generally show a significant positive effect of democracy on growth, although, as described above, the effect is not robust.

I also ran regressions on the long time series samples, using both WAVE and 15-year lagged values on the PI (PILAG) as instruments. To briefly sum up the discussion from the previous section, overidentification tests conducted in Chapter 4 indicated that the exclusion restriction was not violated in 2SLS models using these two instruments. Hence, the results reported in Table 6.13, and in Appendix Tables D.18 and D.19, should yield consistent estimates of the effect of democracy on economic growth.

The results in Table 6.13, and *especially* in Tables D.18 and D.19 in Appendix D, provide very strong evidence for the hypothesis that democracy enhances economic growth. All models, independent of lag-specification, show a significant effect of democracy on growth at the 10% level, and except for in Model II in Table 6.13, all PI coefficients are significant at the 5% level. The estimated effect of going from -10 to 10 on the PI varies between 1.1 and 1.6 percentage points extra annual GDP per capita growth. Thus, I find a relatively large, positive effect of democracy on growth from these 2SLS models, which include between 7000 and 8000 country-year observations. Even when taking into account that democracy may be endogenous, I find that democracy enhances economic growth rates.

6.6 Discussions

6.6.1 The virtues of robustness checks

Xavier Sala-i-Martin published an article in 1997 called "I just ran 2 million regressions" (Sala-i Martin 1997). The follow-up question to the title was what he learned from this exercise? I have not run quite as many regressions, but probably still enough to make the reader bored. What is the point of running so many models? The answer is that one cannot rely on one particular specification of model, econometric method or democracy indicator, when testing one's hypotheses. There is limited knowledge of what a "correct specification" looks like, and results could

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.061*	1.70	0.051	1.41	0.066*	1.93
Ln GDP pc	-1.108***	-5.84	-1.672***	-8.32	-1.306***	-7.17
Ln popul.	-0.218***	-2.66	-0.283***	-2.91	-0.356***	-2.90
Ln reg. dur.	0.012	0.19	0.017	0.25	-0.086	-1.30
Ethn. fr.	-1.843***	-3.41	-1.204*	-1.70	-1.162*	-1.80
E.E.-Soviet	-0.804	-1.42	-0.985	-1.38	-0.277	-0.39
Africa	-2.819***	-4.55	-3.086***	-3.89	-3.169***	-4.15
Asia-Pac.	-0.900*	-1.69	-1.779*	-1.85	-1.587*	-1.77
MENA	-0.481	-0.75	0.780	0.87	0.203	0.25
Lat. Am.	-1.487***	-3.16	-3.215***	-3.62	-2.184***	-2.76
1820s	-4.098***	-4.80	-5.743***	-6.34	-4.913***	-5.50
1830s	-2.951***	-3.70	-4.544***	-5.35	-3.699***	-4.43
1840s	-2.834***	-3.48	-4.343***	-5.06	-3.493***	-4.16
1850s	-2.875***	-4.16	-4.297***	-5.84	-3.569***	-4.94
1860s	-2.606***	-4.21	-3.946***	-5.96	-3.279***	-5.00
1870s	-2.471***	-4.63	-3.709***	-6.44	-3.169***	-5.45
1880s	-2.455***	-4.76	-3.619***	-6.55	-3.083***	-5.55
1890s	-2.006***	-4.16	-3.108***	-6.03	-2.562***	-4.95
1900s	-1.619***	-3.58	-2.648***	-5.49	-2.157***	-4.45
1910s	-2.941***	-6.66	-3.896***	-8.34	-3.414***	-7.28
1920s	-1.413***	-3.67	-2.273***	-5.56	-1.802***	-4.37
1930s	-1.086***	-2.88	-1.894***	-4.71	-1.562***	-3.82
1940s	-0.267	-0.71	-0.982**	-2.46	-0.716*	-1.77
1950s	0.266	0.89	-0.283	-0.90	-0.210	-0.65
1960s	1.286***	4.98	0.985***	3.69	1.004***	3.68
1970s	0.436	1.63	0.271	0.99	0.457*	1.67
1980s	-1.192***	-4.85	-1.281***	-5.18	-1.070***	-4.37
British			-0.123	-0.27	-0.330	-0.86
French			-1.040*	-1.91	-1.283***	-2.80
Portuguese			-0.214	-0.21	-0.649	-0.80
Spanish			0.998	1.16	-0.203	-0.29
Belgian			-2.309*	-1.69	-1.352	-1.22
Sunni			-1.114	-0.63	-0.890	-0.64
Shia			-2.310	-1.22	-1.816	-1.19
Catholic			0.785	0.42	-0.173	-0.12
Protestant			0.721	0.39	-0.226	-0.15
Orthodox			-0.061	-0.03	-0.134	-0.08
Hindu			0.600	0.30	-0.205	-0.13
Buddhist+			1.019	0.52	0.543	0.35
Indigenous			-0.778	-0.41	-0.772	-0.52
Abs. Lat.					-0.007	-0.43
Frankel-Romer					-0.495*	-1.93
Constant	14.528***	7.94	19.816***	7.36	19.951***	6.41
N	9295		9295		8513	

Table 6.12: RE2GSLS results for models with WAVE as instrument. PPP-adjusted GDP per capita growth as dependent variable. Second-stage regressions with 2-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.067**	2.36	0.057*	1.84	0.067**	2.31
Ln GDP pc	-0.972***	-5.08	-1.262***	-6.21	-1.126***	-6.07
Ln popul.	-0.183**	-2.04	-0.196**	-2.05	-0.263**	-2.14
Ln reg. dur.	-0.099	-1.50	-0.102	-1.49	-0.124*	-1.88
Ethn. fr.	-1.800***	-3.12	-1.401**	-2.07	-1.024	-1.62
E.E.-Soviet	-0.312	-0.50	-0.645	-0.84	-0.222	-0.33
Africa	-2.456***	-3.79	-2.870***	-3.62	-3.226***	-4.28
Asia-Pac.	-0.405	-0.74	-2.070**	-2.17	-1.708*	-1.91
MENA	-0.342	-0.57	0.001	0.00	-0.060	-0.08
Lat. Am.	-1.371***	-2.95	-3.823***	-4.59	-2.150***	-2.76
1820s	-3.704***	-4.43	-4.584***	-5.29	-4.255***	-4.95
1830s	-2.729***	-2.61	-3.581***	-3.35	-3.236***	-3.09
1840s	-2.448***	-3.02	-3.244***	-3.87	-2.920***	-3.54
1850s	-2.612***	-3.73	-3.365***	-4.62	-3.071***	-4.28
1860s	-2.267***	-3.53	-2.985***	-4.47	-2.718***	-4.12
1870s	-2.222***	-3.96	-2.876***	-4.92	-2.707***	-4.60
1880s	-2.143***	-4.10	-2.761***	-5.08	-2.618***	-4.77
1890s	-1.697***	-3.46	-2.283***	-4.47	-2.115***	-4.12
1900s	-1.349***	-2.90	-1.900***	-3.94	-1.735***	-3.59
1910s	-2.818***	-6.17	-3.324***	-7.05	-3.131***	-6.61
1920s	-1.124***	-2.75	-1.585***	-3.75	-1.323***	-3.11
1930s	-0.820**	-2.10	-1.265***	-3.12	-1.126***	-2.74
1940s	-0.106	-0.28	-0.509	-1.30	-0.424	-1.06
1950s	0.445	1.34	0.128	0.37	0.187	0.54
1960s	1.438***	4.93	1.220***	4.08	1.204***	3.93
1970s	0.527**	1.97	0.453*	1.66	0.460*	1.67
1980s	-1.080***	-4.60	-1.120***	-4.71	-0.932***	-3.93
British			0.353	0.84	-0.079	-0.21
French			-0.869*	-1.66	-1.316***	-2.80
Portuguese			1.029	1.01	-0.036	-0.04
Spanish			2.240***	2.78	0.104	0.15
Belgian			-1.006	-0.75	-0.390	-0.33
Sunni			-0.939	-0.58	-0.471	-0.35
Shia			-1.696	-0.98	-1.377	-0.93
Catholic			-0.154	-0.09	-0.402	-0.28
Protestant			-0.434	-0.25	-0.528	-0.36
Orthodox			-0.279	-0.15	-0.461	-0.29
Hindu			0.676	0.37	0.088	0.06
Buddhist+			1.241	0.70	1.003	0.66
Indigenous			-1.000	-0.57	-0.451	-0.31
Abs. Lat.					-0.005	-0.35
Frankel-Romer					-0.384	-1.53
Constant	13.153***	6.72	16.298***	6.17	17.158***	5.57
N	7724		7724		7280	

Table 6.13: RE2GSLS results for models with WAVE and PILAG as instruments. PPP-adjusted GDP per capita growth as dependent variable. Second-stage regressions with 2-year lag on independent variables. Long sample.

be driven by the particular specification chosen.

By applying many different models, one does not "hide" some of the uncertainties related to conducting statistical analysis on a topic like the effect of democracy on economic growth. There is, for example, no consensus in the literature on some of the following questions: Should we include cross country variation, or should we control for country-specific factors, as we do in fixed effects? Should we estimate the relationship by assuming linear relationships, or should we rather rely strictly on "local" comparisons, as in matching? Are endogeneity problems grave enough to use the less efficient 2SLS analysis rather than single-equation methods? Which variables should we control for? When estimating the effect of democracy on economic growth, should we include subjective measures of political rights and civil liberties as we do in Freedom House when measuring democracy, or should we rely strictly on observable institutional structures?

Since no one is likely to come up with definite answers to these questions, there is a gain from testing several specifications. When applying a specific method, model and operationalization, one implicitly conduct an "if-then" analysis, basing the estimation on a set of specific assumptions. The quote from Montgomery and Nyhan (2010) below underlines an analogous point about uncertainty and model selection, but in the more particular case of which independent variables to include in one's model. Presenting one or two selected specifications produces a paper that is easy and simple to read, but also a fake sense of confidence in the results.[16]

> Political scientists who analyze observational data frequently encounter uncertainty about what variables to include in their statistical models. A typical researcher develops theory about a few key explanatory variables and then must choose from a set of possible control variables over which she has much weaker prior beliefs. In such cases, the appropriate set of control variables is often highly uncertain. As a result, researchers frequently estimate a variety of models before selecting one to include in the published version of their research. This practice leads to a number of pathologies. First, it understates our uncertainty about the effects of the variables of interest. . . Second, some researchers may search the model space until they find a specification in which a key variable is statistically significant, a practice that has led to indications of publication

[16]These authors argue in favor of a Bayesian model averaging method to deal with the problems related to uncertainty of appropriate model selection. Here, I have rather presented several robustness checks, based on various assumptions. Further analysis along the suggested lines of Montgomery and Nyhan (2010) would be a natural extension of the work conducted here in future research.

bias in top journals (Montgomery and Nyhan 2010, 246).

After having described the results from a vast amount of model specifications in this chapter, the biggest question marks related to the conclusion that democracy is good for growth are related to potential endogeneity and omitted variable bias problems. This is underlined by the fact that the 2SLS analysis based on the short sample and the fixed effects models also controlling for decade-specific effects were the analyses that provided the least clear-cut results. The endogeneity and omitted variable bias problems will therefore be important topics to further address also in future research. Nevertheless, the bulk of statistical evidence presented in this chapter, also from several models that incorporate country-fixed effects and account for the endogeneity of democracy, more or less points in one direction: democracy as a regime type seems to be beneficial for economic growth.

6.6.2 Revisiting the discussion on why democracy affects growth

The most extensive analysis above were based on samples that extended back to 1820. However, as De Long and Shleifer (1993) show, there was likely a positive economic effect from being a polity with guaranteed political and civil liberties also well before 1820. The leading economy of the 15th century, Venice, was characterized by a relatively liberal polity, and a republican government (Maddison 2006, 2007). The leading economy of the 17th century, the Dutch, also had a relatively liberal polity, when compared to other polities of its time. There are good reasons to believe that the relative dispersion of popular control over collective decision making in these political units helped generate predictable business environments and entrepreneurial economies (North 1981; De Long and Shleifer 1993).

As described in Chapter 3, also North (1981), North and Weingast (1989) and North (2000) convincingly show that power dispersion and a higher degree of political equality, with at least some groups of citizens being able to influence politics, had a positive effect on economic performance before the 19th century. These studies show how the lack of absolute monarchic rule in the UK after 1688 helped generate, among other things, better functioning financial markets and more public revenue for use on public goods (and war-making), as private actors found the government's promise of not defaulting on its debt more credible. In countries with a stronger monarch, like Spain and France, such promises were not credible. This lead to thinner financial markets and fewer available resources for the government to use on public goods.

Recently, with the rise of China, Russia's resurgence, and the financial crisis hitting the US and Western Europe, some analysts have asked whether we are leaving the era of democracy and entering a new golden age of autocracy (see e.g. Freeland 2008; Gat 2007). However, as discussed in Chapters 1 and 3, the notion that democracy undermines economic growth is far from novel; it has been, and still is, dominant in several academic and policy circles. In other circles, the notion that democracy does not matter much for economic outcomes dominates. Both these positions are most likely wrong. Not only this study, but also other recent studies, report a positive effect of democracy on growth (see e.g. Baum and Lake 2003; Papaioannou and Siourounis 2008; Doucouliagos and Ulubasoglu 2008). Like this study, these other recent studies often stress that the effect of democracy is not direct, as democracy enhances growth through affecting particular policies, most particularly policies that enhance human capital accumulation (e.g. Lake and Baum 2001; Baum and Lake 2003; Lindert 2005; Stasavage 2005), or even through affecting other institutions, like those that regulate private property rights protection (North 1990; Olson 1993; Leblang 1996; Clague et al. 2003; Gandhi 2008; North, Wallis and Weingast 2009; Knutsen 2011*b*).

Many previous studies have *controlled for* human capital proxies or property rights protection, thus also taking out of the analysis some of the likely most important channels through which democracy enhances growth. Understanding that democracy is a "meta institution" (Rodrik 2000), as argued in Chapter 3, is vital for constructing models that allow us to estimate the total effect of democracy. This point is often misunderstood; a quite standard argument is that it is rather property rights protection, a well-functioning investment environment, low corruption and a good education system that matter for growth, and not democracy per se. Dictatorships can also put in place these features, it is argued, and democracy is therefore of no further economic importance (see e.g. Barro 1997; Leftwich 2000).

However, even if it is *possible* for dictatorial countries to provide good business environments that reduce corruption and protect property, this happens relatively seldom in practice, with the East Asian Tigers being among the few exceptions (see e.g. Wade 1990; Evans 1995; Przeworski et al. 2000; Knutsen 2010*b*). Moreover, although some dictatorships, like for example 19th century Prussia (see Lindert 2005; Clarke 2006), provide high-quality school systems with broad coverage, more open political systems are in general more conducive to the provision of high-quality education systems (Lindert 2005). Good business climates and high-quality education systems *can* exist in dictatorial systems, but they tend not to. This is likely one main reason for why the models above, based on very extensive data samples, find

a positive net effect of democracy on growth.

In Chapter 5, I focused in particular on how democracy is superior to dictatorship when it comes to generating policies that enhance technological change, and thus higher long-run growth rates. When comparing estimates obtained from structurally similar models on TFP growth from Chapter 5 and GDP per capita growth from this chapter, one may conclude that democracy's effect on TFP growth is a vital component in explaining democracy's net effect on GDP per capita growth. The size of the PI point estimates in the TFP growth models are typically about $\frac{3}{4}$ the size of the PI point estimates in the GDP per capita growth models. For example when I consider estimates on TFP growth based on the long sample, the OLS with PCSE Model II using a 3-year lag on independent variables (Table 5.8) yields a PI coefficient of 0.029. The structurally similar model on GDP per capita growth (in Table D.10) yields a PI coefficient of 0.036.[17] In other words, the positive net effect of democracy on economic growth is, seemingly, to a large extent a function of democratic regimes' superior abilities in enhancing efficiency in the use of resources, among others through developing, absorbing and adapting new technologies.

Hence, the focus on democracy's effect on growth via enhancing property rights protection and human capital in the literature needs to be supplemented by discussions on democracy's effect on enhancing innovation and diffusion of technologies. However, the results presented in Chapter 5 and in this chapter do not imply that for example democracy's effects on economic growth through affecting property rights are negligible. Rather, as Figure 3.6 in Chapter 3 indicates, property rights protection affects growth to a large extent by increasing efficiency and generating incentives for innovative behavior (see e.g. Romer 1990; North 1990).

In any case, democracy affects technological change and increases efficiency in the long run. Moreover, despite the mixed results on democracy and human capital in Chapter 5, there are strong indications that democracy also enhances human capital formation (e.g. Tavares and Wacziarg 2001; Baum and Lake 2003; Stasavage 2005; Lindert 2005; Acemoglu and Robinson 2006*b*). Thus, one may at least conclude with a relatively high degree of certainty that democracy enhances growth through affecting knowledge-related factors.

[17] It should here be noted that although the models are structurally similar, the samples used in the estimation procedures are different. More specifically, the models with TFP growth as dependent variable, based on the data from Baier, Dwyer and Tamura (2006), contain fewer observations than the models with GDP per capita growth as dependent variable, based on the data from (Maddison 2006).

6.6.3 Has the effect of democracy on growth changed over time?

Interestingly, the positive effect of democracy on knowledge-related factors points to the possibility of a time-contingent net effect of democracy on economic growth. More specifically, the positive effect of democracy on growth may have increased in recent decades. I discuss this hypothesis in depth in Knutsen (2011*a*). Here, I will only provide a brief summary of that discussion:

A large literature has discussed whether knowledge-related factors are becoming relatively more important for economic growth, whereas physical capital accumulation is losing its relative importance (see e.g. Florida and Kenney 1993; OECD 1996; Houghton and Sheehan 2000). This may, for example, be due to the nature of specific sectors that have become increasingly important (as a share of global GDP) over the last decades, like information technologies and biotechnology. Others have argued more generally that the nature of production, across the board, is changing in a direction that requires less standardization and more flexibility and expert knowledge (e.g. Hirst and Zeitlin 1997). This may imply an increasing relative importance for human capital, and decreasing relative importance for physical capital. This proposition is also backed up by empirical studies investigating the sources of growth, and their relative importance over time (e.g. Galor and Moav 2004; Goldin and Katz 2001). Historically, the leading country of the first industrial revolution, Great Britain, was at the time one of the laggards in education among Western European countries (Lindert 2005). However, the premium to human capital investment has likely risen over time, as production technologies have changed. More complex production technologies are likely complementary to a high human capital level because of various reasons (see e.g. Kremer 1993*a*), and the operation of complex equipment and the organization of production processes that are divided into a large number of tasks may even *require* skilled professionals. If economic growth depends more and more upon diffusion of technology and the workforce's skills rather than accumulation of physical capital, democracy's growth advantage may be increasing (see Knutsen 2011*a*).

There is at least one additional reason for why one may expect that the positive effect of democracy on growth is larger today than it was before circa 1980 (again, see Knutsen 2011*a*). As seen in Chapter 5, dictatorships may generate higher, or at least not lower, domestic savings rates than democracies. In an open economy, there is no necessary relationship between savings and investment, although the correlation has been high historically (Feldstein and Horioka 1980). With the integration of global

capital markets and increased cross-border mobility of capital, the link between domestic saving and investment may be weakening (see e.g. McGrew 2008). This may, as noted in Chapters 1, 3 and 5, also impact on the effect of democracy on growth. The expansion of FDI has been tremendous, at least since 1980 (see e.g. Blonigen 2005), and countries with low savings rates, like the United States, can mitigate capital scarcity through attracting foreign capital. Foreign investors are likely to invest where expected profitability is high and risk is low (see Hveem, Knutsen and Rygh 2009; Knutsen, Rygh and Hveem 2011). As discussed in Chapter 5, the institutional and policy determinants that enhance FDI may not be similar to those increasing domestic saving. For example, low corruption and strong protection of property rights attract FDI (see e.g. Blonigen 2005; Asiedu, Jin and Nandwa 2009; Hveem, Knutsen and Rygh 2009), and democracy, at least when consolidated, enhances both control of corruption and property rights protection (e.g. Clague et al. 2003; Rock 2009*a*; Knutsen 2011*b*). Thus, as shown in Chapter 3, several studies find a positive effect of democracy on FDI. The increasing importance of FDI and the combination of dictatorship's savings advantage and democracy's FDI advantage, implies that the perhaps most important growth advantage for dictatorship has likely been reduced over the last decades.

If FDI and knowledge related factors have lately increased in economic importance, one should expect that democracy has had a stronger positive effect on growth in later decades than in previous. In Knutsen (2011*a*), using similar panel data analysis as in this chapter, I find relatively robust evidence for the proposition that democracy's effect on economic growth has increased after 1980, when compared to the period from 1820 to 1980. This does not mean that the effect was negative or zero before 1980; several models find both a positive effect of democracy from 1820 to 1980, and an extra boost in the effect after 1980. Summing up, political equality and popular control over public decision making ('democracy'), may have become increasingly important for economic growth over the last three decades. However, it has likely had positive effects on economic growth long before that.

6.7 Concluding remarks

Experts on East and Southeast Asian politics have often concluded that authoritarian rule is the best prescription for achieving economic growth and development, and that democracy is to be viewed as some kind of luxury good. Amartya Sen puts it best:

> [A] great many people in different countries of the world are systematically denied political liberty and basic civil rights. It is sometimes claimed that the denial of these rights helps to stimulate economic growth and is "good" for economic development. Some have even championed harsher political systems – with denial of basic civil and political rights – for their alleged advantage in promoting economic development (Sen 1999, 15).

The idea is that you should first go about fulfilling the economic needs of the populace, and then maybe at a later stage grant the people political and civil rights and liberties. Authoritarian regimes are in the eyes of these observers necessary to curb consumption, and thereby increase savings and investments. Moreover, authoritarian regimes are necessary in order for the state to have some autonomy from particularist interest groups that lobby for their own benefit at the expense of society in general. And who other than strong autocrats could push through painful reforms? The South Korean, Singaporean and now Chinese near histories seem to be the ultimate empirical evidence for these hypotheses.

But, as Przeworski et al. (2000) rightfully claim, in order "to assess the impacts of political regimes, we must examine their full record, not just the best performers" (Przeworski et al. 2000, 4). In Knutsen (2010*b*), I show that there is no positive effect of dictatorship on growth, even in Asia (see also Rock 2009*b*). Moreover, the growth record in African (see Knutsen 2009) and Latin American dictatorships are not as impressive as for some of their Asian counterparts; even the Chilean growth record under Pinochet, which Rodrik (1997*a*, 2) calls "exhibit number two" for the claim that authoritarianism is growth-enhancing, is matched by the growth record under later democratic Chilean governments. There *are* modern-day examples of dictatorships that have experienced rapid economic growth over *some* period of time, such as for example China from 1979. However, as Olson (1993, 572) notes, there are no historical examples of dictatorships with strong concentration of power growing economically, relatively uninterrupted, over a *longer* period of time, as democratic countries such as the United States and Sweden have done.

This chapter was a purely empirical chapter. The chapter contributes to the already large existing body of empirical research among other things through using a very extensive data set, indeed the most extensive in the literature. The statistical analysis conducted here generally finds that democracy has a positive and significant impact on economic growth. Our best guess should therefore no longer be that democracy has no systematic effect on economic growth, as many prominent researchers have proposed. Democracy seems to increase growth in GDP per capita,

and many academics and policy makers should start reevaluating their beliefs about the economic effects of democracy.

Chapter 7

The varying economic performances of dictatorships

This chapter discusses explanations for why dictatorial countries vary so much in terms of economic performances. First, a formal model is developed, and its main implication is that dictatorial regimes facing mainly external security threats are more likely to generate economic development-enhancing policies than dictatorial regimes facing mainly internal threats. This insight is used in a two-step explanation of why African dictatorships have generated so poor economic policies and outcomes, particularly relative to several Asian dictatorships after 1960. The second step of this explanation is based on a model of the Organization of African Unity-based international security regime in post-colonial Africa, which mitigated the external security threats to African leaders. Finally, the chapter presents empirical evidence showing that specific types of dictatorships systematically generate quite different degrees of private property rights protection. Some dictatorship types, like multi-party authoritarian regimes and military regimes, are detrimental to property rights protection, whereas others, like dictatorial monarchies, protect property rights approximately on par with democracies.

7.1 A model of security threats and economic policy

7.1.1 Are varying economic performances the result of some dictators being tyrants and others enlightened rulers?

In "Politics", Aristotle claimed that enlightened monarchy was the best government under ideal conditions (Aristotle 2000). But, monarchy easily slides into tyranny. Aristotle thus concluded that more "balanced" forms of government than those based on one-person rule are safer, as they more often provide decent policies and outcomes under different contexts. Aristotle's insight has strong empirical support when it comes to economic performance: dictatorships exhibit far more variation in their economic performances than democratic regimes do (e.g. Przeworski et al. 2000; Besley and Kudamatsu 2007). Indeed, Rodrik (2000, 2008) finds that there is both higher between-nation variation and higher within-nation variation over time for dictatorial regimes than for democratic regimes.

The result that dictatorships have more varied economic performances than democracies is thus already well established in the literature. However, I performed another empirical test to corroborate or contest this result, with real GDP per capita growth as an indicator of performance. More specifically, I conducted a Goldfeld-Quandt test of heteroskedasticity (see Greene 2003, 223–224) on the short time series sample described in Chapter 4. I used the FHI as democracy measure, and controlled for log GDP per capita, log population, log regime duration and the dummies for region, plurality religion, colonizer and decades. The country-years were further divided according to their scores on the FHI. To be precise, a country-year is scored as democratic if $FHI \leq 3.5$.

The Goldfeld-Quandt test shows that dictatorial country-years have far higher variation in growth rates than the democratic country-years have, and this result is significant at the 0.01%-level. The result is robust to choice of threshold on the FHI for a country-year being considered democratic. The result also holds up when using the PI rather than the FHI.

The result from the test above is not surprising. In recent history, as seen from Figure 1.1, there have been dictatorial growth miracles, such as the East Asian Tiger countries. However, there have been even more dictatorial growth disasters, like Zaire, discussed in Chapter 1, and Myanmar. This section takes the large variation in economic performances between dictatorial regimes as a starting point,

and further asks *why* dictatorships' economic policies and performances vary so much.

Aristotle focused on the personal characteristics of rulers when differentiating between monarchy and tyranny. As noted in Chapter 3, Jones and Olken (2005) provide solid empirical evidence for the hypothesis that dictators' personal characteristics matter for economic growth. However, more systemic factors are at least equally important in explaining the divergence between different dictatorships. Below, I show that even if all rulers are self-interested and motivated by staying in office, some will pursue economic development-enhancing policies, while others pursue policies that lead to developmental disasters. Self-interested rulers choose different policies in different contexts; what seems like an "enlightened monarch" may very well be a self-interested dictator.

In this section, I argue that an external security threat, more particularly a regime ruling another state with a possible intention and a capability of threatening the domestic regimes' political survival through military invasion, induces self-interested dictators to produce development-enhancing policies. Dictators who mainly face internal security threats, like democratization movements or contending domestic elites, are less likely to conduct development-enhancing policies.

Section 7.1.2 presents a literature review and a qualitative sketch of this section's argument. Section 7.1.3 discusses several historical cases that illustrate and support the main argument, including a quasi-experimental study on how the Kuomintang changed policies when moving their main base from mainland China to Taiwan. Section 7.1.4 provides a formalization of the argument. Before I sum up the analysis, Section 7.1.5 presents additional empirical implications from the model, based on comparative statics analysis.

7.1.2 Literature review and the basic argument

Why do some dictatorships turn out to be growth miracles, whereas others turn out to be growth disasters? One explanation is that dictatorship as a category includes several distinct political regime types with various institutional structures, ranging from absolute monarchies to one-party states to military regimes (Hadenius and Teorell 2006).[1] Institutional differences between different dictatorships again matter for economic policies and outcomes. This will be further illustrated by the empirical analysis on dictatorship types and property rights protection in Section

[1]See also, for example, Linz and Stepan (1996); Wintrobe (1998); Przeworski et al. (2000); Gandhi (2008).

7.3.

One important question is whether there are institutions in place that constrain the actions of the dictator and his nearest clique, for example a relatively independent judiciary, a rule-following bureaucracy, or even a strong party apparatus. As noted multiple times above, my own empirical results from a previous paper for example indicate that the existence of well-functioning and relatively independent state bureaucracies is very important for dictatorial regimes' propensity to generate economic growth (Knutsen 2009). Institutional variation among dictatorships can thus contribute to explaining the large variation in economic outcomes.

However, actors in power can build, reshape or restructure institutions, at least in the long run. Due to power concentration in dictatorships, institutional structures are not as difficult to change for dictators as they are for democratic governments. The "logic of organizational proliferation" is considered one of three main dictatorial survival strategies by Haber (2006). This strategy involves building new organizations that counter the influence of existing ones. In other words, bureaucracies, courts and other institutional structures can be restructured, strengthened or weakened by the political elite to suit their preferences. In the framework developed below, rational dictators engage in different survival strategies, including the shaping and reshaping of institutions. Institutions are therefore partially a function of the type of security threat facing the regime, if one invokes a sufficiently long time horizon. For example, trying to enhance the "Weberian" characteristics of the state bureaucracy may be spurred by the need to deter a foreign enemy. Let me, however, return to the literature, before I present the main argument.

The political economy literature has generated multiple models where dictators in self-interest promote economic policies that lead to poor macroeconomic results. Generally, dictators may because of preferences for private consumption or political survival have incentives to take actions that have negative consequences for their national economies. This issue, and the literature, was also discussed in Section 5.4 and in Chapter 3. I will, however, reintroduce some of the most important models also here:

In Robinson's (2001) and Acemoglu and Robinson's (2006) models, dictators also maximize discounted utility from consumption. In these models, public investment and economic development strengthen opposition groups and reduce leaders' survival probability. Leaders therefore reduce the overall size of the economy, among others through cutting public investment. The core argument is that "while [capital] accumulation may increase total income, it may induce institutional transition which is unfavorable to the autocrat. If a dictator loses political power then he does

not gain from development and will oppose it. Thus a dictator may wish to slow accumulation" (Robinson 1998, 24). Dictators have extra strong incentives to under-invest in public goods in natural resource rich economies (Robinson 2001). Bueno de Mesquita et al. (2003) assume that political leaders are motivated by surviving in office, and show how dictators with small winning coalitions, especially when combined with a large selectorate, under-provide growth-conducive public goods.[2] For these leaders, it is rational to rather redistribute resources as private goods to their relatively small winning coalitions. Wintrobe's models (Wintrobe 1990, 1998) highlight that certain power-motivated dictators invest heavily in repressive capacity, which distorts public resources away from more productive projects.

Hence, in the models above rational dictators concerned with maximizing private consumption or probability of political survival follow policies that are detrimental to overall economic performance. The notion that dictators may reduce internal security threats by promoting "bad" economic policies, which is acknowledged by the above contribution, is core to the argument of this section.

Most dictators have historically presided over economically stagnating countries, which contrasts with the decent growth record of most democracies. However, a few dictatorships have had very high growth rates. What is the explanation of this empirical trait? Below, I argue that external security threats may induce dictators to pursue "good" economic policies.

However, there are situations where also dictators facing internal security threats have incentives to promote good policies. The perhaps most obvious example is when dictators' survival depend strongly on legitimacy in broader population segments, for example because of a large probability of popular revolution. Economic crises dramatically increase the risk of regime breakdown (Przeworski and Limongi 1997). Overland, Simmons and Spagat (2000) present a model where regime breakdown in dictatorships are more likely in times of economic crisis. A rational dictator with weak hold on power would, given this assumption, have incentives to generate economic growth in order to survive. However, there is a difference between avoiding sudden, short-term recessions, which may lead to revolutions (see Davies 1962), and generating sustained economic growth over the long term. Growth over many years, of course, alters the level of income dramatically. Empirically, a high level of income may be conducive to democratization (Boix and Stokes 2003; Hadenius and Teorell 2005), although this result is not robust (Przeworski and Limongi 1997; Acemoglu et al. 2008). A dictator may thus reduce his own probability of surviving in the long

[2]As described in Chapter 3, a winning coalition is the set of actors a dictator relies on to stay in office. The selectorate is the set of actors that may potentially be part of a winning coalition.

run, if he produces consistent growth. This is recognized in for example Robinson's (2001) model. The model in Bueno de Mesquita and Smith (2009) indicates that due to conflicting mechanisms, the economic policy response to a revolutionary threat may be non-linear. Moreover, the policy response may depend on access to natural resources or aid.

There are other arguments for why some dictatorships generate good economic policy: Besley and Kudamatsu (2007) show that when a winning coalition is relatively autonomous from the dictator, it may chose to pressure the dictator into promoting growth-enhancing policies. One-party regimes with relatively strong party apparatuses and weak leaders, such as present-day China, are examples of such regimes. As Bueno de Mesquita et al. (2003) point out, dictators with relatively large winning coalitions, and especially if they have relatively small selectorates, may also follow growth-conducive strategies.

However, the size and autonomy of winning coalitions may to a certain extent be endogenous. The decision to broaden the winning coalition through including new groups and the decision to build autonomous strong organizations, for example a bureaucracy dealing with industrial planning or an efficient army organization, may be spurred by the need to deter a foreign enemy. As Doner, Ritchie and Slater (2005) show, the East Asian Tigers' geopolitical context with severe external security threats was an important reason why these regimes extended their winning coalitions by offering side-payments to broad population segments. The external threat situation these countries faced was also a likely reason for why they institutionalized their state apparatuses in the way and to the extent they did.

Let me now turn more directly to this section's argument: A dictator may face not only internal, but also external security threats. Furthermore, dictators are often strongly motivated by survival in office. As Wintrobe (1998) correctly points out, dictators have heterogeneous motivations. However, staying in office is generally a major concern, partially because many other potential objectives like money, fortune and fame, the promotion of specific interest groups' welfare, and realization of ideological vision depend positively on holding office (see Bueno de Mesquita et al. 2003). A rational dictator therefore evaluates the consequences for political survival when choosing policies.

Hence, economic policies can to some extent be analyzed as political survival strategies. More specifically, the optimal survival strategy when facing a foreign (external) security threat may likely include strengthening the industrial, administrative and ultimately military capacity of the country. Dictators who face external security threats want to build up military capacity to fight off or preferably deter

attacks from foreign adversaries, since a foreign invasion often leads to the demise of the ruling dictator (Bueno de Mesquita et al. 2003). In order to have a strong fighting force, the dictator needs to develop the national economy through industrialization, promotion of technological innovation and diffusion, development of a well-functioning bureaucracy and investments in public infrastructure. Thus, dictators who mainly face external security threats are likely to pursue "developmentalist" economic policies.

Dictators facing mainly internal security threats are not equally eager at pursuing good economic policies. The literature reviewed above indicated that promoting bad economic policies may be good politics for the dictator, as it may reduce the severity of internal security threats. If the dictator's largest threat to staying in power is an aspiring democracy movement, he may rationally choose policies that negatively affect economic development. For example, as the highly educated tend to be among those with the strongest democratic values (Lipset 1959; Inglehart and Welzel 2006), a rational survival-oriented dictator may want to harshly regulate and limit the content of and access to education.

The argument can be generalized to other internal threats than democracy movements. Expropriating the property of potential opponents, pursuing clientelistic practices and investing heavily in a repressive domestic security apparatus may mitigate internal threats. However, all of these strategies have negative economic effects. Conversely, granting free speech and freedom of media may increase the opposition's strength and coordination abilities. Therefore, as described in Chapter 5, dictators crack down on civil liberties. Restricting civil liberties reduces the diffusion of new ideas and technologies into and within the economy, and dictatorships thus have slower technological change-induced economic growth, as evidenced by the analysis in Chapter 5. One interesting example discussed in that chapter relates to communication technologies like the internet and cell phones, which may generate vast economic opportunities. However, as these tools also increase internal security threats, they are often heavily regulated in dictatorships (see e.g. Hachigian 2002).

The argument above will be clarified below through a formal model, but let me first present some illuminating historical examples.

7.1.3 Empirical illustrations of the security threat argument

External security threats

Bueno de Mesquita et al. (2003) argue that for most dictators, the threat from

within is more severe than the threat from abroad. However, the severity of external security threats varies greatly; some dictators have historically had better reasons to fear being toppled by an external enemy than others.

The argument that external security threats may generate incentives for development is not novel. Tilly (1975) argued that the security climate in Europe, with constant threat of warfare, was one of the main reasons for why this continent modernized when countries elsewhere did not (see also e.g. Mokyr 1990, 209–238). Crucial in this process was the development of state institutions that allowed regimes to wage wars efficiently, but which also had positive long-run effects on economic development. As Bueno de Mesquita et al. (2003) recognize, when a state loses in war, its leader's probability of losing office increases. Leaders may thus build institutions and conduct specific economic policies to reduce the probability of losing office through losing in war, which generates economic welfare for citizens as a by-product.

One regime with incentives to modernize its country because of external security threats was Prussia's Hohenzollern dynasty. Prussia faced hostile states on several borders throughout much of its history (Clarke 2006). Being endowed with less manpower than many of its enemies, Prussia's Kings had incentives to modernize the bureaucracy and streamline tax-collection, in order to establish an efficient fighting force. Later, the development of mining, heavy industrialization and the railway served the same purpose. As Boix (2003, 218) recognizes, "the need to modernize to prevent neighbours from amassing resources to defeat them in future wars" generates strong incentives for political elites to industrialize.

Several of the best economic performers that industrialized after WWII were small, Asian autocracies that arguably faced severe threats from larger military powers with an eye to occupying or sub-ordering them. Taiwan faced a hostile China, South Korea faced a militarized North Korea and Singapore had its more populous neighbor Malaysia. For these regimes, building military capacity was important to deter neighbors from attacking. A strong and modern military apparatus requires a relatively developed economy and effective state institutions. Thus, external security threats provided incentives for these Asian regimes to develop their economies and state institutional apparatuses (Woo-Cummings 1998; Doner, Ritchie and Slater 2005). As Doner, Ritchie and Slater (2005) note, these incentives were strengthened because of these countries' lack of natural resources. The argument that natural resources reduce a dictator's need to develop his economy (and thus perhaps enhance internal threats) in order to fight external threats will be discussed in Section 7.1.5.

The "Meiji-restoration" in Japan started in 1868, with the removal of the feudal

Tokugawa rule. Although the new regime was more liberal than the previous, it was still at least semi-authoritarian. The biggest threat to the new government came not from within Japan, but from Western countries. Japanese leaders feared that Japan would be colonized, or at least subjected to strong political influence from foreign powers. The so-called "unequal treaties" imposed on Japan by the Western powers were disliked, but they were feared to be only the first step towards Western domination over the country. How could the regime guarantee Japan's, and thus its own, continued existence? The answer to Japanese leaders, including Prime Minister Ito Hirobumi (Murphey 2000, 308–309), was modernization and economic development. The leaders "were quick to realize that if Japan was not to become a colony or semicolony like the rest of Asia, it would have to adopt Western technology. . . Japan also saw that military technology could not be separated from overall industrialization" (Murphey 2000, 304–305). The Japanese political elite promoted industrialization through various active industrial policies, enhanced technological diffusion through increased economic openness, and engaged in the building of competent political and military organizations.

Another illuminating historical example is the regime of Peter the Great, who around 1700 presided over early modernization efforts in Russia. This process involved the deliberate reshaping of the Russian bureaucracy and fiscal structures, and efforts to improve the Russian educational system. These policies arguably increased prosperity at least in parts of the country. The main motivation for Peter to "partially dismantle the patrimonial state", according to Pipes (1995), was to improve the organizational capability and fighting strength of the Russian army so that it could fight off future attacks from richer European neighbors and expand the Russian empire. Russia bordered several less populous states to its West, but had nevertheless suffered military defeats to these countries. As a response, "Russia launched a process of internal reform ... First to be reformed was the army. But it soon became evident that the mere copying of western military techniques was not enough, because the more fundamental sources of the west's strength lay in the social, economic and educational base; this too then had to be emulated" (Pipes 1995, 113). Peter wanted a large standing army to fight external enemies, but "[f]or a country as poor as Russia, the maintenance of such an armed force represented an immense burden. To enable it to carry the load, Peter had to re-vamp the country's fiscal, administrative and social structures, and, to some extent, transform its economic and cultural life as well" (Pipes 1995, 120). Hence, it was to a large extent the threat from Western countries that spurred the early modernization efforts in Russia.

Internal security threats

Mobutu Sese Seko once infamously claimed, when addressing then Rwandan President Habyarimana on RPF guerrillas threatening Habyarimana's regime, that "I've been in power in Zaire for thirty years, and I never built one road. Now they are driving down your roads to get you" (Sundstøl Eriksen 2003, 4). It seems that Mobutu was well aware of the threats to his power stemming from different guerrilla groups in the Zairian periphery, and how these threats could be enlarged by investing in public infrastructure. Needless to say, the lack of infrastructure in Zaire negatively affected the economic prospects of that country.

However, survival strategies are not restricted to infrastructure investment and other types of public investments. Survival strategies can also relate to restricting economic openness, as for example is the case in Kim Jong Il's North Korea. North Korea is sealed off socially, politically and economically from the outside world. While such isolation policies probably are constructed with an eye towards prolonging the Kim Jong Il's regime, they are ruining the economy (Nanto 2006).[3] Foreign ideas and influences (often Western) are generally feared by many dictators, among other things because they often entail notions about democracy and human rights. Dictators are therefore often willing to restrict the flow of information into the country by enforcing bans on internet usage and cell phones. Such restrictions on information technology again negatively affect diffusion of ideas and technology conducive to economic growth, as was discussed intensively in Chapter 5.

Many of the worst-performing economies in the post-colonial era have been African dictatorships. As I will illustrate in Section 7.2, African dictators have not had to fear external invasion as much as internal groups seeking to grab political power. The main threat to most of Africa's strongmen has come from within the juridical borders of their own states. On a war-torn continent, only a small number of wars have been traditional inter-state wars (Lemke 2003), and "[I]n only one case did the direct invasion of one African state by another lead to the overthrow of the regime in power and its replacement by a government acceptable to the invading state. This was the Tanzanian invasion of Uganda" (Clapham 1996*a*, 123). The Organization for African Unity (OAU), as I will discuss in depth below in Section 7.2, contributed strongly to the non-intervention policies followed by African rulers, by establishing explicit norms of non-intervention on the continent, by providing a coordination-forum for African rulers, and by multi-lateralizing

[3]Arguably, the Kim-regime also faces severe external security threats. However, North Korea has its nuclear arsenal, which gives it a "cheap" way of deterring foreign adversaries without having to modernize its economy and military.

African security policy. As argued in the next section, different African leaders may have had short-term incentives for invading neighboring countries, but feared that a breach of non-intervention norms would backfire by enabling other countries to later intervene in their own domestic affairs. Hence, the "African dictator's" most imminent security threats have not been external, but rather internal.

One particular survival strategy that has contributed to bad economic results in African dictatorships is African "Big Men's" extensive use of clientelism to maintain political control in the face of internal opposition (Chabal and Daloz 1999). Certain groups may be considered essential backers for a dictator in his quest to maintain power, and the allocation of private goods to these groups for political support is imperative (Bueno de Mesquita et al. 2003). A dictator may secure the continued support from such groups through what Haber (2006) calls the logic of co-optation. Co-optation could be achieved through the distribution of economic rents or the passing of specific policies that benefit one group at the cost of others. Clientelism may bolster the power of dictators, but it is harmful to the overall economy (see e.g. Miquel 2007), as experienced in Africa (Moss 2007).

Dictators who want to secure continuation in office, or who are interested in personal consumption, may also have incentives to violate or selectively enforce property rights, despite the negative macroeconomic effects (North 1990; Olson 1993). There is an especially strong incentive to violate the property rights of opposition groups or potential adversaries, as this may directly weaken these groups. Robert Mugabe's 2005 "clean-up" in the Zimbabwean capital Harare is a good example. Mugabe's government demolished the homes and shelters of about 700 000 poor, and moved many of them to the country-side (BBC News 2005). The government claimed that aesthetic reasons were behind the operation. However, most revolutions originate in the large cities, and particularly the capital. Mugabe had fewer disgruntled subjects in the capital to worry about, after the "clean-up", and was probably safer as a result.[4]

Summing up, a vast amount of specific survival strategies undertaken by a dictator and his backers may hurt the economy. For example, for dictators motivated by staying in office, "[g]enerating an entrepreneurial class with an interest in industrial transformation would be almost as dangerous as promoting the political organization of civil society. For predatory states, "low-level equilibrium traps" are not something to be escaped; they are something to be cherished" (Evans 1995,

[4]The insight that revolutionary threats often emanate from the capital may also be the reason why the North Korean regime forbids entry for North Koreans to Pyongyang without permit (Nanto 2006); this is a policy that arguably hurts economic efficiency.

248).

A quasi-experiment: Kuomintang and strategy change on the boat

The behavior of the Kuomintang, under the leadership of Chiang Kai Shek, before and after its defeat in the Chinese civil war highlights the mechanisms proposed above. The Kuomintang went from a situation in the mid-40s where it largely faced an internal security threat to a situation in the early 50s, where the main security threat was external. This constitutes a very interesting "quasi-experiment", since the same actor, the central elite in the Kuomintang, was operating in two different contexts.[5] One can therefore to a large extent exclude explanatory factors related to differences in actor capabilities, motivation and preferences, and isolate the variation that is due to change in security context. My model quite clearly predicts that the Kuomintang would engage in different survival strategies and conduct different economic policies in the two different contexts.

The Kuomintang, led by Chiang Kai Shek, was engaged in a bloody civil war with the Communists, led by Mao Tse Tung, (before and) after the Japanese occupation of China. As time passed, the Kuomintang was losing ground on the mainland to the Communists, and eventually retreated to Taiwan where the Kuomintang leadership established their new base. About 2 million Kuomintang supporters moved over the Taiwan Strait in the late 1940's, among them 600 000 soldiers (Roy 2003, 76). When the Kuomintang fought on the mainland, it was engaging an internal security threat. The Kuomintang controlled relatively large parts of China and could for analytical purposes be treated as a sitting regime facing an internal threat.

When the Kuomintang retreated to Taiwan the Communist threat changed from an internal to an external threat. The Kuomintang faced a possible security threat from Taiwanese inhabitants as well, illustrated by the fact that, at a point in time, approximately 500 000 people worked part-time as government informers on Taiwan (Roy 2003, 91). Nevertheless, the main security threat was perceived to be Communist China, with its armies on the mainland. This was especially true after 1951, since during the purges in the preceding years "the KMT crushed most of the potential leadership of Taiwanese nationalist movements; most of those activists not killed were co-opted by the party or forced to flee the island" (Roy 2003, 72).

How did the Kuomintang conduct its policies in the two different contexts? When

[5]One observation that casts some doubt on the claim that the Kuomintang example indeed functions as a quasi-experiment, is that some of the policies pursued by the Kuomintang, when based in mainland China, can be explained by the fact that the civil war was ongoing for much of the period, rather than by the existence of the internal security threat in itself.

based in mainland China, the Kuomintang "had been largely predatory, based on rent-seeking" (Cho and Kim 1998, 137). The Kuomintang's officers and officials were notoriously known for their corruption, stealing and looting, which were perceived as the best way to provide resources to fight the Communists in the civil war. It was a strategy for the short term, but it also made sense since it did not build economic capacity that could later be utilized by the Communists if they should gain control over it. After the arrival of Kuomintang troops on Taiwan in 1945, they "were expected to make their living by scrounging and plundering among the local civilian community, following the pattern of Chiang[Kai Shek]'s armies on the mainland" (Roy 2003, 59). And so they did, as even doorknobs were stripped off buildings. The looting was in some instances also very organized, and in some cases, whole factory plants were dismantled and sent to mainland China. Weak protection of property rights thus characterized the Kuomintang's rule of both Taiwan and the mainland around 1945.

Chiang Kai Shek assigned the rule of Taiwan to one of his commanders, Chen Yi, whose administration became "infamous for its widespread corruption and nepotism" (Roy 2003, 61). The economy was also organized through state-run monopolies in several sectors, allowing the Kuomintang to extract the maximum share of the generated income. In these early days, the internal security threats in Taiwan itself was larger than it would be a few years later, illustrated by the takeover of the nine largest cities in Taiwan in 1947 by more or less organized crowds of Taiwanese inhabitants (Roy 2003, 68). Kuomintang armies had to be sent from the mainland to eventually crush the uprising.

The Kuomintang's economic strategies some years later might therefore look as a puzzle to many observers of the regime's earlier economic policies. However, they are perfectly understandable according to the logic of the argument presented here. "[B]y late 1948 it was apparent that the ROC regime would have to evacuate to Taiwan and make the island its new base. This involved a reversal of policy from stripping down Taiwan to building it up" (Roy 2003, 76). The reversal of economic policies in Taiwan is arguably among the largest turnabouts in economic policy in modern history. The "KMT enforced a series of reform measures with the purpose to reconstruct Taiwan as a base for the eventual recovery of the mainland. These measures included not only registration of the members of the KMT, strict application of discipline, consolidation of the central leadership for its renovation, but also economic reforms" (Cho and Kim 1998, 137).

Policies on land reform, industrialization and good education policies produced spectacular economic growth on the island in the 1950s and 1960s (Wade 1990), and

policies in all of these fields were conducted with an eye towards improving the fighting capacity of Taiwan (Dorn et al. 2005). "During the decades of 1950s and 1960s, Taiwan's primarily agricultural economy developed into a semi-industrialized economy, domestic consumption demand greatly increased, and unemployment faded as a serious problem. Through the 1950s, Taiwan's annual gross national product (GNP) grew at a rate greater than 8 percent. In the 1960s the growth rate rose to nearly 10 percent, while inflation was kept below 5 percent" (Roy 2003, 103).

Different industrial policies were put in place to boost export production in particular (Wade 1990). One reason was that exports would generate foreign currency that could be used to buy arms from abroad (e.g. Doner, Ritchie and Slater 2005). In the late 1960s and early 1970s, the US was preoccupied with Vietnam, and Taiwan also became more isolated diplomatically. Taiwanese leaders, as South Korean leaders facing the North Korean threat, responded with "efforts at military self-sufficiency through the development of domestic arms and related industries and, in the early 1970s, with heavy industrialization projects in steel, chemicals, metal, machine-building, plastics, shipbuilding, and electronics" (Doner, Ritchie and Slater 2005, 344). Although not all industrial policies were equally successful, quite a few were. For example the electronics industry in Taiwan blossomed, and this was likely, at least partially, a result of smart industrial policy.

Also a program of institution building was intentionally promoted by the Kuomintang leadership, underscoring the point that in the long run, institutions and institutional qualities are endogenous to the strategies of autocratic political elites. Chiang Kai Shek founded an institute for training party cadres in 1949, threw out incompetent or corrupt statesmen, and refurnished party structures and the bureaucracy. "These years of reform and reorganization saw growth in discipline, efficiency and morale" (Roy 2003, 81). A competent Taiwanese bureaucracy became vital for the island's economic modernization (Wade 1990; Evans 1995, 54–60), and Chiang Kai Shek was acutely aware of this.

Above, I argued that self-interested and power motivated autocratic elites will conduct different economic policies in different contexts, and more specifically in different security threat contexts. The fact that the same actor changed its economic policies from "predatory" to "developmentalist" with the change in security context, lends credibility to the argument developed above. The Kuomintang case can be interpreted as a quasi-experiment; one has the same actor combined with a clearly specified difference on the "treatment variable" (main security threat). Kuomintang faced internal threats both in Taiwan and on the mainland before the end of the civil war. The major security threat after the end of the civil war was the People's

Republic of China's (PRC) forces on the other side of the Taiwan Strait, an external threat. After the Korea war ended, the PRC's appetite for an adventure in Taiwan was temporarily low after taking losses in that war, and the US was at the time eager to guarantee the security of Taiwan's regime. Kuomintang officials could, however, not rely on a US security guarantee in the long run (Roy 2003), and needed to develop a modern and well-functioning fighting force of its own. This was gradually achieved, thanks in large part to the booming economy.

In conclusion, the greatly diverging economic policies followed by the Kuomintang before and after the exit from mainland China are well in line with the predictions from the argument above.

7.1.4 A formal model

In order to further clarify the argument presented above, I propose a fairly simple formal model with two time periods and three actors; A dictator, D, a domestic opposition, O, and a foreign government, S. I will not specify whether O will impose democracy or autocratic rule if it gains power. D has a simple utility function that depends only on personal power, or, more specifically, his probability to maintain control over government in period two, p:

$U_d = U(p)$, with $U'(p) > 0$.

Hence, I assume that D is motivated by holding office in the second period. O and S are motivated by taking over power in the country, but they are sensitive to the costs of fighting, c, with D:

$U_s = U(p, c)$, with $\frac{\partial U_s}{\partial p} > 0$ and $\frac{\partial U_s}{\partial c} < 0$.

$U_o = U(p, c)$, with $\frac{\partial U_o}{\partial p} > 0$ and $\frac{\partial U_o}{\partial c} < 0$.

It is reasonable to assume that the utility increase of gaining power in the country is higher for O than for S. As Machiavelli (1999) noted, holding on to foreign territory is costly and difficult business. I model this assumption through c, and for simplicity assume that the cost of contending power is positive for S and 0 for O.

Let me now model the economy. Industrial output, Y, is a function of public investment, g:[6]

$Y = Y(g)$, with $Y'(g) > 0$ and $Y''(g) < 0$.

It is D who invests in public capital. D can lend at free interest to invest in as much capital as he likes, given that he can repay after his revenue has been realized.

[6] As argued above, survival strategies are not restricted to the manipulation of public investment, so the g-variable can be interpreted more widely as policies that affect industrial output.

The economy also contains some natural resources, R, and these can be tapped directly by D without any further investments. The opposition, O, cannot obtain any income from the natural resources. The total output of the economy, W, is therefore given by:

$$W = Y + R \tag{7.1}$$

Regarding the distribution of output, I assume that D appropriates a fixed, and exogenous, share of industrial output, equal to α. The net income, I_d, for the dictator is then:

$$I_d = \alpha Y + R - g \tag{7.2}$$

The net income, I_o, for the opposition is:

$$I_o = (1 - \alpha)Y \tag{7.3}$$

The foreign government has an income, I_s equal to a fixed share, β, of the fixed foreign output Y^*:

$$I_s = \beta Y^* \tag{7.4}$$

All actors can convert their resources into fighting capabilities, given specified technologies of transforming income into arms and organizational ability. When it comes, for example, to a democratic opposition, "fighting capability" need not be interpreted militarily, but can also indicate how well O organizes effective non-military democratization challenges to D. The actor-specific technologies for transforming income are given by:

$F_d = F_d(I_d)$

$F_o = F_o(I_o)$

$F_s = F_s(\mu I_s)$

The amount of income that will be used to generate fighting capacity depends on the utility functions of the actors. In accordance with the utility functions posted above, O and D will choose to transform all their income into fighting capacity, since their only objective is to control government in the second period. For the sake of simplicity, I assume that S allocates a constant share of its income, μ, to military expenditures.

The probability of any one of the two groups (O or S) fighting for and winning power depends on the relative distribution of fighting power. This again depends on the relative income of D compared to those of the other actors, and on the form of the F-functions. The probability of O winning power after contesting it, P_o, and

the probability of S winning over D and overthrowing him, P_s, are given by the equations below:

$$P_o = P_o(\frac{F_o}{F_d}); P'_o(\frac{F_o}{F_d}) > 0 \tag{7.5}$$

$$P_s = P_s(\frac{F_s}{F_d}); P'_s(\frac{F_s}{F_d}) > 0 \tag{7.6}$$

I further assume that O and S cannot form a military coalition, and further that the probability of one of the contending actors (O or S) winning is independent of the other contending actor's actions. R, Y^* and the F-functions are exogenously given.

I thus have a game between the three actors. D moves first by setting his economic policies, g. Y is then realized. The three actors' incomes (I_x, where x denotes the specific actor) are then realized and subsequently transformed into fighting power, represented by F_x. O and S thereafter decide on whether they should contend power or not. O will always contend power since $c_o = 0$, but S will not always wage war, since $c_s > 0$. S weighs the expected utility of war against the costs before deciding whether to attack or not.

I make some restrictions on the game: Maximally one of the actors can grab power in the second stage. D cannot lose his office to both O and S, even if he loses to an internal revolt and an external invasion simultaneously. In the case of both O and S defeating D, O and S decide who is going to realize the spoils of victory through a coin-toss.

How do the probabilities of D losing power to O and S depend on the size of g, and the subsequently realized Y? First, let me consider P_s: Since Y^* is exogenous, and thereby also F_s, it is the military capacity of D that determines this probability. An increase in g increases Y, thereby increasing I_d, which again increases the military capacity of D. This makes it less likely that D will lose a war. When the probability becomes sufficiently small, $P_s \leq P^*$, the utility-maximizing foreign government will not wage war since the cost exceeds expected utility. D's probability of losing power to S as a function of g is illustrated in Figure 7.1.

When it comes to P_o, the sign of $\frac{\partial P_o}{\partial g}$ is not straightforward to establish. It partly relies on the specification of the military capability transformation functions. If the F-functions are concave, that is an increase in military capability is higher for the first dollars used, and O receives a small fraction of the national income, then it is likely that $\frac{\partial P_o}{\partial g} > 0$. Another and perhaps more appealing argument for the claim

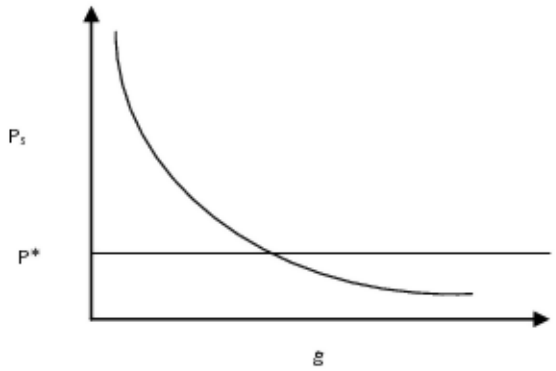

Figure 7.1: Dictator's probability of losing power to an external threat as a function of g

that $\frac{\partial P_o}{\partial g} > 0$ is that the probability of democratization increases with industrial output. A higher Y, resulting from a higher g, leads to the democratic opposition improving its effective organizational capability relatively more than D's increased ability to suppress. If O is a democracy movement, a higher Y will likely broaden the movement's base, and maybe also deepen the commitment of those involved (e.g. Inglehart and Welzel 2006).

A more technical argument is that $Y(g)$ is concave, whereas the cost of providing more g is linear. At a high level of g, the returns from an increase in g becomes smaller for D (and also for O), but the marginal cost for D of providing g is constant. Additionally, if the regime controls a large base of natural resources, a higher Y will tend to even out the disparities in welfare between D and O, relatively. All these considerations would lead me to believe that $\frac{\partial P_o}{\partial g} > 0$. In words, an increase in public investment, with a subsequent increase in industrial output, will lead to an increased probability of O gaining power in period 2. Some of the arguments presented above, like the concavity of $Y(g)$, could perhaps also lead one to believe that $\frac{\partial^2 P_o}{\partial g^2} > 0$. Hence, D's probability of losing power to O as a function of g may look like the relationship illustrated in Figure 7.2.

External threat

If D faces only an external threat, D would according to the logic of this model increase g in order to increase Y, and thereby his fighting capability. D would

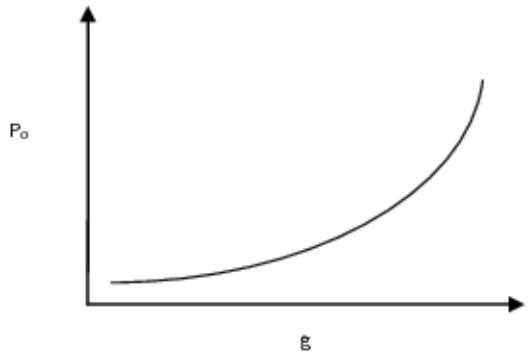

Figure 7.2: Dictator's probability of losing power to an internal threat as a function of g

at least increase g until he reaches P^*, given that D has full information.[7] The sub-game perfect Nash-equilibrium of this game consists of D investing an amount of g that is higher than or equal to g^* (the g that achieves P^*) in the first stage, combined with S' strategy to invade in the second stage if $g < g^*$ and not invade if $g \geq g^*$. S will therefore not invade in the second stage in equilibrium. If S is very strong, however, P^* may be impossible for D to reach. D will then maximize his income in order to later obtain the maximal amount of fighting power. D's income is given by:

$$I_d = \alpha Y + R - g \tag{7.7}$$

This gives me the optimality condition:

$$\frac{\partial I_d}{\partial g} = \alpha Y'(g) - 1 = 0 \Rightarrow Y'(g) = \frac{1}{\alpha} \tag{7.8}$$

Equation 7.1.4 implies that D will set g such that the marginal increase in production from a unit increase in g multiplied by the share of the production he gets is equal to the marginal cost of investing in g, which is 1.

[7] If I introduce uncertainty into the model, for example related to the military capacity of S or the exact position of P^*, D would certainly invest in a higher amount of g than his best estimate of g^*, in order to be certain that he will stay in power in the second period.

Internal threat

What if D faces only a domestic opposition, O? As mentioned above, the important factor here is the nature of $\frac{\partial P_o}{\partial g}$. If $P_o(g)$ is non-monotonic, one would have to differentiate and find the minimum point by setting $frac\partial P_o\partial g = 0$, and check for appropriate second-order conditions. D will invest the amount of g that minimizes his probability of losing an internal conflict with the opposition, given public investment's effects on incomes and thereby fighting capabilities of the two actors. O will choose to fight, and "nature" determines whether O or D will have power in period 2. If $P_o(g)$ is monotonic and increasing, the dictator will set g equal to zero, since this is the amount of g that optimizes his probability of survival. If the specific prediction of $g = 0$ seems to strong, the qualitative interpretation of the result is that dictators will intentionally set public investment very low.

Comparing economic outcomes for the internal threat case and the external threat case

Let me sum up and compare the implications for development from the two (pure) types of security threats that D may face. Let me assume that D sets $g = g^*$ when facing an external security threat and $g = 0$ when facing an internal security threat (as described above, given certain conditions these are the outcomes). What is the output in these two hypothetical economies? In the first case one finds that

$$W_s = Y(g^*) + R \tag{7.9}$$

, whereas in the second case

$$W_o = Y(0) + R \tag{7.10}$$

. Since $Y'(g) > 0$ and $g^* > 0$, it is clear that $W_s > W_o$. That is, the model economy will have a larger per capita income due to higher public investment in the case where the dictator faces an external security threat than when the dictator faces an internal threat.

Two simultaneous threats

A dictator may, however, have to take into account both internal and external threats when setting policies that are intended to enhance his political survival probability. D does not care whether he is overthrown by an internal opposition or an external invading army; he just wants to minimize the probability of being

overthrown. Let me call the event of overthrow by foreign forces s, and overthrow by domestic opposition o. The dictator then wants to minimize $P(s \vee o) = P(s) + P(o) - P(s \wedge o)$. $P(s)$ is P_s and $P(o)$ is P_o. Since I assumed that these probabilities were independent, the dictator will set g at the level that minimizes the expression $P_s + P_o - P_s \cdot P_o$. I insert the F-functions into this expression and get:

$$P_s(\frac{F_s}{F_d}) + P_o(\frac{F_o}{F_d}) - P_s(\frac{F_o}{F_d}) \cdot P_o(\frac{F_o}{F_d}) \tag{7.11}$$

By inserting the income functions as arguments into the F-functions, I obtain the expression:

$$P_s(\frac{F_s(\beta\mu Y^*)}{F_d(\alpha Y + R - g)}) + P_o(\frac{F_o((1-\alpha)Y)}{F_d(\alpha Y + R - g)}) - P_s(\frac{F_s(\beta\mu Y^*)}{F_d(\alpha Y + R - g)}) \cdot P_o(\frac{F_o((1-\alpha)Y)}{F_d(\alpha Y + R - g)}) \tag{7.12}$$

If one wants to solve and find the optimal amount of g, one has to differentiate the expression with respect to g and set the resulting expression equal to zero:[8]

$$\begin{aligned} &P_s'(\frac{F_s}{F_d}) \cdot -\frac{F_s \cdot \frac{\partial F_d}{\partial g}}{F_d^2} + P_o'(\frac{F_o}{F_d}) \cdot \frac{F_d \cdot \frac{\partial F_o}{\partial g} - (F_o \cdot \frac{\partial F_d}{\partial g})}{F_d^2} \\ &- (P_o P_s'(\frac{F_s}{F_d}) \cdot (-F_s \cdot \partial F_d \partial) F_d^2 + P_s P_o'(\frac{F_o}{F_d}) \cdot \frac{(F_o \cdot \frac{\partial F_o}{\partial g}) - (F_o \cdot \frac{\partial F_d}{\partial g})}{F_d^2}) = 0 \end{aligned}$$

I simplify this expression and get:

$$-(1-P_o)P_s'(\frac{F_s}{F_d})(F_s \cdot \frac{\partial F_d}{\partial g}) + (1-P_s)P_o'(\frac{F_o}{F_d})((F_d \cdot \frac{\partial F_o}{\partial g}) - (F_o \cdot \frac{\partial F_d}{\partial g})) = 0 \tag{7.13}$$

This implies that:

$$(1-P_s)P_o'(\frac{F_o}{F_d})((F_d \cdot \frac{\partial F_o}{\partial g}) - (F_o \cdot \frac{\partial F_d}{\partial g})) = (1-P_o)P_s'(\frac{F_s}{F_d})(F_s \cdot \frac{\partial F_d}{\partial g}) \tag{7.14}$$

What does this expression tell me? The right-hand side shows the marginal effect of increasing g on the probability of being ousted by an external actor. This effect is in optimum equal to the marginal effect of g on the probability of being ousted by the domestic opposition. The rational dictator therefore balances these threats at the margin by setting an "intermediate" value of g. An increase in g from this point would increase the severity of the internal security threat more than it would reduce that of the external threat. A decrease in g from this point would increase

[8] $\frac{dF_d}{dg} = \frac{dF_d}{dI_d} \cdot \frac{dI_d}{dg} = \frac{dF_d}{dI_d} \cdot (\alpha Y'(g) - 1)$; $\frac{dF_o}{dg} = \frac{dF_o}{dI_o} \cdot \frac{dI_o}{dg} = \frac{dF_o}{dI_o} \cdot ((1-\alpha)Y'(g))$

the gravity of the external threat more than it would reduce that of the internal.

There are some assumptions that must hold for this condition to represent the optimal solution. There might be so-called corner solutions that D prefers. If the threat from O increases more with the first unit increase in g than the external threat drops, D will choose $g = 0$. The second corner solution is $g = g^*$, the point where S decides not to go to war. D chooses g^* if the external threat is grave, and the increase in domestic threat is not much affected by the increase in g, which might for example be the case in a country with a homogenous population, with no rebel movements, and with low popular aspirations for democratization. This could also be the optimal choice in cases where the relative strength of D versus O is not much changed when g increases, for example by the fact that the dictator is able to appropriate most of the resulting industrial outcome, Y.

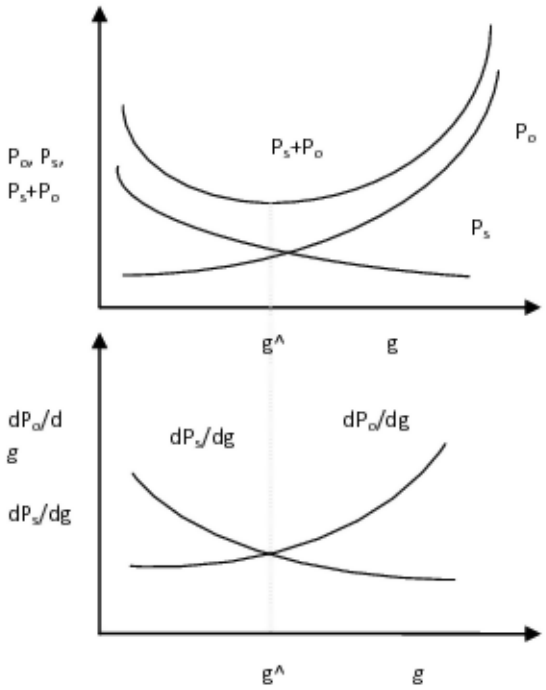

Figure 7.3: Optimization problem for dictator facing both internal and external security threats

Two helpful conditions, but which are neither necessary (one of the functions could have very strong concavity or convexity properties) nor sufficient (corner solutions), in order for the first order condition derived above to be the optimum, are that $\frac{\partial^2 P_o}{\partial g^2} > 0$ and $\frac{\partial^2 P_s}{\partial g^2} < 0$. This means that the positive *marginal* effect on the

threat from O when increasing g, increases in the level of g, and that the *marginal* effect on the threat from S is reduced in the level of g. Increased public spending increases D's readiness to fight off the neighboring country's army to a larger degree when D's country initially has a poorly developed industrial economy. However, an increase in g is particularly bad for D's ability to defeat his internal opposition when the industrial economy is already well developed. Figure 7.3 shows how the optimality condition is determined in the case where the "helpful" conditions above are satisfied. The optimal amount of g, $\hat{g}$, in this case lies between the two extreme cases where the dictator faced only an internal or only an external threat.

7.1.5 Comparative statics: Further implications from the model

How do other contextual variables interact with the nature of the security threat to produce economic policies, and subsequently economic outcomes, in the model above? Let me engage in some comparative statics. Throughout, I will assume that the amount of g before the shift is determined by the optimality condition derived above when D faces two simultaneous security threats ($g = \hat{g}$), illustrated in Figure 7.3. I will not perform the calculations here, but only describe the results qualitatively.

Natural resources

What happens, according to the model, if there is an exogenous change in the amount of natural resources, R? Since D receives all income from R, he will get extra revenue "for free", which he can use to invest in fighting capability. From the model, one sees that D will then choose to reduce the amount of g. The logic behind this result is that since D is now better suited to fight S without creating the conditions for industrial development, he can afford to reduce g in order to diminish the threat from O. Besides the alteration in relative strength between D and O stemming from the reduction in g, D will also benefit in the fight against O from the extra R.

The lower Y for natural resource rich dictatorships predicted from the model triangulates well with the literature on the "resource curse" discussed in Chapter 3 (e.g. Mehlum, Moene and Torvik 2006*b*; Humphreys, Sachs and Stiglitz 2007; Robinson 2001). Indeed, R may capture not only natural resource rents; also "exogenous resources" in the form of (unconditional) foreign aid has a functionally equivalent ef-

fect in the model (see also Bueno de Mesquita and Smith 2009): The model predicts greater survival probability for dictators with access to natural resources or unconditional foreign aid. Rational dictators do simply not need to invest in industrial development to fight off foreign enemies. Natural resources or unconditional aid give dictators easy access to income that can be transformed into fighting power, and they do not have to risk the "by-products" of economic modernization, for example a well-endowed and organized opposition fighting for control over the country's political positions.

Military build-up in the foreign country

What if the parameters β or μ, or the foreign GDP, Y^*, increase? This would lead to a military build-up in the foreign country, thereby increasing the external security threat. This would increase D's probability of losing power to S, thereby providing an incentive for D to increase g in order to further boost his own fighting capabilities. This will, however, come at the cost of an increased probability of losing power to O, and this effect will restrain the increase in g. I can, however, conclude that $\frac{\partial g}{\partial Y^*}$, $\frac{\partial g}{\partial \beta}$ and $\frac{\partial g}{\partial \mu} > 0$. Both P_o and P_s will increase relative to the initial situation, and the dictator's probability of survival will be lower. Y, production in the industry sector, will be higher in the new situation. Hence, one implication from the model is that when one country becomes richer, potential adversaries of this country, for example neighboring countries with which the country has latent border conflicts, have stronger incentives to modernize their economies.

Organizational strength of the opposition increases

Another empirical implication comes from looking at D's response to a strengthened opposition, O. Let me assume that the transformation function, F_o, changes so that O can generate more fighting power from the same amount of income. Given a wide interpretation of F_o, such an improvement could come from an exogenous shock that increased the willingness of a large share of the citizenry to fight for democracy, perhaps spurred by a successful democratization in a neighboring country. Since $F_{newo}(I_o) > F_{oldo}(I_o)$, P_s increases. This would, ceteris paribus, lead the dictator to lend more concern to O as a security threat. In this model, D responds by reducing g. This comes at a cost, however, as the reduction in g increases the probability of S successfully invading in the second stage of the game. The probability of survival for D decreases, and Y is also lower in the new situation.

The dictator is able to obtain a higher share of the industrial outcome

What happens if D is able to increase the income share he can appropriate from the industrial sector, α? Let me assume an exogenous increase in α; D's income increases and O's income goes down, when looking only at the first round of effects. The effect on D's survival probability is unambiguous; P_o will decrease, and D sits safer.

However, what will D's response be, in terms of the preferred level of g? This turns out to be more ambiguous since there are two different effects operating at the same time. First, D can now turn to reducing P_s, as the internal threat is reduced. D will according to this effect set a higher g. However, there is also another, but not equally obvious, effect. Since D has become richer, because a rise in α implies a rise in I_d, there will be a decrease in P_s even if D does not change g. This effect would actually encourage D to reduce g, since he faces a less dangerous external threat. It is not possible to determine a priori which one of these two effects that dominates; this depends on the specifications of the various functions and parameters. It is therefore unclear, from the general model presented here, whether D will actually increase or decrease g when α increases.

It seems intuitive, however, that for many plausible specifications of the model, the first effect will dominate; when it comes to the internal threat, an increase in α both increases D's fighting strength and reduces O's. When measured against S, however, D's absolute strength increases, whereas that of S stays constant. However, if I assume that the increase in income tilts P_s below P^*, the dictator can now forget about the foreign actor and reduce g, as long as his income is not reduced sufficiently to bring P_s above the threshold again. This is maybe one of the least intuitive results from the model: an increase in the share of the industrial income going to the dictator may in some cases lead him to set policies so as to reduce the overall industrial output.

7.1.6 Summing up the analysis

Aristotle (2000) laid out a claim that is supported by the analysis above, namely that one-man rule in different empirical contexts can have dramatically divergent effects for citizens. However, Aristotle focused on the ruler's personal characteristics. Dictators do, of course, differ in their capabilities and motivations, which may have considerable effects, for example on economic policies and outcomes (Jones and Olken 2005). However, I have shown that *even* if one considers two dictators with

similar personal characteristics, the economic outcomes in two countries could still differ dramatically if certain contextual factors diverge. I have focused on the less virtuous rulers, those motivated by personal power. Some of these dictators will produce development-conducive policies and help their nations' economies grow, some will produce policies that are economically disastrous, and some will choose "intermediate policies". Especially the security threat to the dictator, but also the existence of natural resources and the share of national income appropriated by the dictator, were identified as key contextual variables that generate economic divergence. Hence, the model presented here contributes to explaining why dictatorships show widely diverging economic growth rates.

Robinson (1998, 2001) and Acemoglu and Robinson (2006*a*) have also shown that one can expect economic divergence among dictatorships if dictators are motivated by wealth instead of power. Bueno de Mesquita et al. (2002, 2003) and Besley and Kudamatsu (2007) have shown that the size and autonomy of a survival-oriented dictator's winning coalition also matter for economic policies and outcomes. Olson (1993); McGuire and Olson (1996) have shown that the time horizons of rational dictators matter for divergence in economic outcomes. A general conclusion from all these studies is that dictatorship often leads to poor economic outcomes.

However, another general conclusion is that when good economic outcomes occur, they are not necessarily the result of an altruistic ruler doing the right thing for the right reasons. Economic development can be the result of a dictator doing the right thing for the wrong reasons. According to Barro "history suggests that dictators come in two types: one whose personal objectives often conflict with growth promotion and another whose interests dictate a preoccupation with economic development" (Barro 1997, 50). Barro then went on to claim that "the theory that determines which kind of dictatorship will prevail seems to be missing". This section has sketched out one plausible theory.

7.2 The external security threat environment in post-colonial Africa and its economic implications

7.2.1 Dictatorship and economic growth in Asia and Africa

In two earlier papers, I discussed and estimated the effect of democracy and dictatorship on economic growth in Sub-Saharan Africa (Knutsen 2009) and Asia (Knutsen

2010*b*). Although several Africanist scholars and others have questioned the appropriateness of democracy in Africa (see e.g. Chabal and Daloz 1999), African dictatorships have empirically been particularly detrimental to economic growth. The negative effect of dictatorship on economic growth in Africa South of the Sahara is quite robust, and the effect is indeed significantly more negative in Africa than in the rest of the world (Knutsen 2009).

Not only have dictatorships performed poorly on the continent, but some African democracies, like Botswana and Mauritius (Acemoglu, Johnson and Robinson 2001*a*; Leith 2005; Danevad 1995; Tsie 1996; Sacerdoti et al. 2005; Bräutigam 1997; Meisenhelder 1997; Subramanian and Roy 2003; Knutsen 2006), have performed very well. Moreover, the democratizing African countries of the early 1990s generally experienced steep increases in economic growth rates after democratization (Knutsen 2006). In Chapter 1, I also briefly discussed comparative evidence from two relatively similar countries, the neighboring, small, West African former French colonies of Benin and Togo. Whereas Benin democratized in the early 1990s, the Eyadema regime in Togo managed to cling to power. The diverging paths of these two relatively similar countries are startling, as seen from Figure 1.6, with relatively democratic Benin outgrowing relatively dictatorial Togo. Case-based, comparative and statistical evidence thus indicate that democracy has been conducive to economic growth in Africa.

In Asia, several dictatorships have experienced tremendous economic growth after 1960. Statistical results based on Asian samples (Rock 2009*b*; Knutsen 2010*b*) find no evidence for the so-called "Lee thesis", which claims that democracy reduces growth and development prospects, at least in poor countries. More precisely, there is no significant effect of regime type on growth in Asia. However, even if Asian dictatorships do not outperform Asian democracies, the empirical results from Asia stand in contrast to the positive effect of democracy found in Africa.

Why have Asian dictatorships fared *relatively* well, compared to the disastrous economic performances of dictatorships elsewhere? The model above predicted that dictatorial regimes facing external security threats would perform relatively well. Many of the examples of successful dictatorships described above were Asian regimes in countries facing a substantial foreign adversary (see Dorn et al. 2005). The security-threat context might, according to the model above, explain the high growth rate of countries such as South Korea, Taiwan, Singapore and even Meiji-Japan.

What about African dictatorships? Their dismal economic performances could according to the model above be attributed to these regimes mainly being concerned with internal security threats. Below, I argue that this has *indeed* been the case for

most Sub-Saharan African countries, at least from de-colonization to the end of the Cold War. I present a model that shows how coordination among African dictators within the framework of the Organization of African Unity (OAU) contributed to mitigating external security threats for regimes on the continent. The model below together with the model in the previous section thus contribute to explaining the horrendous economic performances of African dictatorships. Moreover, they contribute to explaining the discrepancy in effect of democracy between Africa and Asia, where such international elite coordination did not occur at the same scale.

I am at pains, however, to point out that this explanation is not the only plausible explanation of the differences in effects of democracy on economic performance between the two continents. First, it should be noted that the differences are quite large, and it is very likely that several independent variables carry explanatory weight. The explanation proposed here is a supplementary explanation to those focusing on structural differences between different types of dictatorships (e.g. Przeworski et al. 2000; Gandhi and Przeworski 2007; Gandhi 2008; Bueno de Mesquita et al. 2003; Besley and Kudamatsu 2007; Linz and Stepan 1996; Evans 1995). Such explanations have been presented earlier in this thesis, among others in Chapter 3. Moreover, as mentioned above, I show in Knutsen (2009) that institutional capacity interacts very strongly with regime type in affecting economic outcomes, like growth. Indeed, the variation in growth rates between Asian and African dictatorships is clearly influenced by the fact that dictatorship combined with poor state capacity induces bad economic outcomes, and dictatorship combined with high state capacity induces economic outcomes at least comparable to those of democratic countries (Knutsen 2009). African dictatorships have generally scored low in terms of state capacity, whereas several Asian dictatorships have scored quite high.

Nevertheless, as argued in the section above, dictatorial institutions and institutional capacity are endogenous, at least in the longer run, and security threat facing the regime might influence the structure of dictatorial institutions.[9] As seen above, the Kuomintang intentionally built up an effective bureaucracy first when it arrived in Taiwan, although many have argued that the millennia-old Mandarin bureaucratic traditions were helpful in allowing these efforts' successes. Thus, the explanation for the divergence in dictatorial economic outcomes proposed here and

[9]Interestingly, the coordination among leaders in Africa that led to the reduction of external security threats, which is analyzed below, may also to a certain extent be dependent on an initial low level of institutional capacity. This is described in Subsection 7.2.4. Therefore, one may in Africa have had a reciprocal relationship between the degree of institutional capacity and external security threat environment, and this "equilibrium" may have generated a climate that allowed dictators to pursue economic policies with disastrous macro-outcomes.

the explanation proposed in Knutsen (2009) are complementary rather than contradictory (on related points, see also Acemoglu and Robinson 2006*a*).[10] Therefore, I do not downplay the importance of institutional and other inherent differences between dictatorships in explaining the difference between African and Asian dictatorships' economic records, when pointing to the general importance of their different security-threat environments.

In any case, there were arguably successful international coordination efforts being conducted between African leaders in the post-colonial period, in terms of reducing the security threat from one African country towards another. These efforts were so successful that they flushed in what has been called "the African peace" (Lemke 2003). The model below contributes to explaining the conspicuous lack of interstate wars on an otherwise war-torn continent. I will discuss the model's implications for interstate war and peace in Africa, and not explicitly link the model to economic performance, at least not before the concluding remarks.

However, if the reader accepts both the relevance of this model and the one presented in the previous section, together with acknowledging the fact that most African dictators faced grave internal security threats, the model can also be considered part of a two-step explanation of the disastrous economic performances of African dictatorships.

7.2.2 African dictators and security threats

While Africa after decolonization has suffered from many internal conflicts and civil wars, there has been a puzzling lack of interstate wars. Why is this so? Given the historically rootless borders, lack of vital resources like water, and indeed the prevalence of dictatorships, one could have predicted several African interstate wars. Empirical regularities posed as puzzles can sometimes have quite subtle explanations. I will argue that national political structures in Africa combined with the existence of the Organization of African Unity (OAU), and its principles of non-intervention and national sovereignty, contributed to the relative lack of interstate wars on the continent from decolonization to the end of the Cold War.

[10]There are several *other* plausible interrelations between the structural factors discussed as vital for dictatorships' economic performance and the type of security threat a dictatorial regime is mainly concerned with. For example, Bueno de Mesquita et al. (2003) argue that regimes with larger winning coalitions are beneficial among others for growth. It may be that regimes facing grave external security threats have extra incentives to expand their winning coalitions to stand stronger against the foreign adversary. For example, increasing the size of the winning coalition may disallow the foreign government to strategically enter into alliances with disgruntled domestic groups.

The explanatory framework presented below is a simple game theoretic framework, where national rulers are the central actors. These actors care mainly about their own continuation in office, and they take into account how their present actions might affect the future. A modified version of Keohane's theory on international regimes (Keohane 1984) is presented formally. The model implies that non-intervention strategies can constitute an equilibrium even if there are short term gains from intervention.[11]

The logic of the model can be shortly summarized as follows: Political leaders in a country refrain from intervening in another country because they fear this increases the probability of a foreign intervention into their own country later. This equilibrium becomes even more likely under the presence of an international security regime like the OAU.

In this section, the preferred unit of analysis is, as it was in the models in the previous section and in Chapter 5, the national political leadership. This choice triangulates well with the insights produced by Africanist scholars on how national politics works on the continent. Political power, or more specifically staying in office, is portrayed as the ultimate objective for the actors, which resembles "realist" thinking on political motivation. However, as "neo-liberalist" scholars persuasively have argued, international regimes might matter for political outcomes, even If one models actors as instrumentally rational with fixed preferences.

Section 7.2.3 gives a brief description of interstate wars in post-colonial Africa, and some alternative explanations of the puzzling "African Peace". Section 7.2.4 presents some central features of African politics that are of relevance to the subsequent analysis. Subsection 7.2.5 briefly describes the OAU. Section 7.2.6 presents the theoretical framework in a non-formal manner, whereas Section 7.2.7 develops a simple game-theoretic model and presents some empirical implications from the model. Section 7.2.8 discusses why the OAU likely mattered for the relative lack of interstate wars in Africa, thereby reducing the severity of external security threats to African leaders. Section 7.2.9 looks at how the different empirical implications from the model match up against empirical evidence.

[11]The term 'intervention' is broader than that of starting an interstate war. However, the terms are used interchangeably throughout the section. The main type of intervention I am concerned with here, however, is interstate war.

7.2.3 Interstate wars in Africa

Africa has seen its fair share of conflicts in the period after decolonization. From 1960 to 1999, 33 of the world's 79 civil wars took place in Africa (Collier, Hoeffler and Sambanis 2005, 4–5).[12] In contrast, there have been few African interstate wars or other direct governmental military interventions by African countries into other African countries.[13] As will be shown below, Africa has seen fewer (intra-continental) interstate wars, relatively ($\frac{wars}{countries}$), than regions such as the Middle East and Asia in the period from 1960 to the end of the Cold War.

Francis (2006, 75) lists the interstate wars in Africa, and these were "Ethiopia-Somalia in 1977–78, Uganda-Tanzania in 1978–79, Ghana-Mali in the 1980s, Nigeria-Cameroon, Mali-Burkina Faso 1986, and recently between Eritrea and Ethiopia, 1998–2000". Figures from the Correlates of War data set, based on a more stringent operational definition, exclude several of these instances when counting African interstate wars (Ghosn, Palmer and Bremer 2004). According to Francis (2006, 76) the few traditional interstate wars that have been conducted have mainly been over contested borders. Even so, due to the nature of African borders, which are arbitrarily drawn up by colonial powers with little ethnic or geographical rationale (e.g. Herbst 1989; Englebert 2000), one could arguably have expected more border conflicts in Africa.

The empirical trait that needs explanation is therefore the general lack of interstate wars on a conflict-torn continent. In Africa, the prevalence of weak states without deep historical roots, dispersion of ethnic groups across borders, little economic integration in the form of bilateral trade and FDI, and dictatorial rule should according to the literature have contributed to a high probability of interstate war.[14] As mentioned above, Lemke (2003) has called this puzzling trait the "African peace".

Some explanations for the African Peace have been offered by different analysts.

[12] However, Collier and Hoeffler (2002) show that the high frequency of civil wars in Africa is largely due to the continent's social and economic conditions, and not to some Africa-specific effect.

[13] One important modification is that Africa has seen several shadow or proxy wars. These proxy wars often take the form of a government in country A supporting a rebel movement in country B. Typically, the government in country B also supports an armed opposition movement in country A. Saideman (2001) claims that intervention, when interpreted more broadly, has been far more common in Africa than what is usually acknowledged. One should therefore not overdo the point of lacking external interventions in Africa. However, the choices of more subtle types of intervention in Africa are interesting, and these choices can be related to the logic of the analysis presented below. Intervention through proxy-war might be a less risky project than a full blown interstate war for a leader: It might for example be harder to detect and establish precisely the degree of external intervention, which might lessen the risk of sanctions from other parties.

[14] The literature on determinants of interstate conflicts is large. See for example Badura and Heo (2006) for a review and some empirical results.

Lake and O'Mahoney (2006) claim that a low average state size reduces the probability of interstate wars and this could help explain the low number of wars in Africa after 1960. These authors point to mechanisms that may be complementary to those presented in the analysis below. It is difficult to argue, however, that state size deterministically explains the outcome. Furthermore, Francis (2006, 75) points out that interstate wars are often costly, and that limited resources on the part of African rulers and states might explain the absence of such wars. However, the cost of waging and winning a war depends to a large degree on the relative capabilities of the parties (for an analysis of the complex relationship between economic development and interstate war, see Hegre, Høyland and Knutsen 2009). If your potential victim is weak in terms of military capabilities, a large fleet of jet-planes and high-tech equipment might not be necessary to go to war and ultimately win it. There were plenty of wars in medieval Europe, for example, and as we will see below, other regions that had a relatively similar level of economic development experienced a higher frequency of interstate wars. This should lead us to look for additional explanations of the African Peace.

7.2.4 The political structure of post-colonial Africa

Africanist scholars have pointed out differences in political structures between those in African countries and those in "Western countries", particularly focusing on the structures and functioning of state institutions. Labels such as "quasi-state" (Jackson 1990) have been assigned to the archetypical African state, and Clapham (1998) advices us to think in terms of "degrees of statehood", for example when analyzing African political entities. I will not survey the literature on the African state here, but rather provide a concentrated argument for why one should think twice before choosing the state as unit of analysis in an African context. Particularly within a rational choice framework, where actors are assumed to be unitary with complete and transitive preference-orderings, a misspecification of unit of analysis can cause problems for understanding political dynamics.

Weakly institutionalized state apparatuses and weak state capacity have been central in the descriptions of African states. The African states' abilities to penetrate society and conduct policies have been described as relatively weak when it comes to social and economic policy, but also when it comes to security issues (Dokken 2008). As discussed in Chapter 3, neopatrimonial structures have dominated in African politics (see e.g. Médard 1996), with political processes and distributive policies being managed within vertical, personalized networks rather than through state

institutions: "If there is a consensus among political scientists it is probably that the state in Africa is neo-patrimonial in character" (Jackson 1987, 527). This notion has led to the description of African political institutions as "privatized" (Jackson 1987; Clapham 1998). It is argued that formal state apparatuses in Africa are often nothing but formal, juridical shells, with state offices being personal "possessions rather than positions" (Jackson 1987, 528). Others have described African politics as "informalized" (Chabal and Daloz 1999). These political features indicate that one should look beyond formal state structures when analyzing African politics.

Another reason for being skeptical towards the state as a unit of analysis in Africa is the historical prevalence of dictatorships on the continent. Up until the dramatic political events in the early 1990's, post-colonial Africa was mainly ruled by dictators (Bratton and van de Walle 1997). A couple of small countries, Botswana and Mauritius, have had relatively stable democracies since decolonization. However, despite some early democratic experiments in the aftermath of decolonization, most of the newly created African states succumbed to dictatorial rule under Huntington's (1991) second reverse wave. It is problematic to speak of "national interests" being followed even in democracies, partly because the concept is difficult to define (Schumpeter 1976; Arrow 1951). Additionally, policy makers have their own particular interests that likely deviate from those of their electorates. As discussed intensively in Chapter 2, dictatorships lack political accountability-generating mechanisms like free and fair elections, the right to organize and freedom of speech. It is therefore even harder to assume that political leaders will follow the interests of citizens in dictatorships than in democracies. Thus, when one combines the lack of political accountability mechanisms with the personalized style of African politics, one has a situation where the political leaders' interests are crucial to political decision making. This is most likely the case also when it comes to foreign policy.

Hence, African countries have been characterized by "weak states governed by strong regimes" (Dokken 2008, 18), and this has implications for the analysis of African international politics. Clapham (1996*a*, 62) argues that as a general rule, "it may be assumed that African leaders sought to maximize their own security and freedom". Clapham deals largely with revenue-generating foreign policies, but as I will show, the leaders' interest in keeping office likely also has implications for the reluctance of African leaders to wage interstate wars. Hence, the proper unit of analysis for analyses such as that below is the the political leader, perhaps also including his "winning coalition" (Bueno de Mesquita et al. 2003). Guerilla leaders, and other actors not in government, have sometimes been important actors in African international affairs (e.g. Clapham 1996*a*). However, the analysis in

this section will focus on interaction between actors represented within the OAU framework, and therefore only government leaders will be recognized explicitly as central actors.[15]

Having argued that "privatized politics" and dictatorial government should lead us to recognize the ruler (and alternatively his backers) as the central unit of analysis in African foreign policy, I need to make assumptions on their preferences. The most important assumption made here is that the governments care largely about survival in office. As discussed above, personal power is a strong motivational force in its own right, but other interests can also be served best through holding political office. In post-colonial Africa, political office has been instrumental for controlling revenues from natural resources and trade, and political power has also been extensively used to appropriate economic resources from corruption and property grabbing. One extreme example, mentioned in Chapter 1, is Mobutu's amassment of a personal fortune that made him one of the three richest persons in the world (Sørensen 1998, 80). Moreover, *even if* rulers want to promote particular ideologies or support ethnic brethren, political office is the key instrument to achieve also such aims. I will therefore in the following assume that leaders are mainly motivated by holding office, but I will allow for other objectives as well, as will become clear from the specification of gains from intervening into another country presented below.

7.2.5 The OAU

With the new state system in Africa in the 1960s emerged the OAU. The OAU was established at a conference in Addis Ababa in 1963, with representatives from 30 African states present. The Pan-African movement, led by Ghanaian President Kwame Nkrumah, had hoped to use an African-wide intergovernmental organization as a vehicle for promoting African integration, but there were several "blocs"

[15]The game modeled below will focus on the interactions of rulers, but it could certainly be modified to a kind of two-level game (Putnam 1988), by incorporating that rulers are linked to a "winning coalition" of backers through patron-client networks. The main logic of the model below is that rulers motivated by staying in power will not invade other countries because of the risk of retribution from other actors, and the subsequent increased risk of losing office. In a two-level game, the winning coalition could be modeled as motivated by material consumption, and therefore backs "its ruler" if he maximizes the winning coalition's opportunities for consumption. What implications would such an expanded model have? If there are material resources to be gained from invading a foreign country, the winning coalition might force the ruler to undertake more adventures abroad than what is implied by the model presented below. However, if the main concern of the winning coalition is keeping their ruler in office at any cost, to maintain material advantages related to patronage, the winning coalition would not want to increase the probability of the sitting ruler losing office (see also Miquel 2007). If so, there is not much to be gained from a two-level model, as it yields similar predictions to those generated by the more parsimonious model presented below.

of countries, with different aims for the scope and depth of such an organization, represented at the conference (Francis 2006, 16–24). The blocs finally converged around the OAU Charter. The Charter included principles that stated opposition against colonialism on the continent and against white minority rule in South Africa and Rhodesia.[16] However, the principles most relevant for the analysis below were the principles of "Non-interference in the affairs of States" and "Respect for the sovereignty and territorial integrity of each State and for its inalienable right to independent existence" (Organization of African Unity 1963, 4).

National sovereignty has long been a basic cornerstone in international politics, but in African international relations the principle has been stressed to a comparatively high degree. One reason may be that any breach of the principles of sovereignty and territorial integrity could have extra large consequences in these newly created and presumably unstable states. Herbst (1989) has called it a paradox that Africa with its artificially created borders has seen so few border adjustments and revisions. Given the motivational force of continuation in office for African rulers, however, the stress put on these principles could be interpreted as a quite rational response. It is particularly important for African governments to not break the principles of national sovereignty and territorial integrity, because "all parties know that once African borders begin to change there would be an infinite period of chaos" (Herbst 1989, 689).

Interestingly, the OAU "has been instrumental in establishing the decision-making rules that created the boundaries and promoted their stability" (Herbst 1989, 689). Clapham also notes that the embracement of the Westphalian norms of state sovereignty and non-interference by the leaders of these weak states was instrumentally motivated, and that the OAU was used for protecting these norms:

> [q]uasi-statehood understandably led the rulers of weak states to place an emphasis on sovereignty. . .The key criteria for absolute sovereignty - the maintenance of existing frontiers, the insistence on the principle of non-intervention in the internal affairs of states, and the claim to the state's right to regulate the management of its own domestic economy - were built into such documents as the Charter of the Organization of African Unity (Clapham 1998, 145).

These insights will be specified and formalized below.

[16]Since the eradication of white minority rule was an explicit ambition of the OAU and many African nations, the relations between white minority regimes and other African regimes are not particularly relevant for the model framework below.

7.2.6 Theory and context; a modified version of Keohane's theory of international regimes

A quite common statement in the Africanist literature is that many theoretical frameworks and models in political science are based on Western experiences. The implication sometimes drawn from this observation is that such frameworks and models are unfruitful when applied to the African context, and that Africanists should develop novel frameworks (see e.g. various chapters in Dunn and Shaw 2001). This implication is not necessarily valid. If one throws away existing theoretical frameworks for understanding politics, one likely wastes a lot of valuable insight. Development economists, for example, have generated important insights into how developing economies, including African economies, work by using *modified* frameworks from general economic theory. The same strategy, that of modifying existing theory to suit the particular context, can be used for understanding African politics. Here, Robert Keohane's (1984) theory of international regimes and cooperation will be modified by taking into account that political rulers rather than states are the central actors in African international politics.

It may be useful to consider the OAU as a vital component in an African international security regime. Krasner (1982, 186) defines international regimes as "sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations". Keohane, in "After Hegemony", developed a theoretical framework for understanding how international regimes can contribute to enhancing cooperation between actors, particularly states. Keohane (1984, 85) labels the framework a "functional theory" of international regimes. One of Keohane's main points of departure is game theory, although he does not provide a formal analysis. According to Keohane, several types of interactions between states in the international system can be interpreted as having a prisoner's dilemma structure. The key feature of this interaction structure is that the dominant strategy in one-shot games is to not cooperate. The equilibrium where all actors choose non-cooperation is, however, not Pareto optimal; the actors would have been better off by coordinating on cooperation.

However, when moving from one-shot games to infinitely repeated games, the "folk-theorem" implies that there are an infinite number of sub-game perfect Nash-equlibria (SPNE) where actors can rationally arrive at cooperative outcomes (see e.g. McCarty and Meirowitz 2007, 260–261). Rational actors may choose to cooperate because they will be punished in one or more of the subsequent rounds of the repeated game, if they do not cooperate in the present round. In other words, fear

of punishment in the future can therefore induce rational actors to cooperate even if they would have gained from not cooperating in the short term.

International relations are characterized by repeated games structures, with actors that are likely to engage in interaction also in the future. One of Keohane's (1984) main points is that international regimes exercise several functions that enhance the probability of actors arriving at cooperative equilibria. International regimes are designed to enable "stable mutual expectations about others' pattern of behavior and to develop working relationships that will allow the parties to adapt their practices to new situations" (Keohane 1984, 89). International regimes bring a stabilizing element into international politics because they introduce, solidify or specify practices, principles and norms. This makes cooperation between rational self-interested actors easier to establish because actors can converge around the norms, principles or even rules set down by the particular international regime.

Keohane further specifies the cooperation-enhancing functions of international regimes: International regimes for example reduce information costs, making information on others' actions easier to obtain and more reliable. Breaches of cooperation can therefore more easily be quickly identified. International regimes also provide forums for institutionalized dialogue between actors. This reduces transaction costs related to engaging in dialogue and reduces uncertainty, thereby also mitigating the probability of unfounded breaches in cooperation based on fears that other actors might be in the process of breaching it. The probably most important function of international regimes, however, is that the principles, norms and procedures laid down by the regime function as measuring rods for behavior. By clearly specifying what constitutes cooperative behavior, it is easier to establish when certain actors have breached cooperation. This again will lead to more certain punishment for deviation, which again deters actors from breaching cooperation in the first place.

7.2.7 A game-theoretic model

As mentioned above, the model constructed in this section takes the national political rulers, rather than states, as units of analysis. The rulers carry a flag and represent a state, but it is really the preferences and goals of the rulers that matter. Personal enrichment and power are identified as central goals in the non-formal literature on African politics, and this should carry over to a formal model's actors and their utility functions. Personal wealth and power in African politics hinge upon the control of the formal state apparatus. I can therefore parsimoniously model these regimes as mainly interested in maximizing their probability of remaining in

A \ B	$\Psi = 1$	$\Psi = 0$
$\Psi = 1$	pv+w, pv+w	v+w, pv
$\Psi = 0$	pv, v+w	v,v

Table 7.1: One-shot intervention game

office. When I combine these insights with the insights from Keohane's theory on international regimes (1984), I can establish a model that helps explain the lack of interstate wars in Africa under the OAU.

One-shot game

First, I analyze the hypothetical one-shot prisoner's dilemma game, where African rulers play against each other once. There are two actors (or players), ruler A and ruler B. The actors are identical in terms of parameters, pay-offs and possible strategies. The actors choose whether to invade a foreign country or not. Technically, $\Psi = 1$ if an actor intervenes, and $\Psi = 0$ if not. The rulers have a utility of v, from staying in power in their own state. If A intervenes or conducts an act of aggression against B, I assume that A gains a price, w, for example in the form of occupied territory, resources or utility gained from helping ethnic brethren abroad. When there is absence of external intervention in a country, the ruler in the country remains in office with a probability 1. When there is an intervention, the ruler remains in office with a probability $p < 1$. Furthermore, I assume that the expected utility loss stemming from experiencing foreign intervention is strictly larger than the utility gain from intervening, that is: $(1 - p)v > w$. This latter condition follows the assumption that rulers are mainly concerned about office; even a relatively small probability of losing office cannot be compensated from the gains of intervening abroad. Table 7.1 illustrates the one-shot game:

Playing $\Psi = 1$ is a dominant strategy for both players, since $pv + w > pv$ and $v + w > v$. Both actors will gain from intervening, independently of what the other chooses. $\{1, 1\}$ is therefore the (only) Nash-equilibrium of the game. However, since I assumed that $(1 - p)v > w$, both players are worse off in this equilibrium than if they had coordinated on non-intervention. However, $\{0, 0\}$ is not a plausible solution to the one-shot game, since both players have individual incentives to deviate from this situation.

Infinitely repeated game

What happens within a repeated games structure? Could office-motivated African rulers escape the "bad equilibrium" of mutual intervention? Given certain assumptions, they could. The folk theorem states that there are infinitely many strategy combinations that allow players to reach a better outcome, if the sequence of games is infinite (which can be interpreted as an unknown end-point of the game) and if the players are relatively patient.

Let me consider the simplest of these strategy combinations, namely the combination where all players play a grim-trigger strategy.[17] With a grim-trigger strategy, a player starts out by cooperating in the first period, and plays a specific history-contingent strategy in the following periods: *If* the other player cooperated in all earlier periods, then cooperate in this period. *If* the other player did not cooperate in at least one of the earlier periods, then don't cooperate in this period.

Cooperation in this game is choosing $\Psi = 0$. The cooperative strategy can be simplistically stated as following: "If you mind your own business and don't intervene in my country, I won't intervene in your country next time I have the opportunity". This strategy can bring about non-intervention SPNEs if the players are sufficiently patient, if the gains from intervening abroad relative to the gains of continuing in office are relatively low, or if the probability of losing office when experiencing foreign intervention is relatively high.

I assume that all players have a discount factor of β, which lies between 0 and 1. A low discount factor implies that the actor values the present relatively much compared to the future. I use a von Neumann-Morgenstern utility function, and the discounted utility for an actor from cooperating in every period, assuming that all players play grim-trigger, is:

$$v + \beta v + \beta^2 v + ... + \beta^n v + ... = \frac{v}{1-\beta} \tag{7.15}$$

What is the discounted utility of playing $\Psi = 1$ in the first period, thereby breaching the implicit or explicit cooperative agreement? Clearly, the player would

[17] I could have investigated other reciprocal strategies, which are less strict than the grim-trigger in the sense that they allow for cooperation after a certain period of time after a breach. Examples are tit-for-tat and other "intermediate punishment strategies" (McCarty and Meirowitz 2007, 256–260). The main logic of such strategies is, however, qualitatively similar to that of grim-trigger games; credible threats of future punishment can induce actors to forego short-term gains from breaching cooperation. There are therefore SPNEs where all parties cooperate also when "milder" strategies than grim-trigger are played, but the parameter requirements for cooperation are more demanding.

be better of in the present period, as he gains an extra utility of w. However, the player will lose out in all subsequent periods, as $pv+w < v$. Moreover, I assume that the ruler cannot come back to power once office is lost, and that he cannot gain from intervention from the periods after office is lost. For simplicity, I assume that all probabilities are independent. The discounted pay-off from breaching cooperation is thus:

$$(v+w)+\beta(pv+w)+\beta^2(p^2v+pw)+...+\beta^n(p^nv+p^{n-1}w)+...=\frac{v+\frac{w}{p}}{1-\beta p} \quad (7.16)$$

Hence, the rational African ruler chooses not to intervene if:

$$\frac{v}{1-\beta} > \frac{v+\frac{w}{p}}{1-\beta p} \quad (7.17)$$

One may see from the inequality above that a high w, a low β and a low p contribute to the likelihood of intervention. In words, large gains from intervention, impatience and a low probability of being ousted from office given intervention by another player are factors that make breakdown of the non-intervention equilibrium more likely. I rewrite expression 7.2.7 to:

$$p\frac{v(1-\beta p)}{1-\beta} - pv > w \quad (7.18)$$

If I normalize v to 1, and set the the value of p to 0.80 and β to 0.95, non-intervention is ensured whenever the value of w is lower than 3.04. That is, the value stemming from intervention has to be more than three times higher than that of remaining in office. If I recalibrate p to 0.95, the critical value of w is 0.90, which is still very high and indicates that the gain from intervention should be almost as high as the gain from sitting in office. For p equal to 0.99, the critical value of w falls to 0.19. In this model, one therefore needs a very low probability of being ousted from power after intervening in another country to make intervention a likely strategy. Figure 7.4 shows how the critical value of w for breaching cooperation varies with p and β.[18]

[18]The model could have been made more realistic by assuming that actors are unable to intervene in every period. The possibility of intervention could be contingent on several factors, such as national and international political climate, availability of resources and the capability and loyalty of the army. This could be modeled through an exogenous probability of opportunity to intervene. This adjustment would have made the mathematics more complex, but the main result is that intervention would be rational for a broader set of values of p and β. The reason is that a breach of cooperation would not with certainty lead to intervention in the breacher's own country in the next

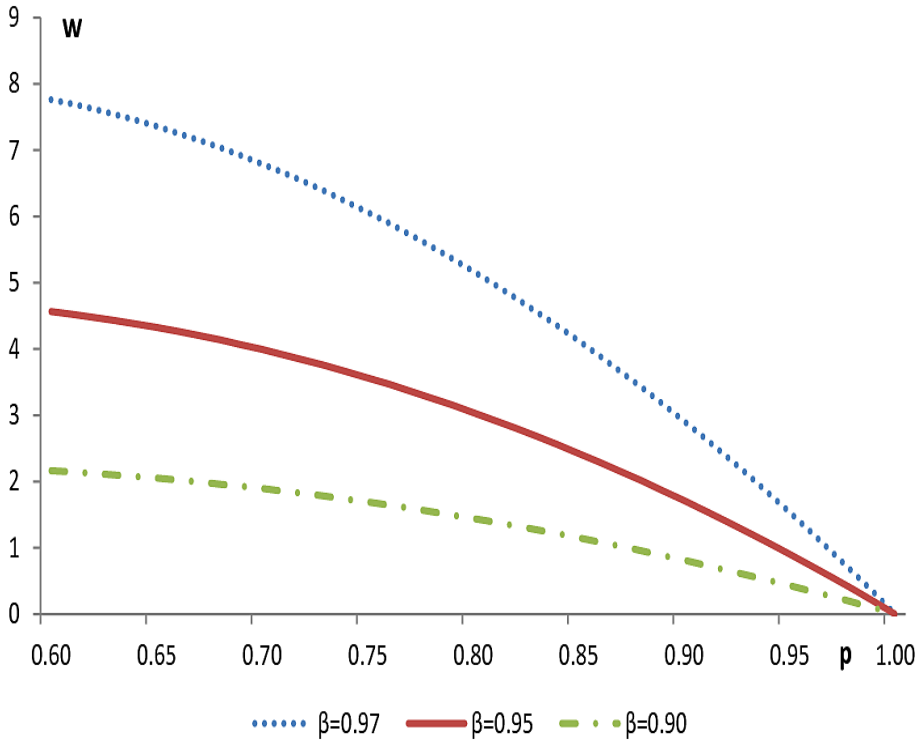

Figure 7.4: An illustration of the determinants of foreign intervention in the simple repeated game model. Critical value of w as a function of p, when $v = 1$, for different values of β.

Modified infinitely repeated game

What if the particular current government of B poses a direct threat to A? That is, what if the existence of B reduces A's probability of staying in office even if there is no intervention? This would alter the algebraic solution proposed above (in Inequality 7.2.7). Intervention in the foreign country with the intention of overthrowing the ruler next door might now actually increase the probability of staying in office. At least, the net reduction in probability of survival due to intervention is lower than in the model above. I model this situation by including a probability, q, of survival in the case of non-intervention. The ruler will now cooperate if the inequality in 7.2.7 is satisfied.

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period(-s). This would lower the probability of being thrown out of office in subsequent periods, and the expected cost of intervening would therefore go down. The comparative statics related to how increases in p and β affect the likelihood of intervention would, however, be qualitatively similar to those in the model presented here.

$$\frac{v}{1-\beta q} > \frac{v+\frac{w}{p}}{1-\beta p} \tag{7.19}$$

Whether q is larger than or smaller than p is context-contingent. However, it is straightforward to see from the comparison of Inequalities 7.2.7 and 7.2.7 that the critical value of w will be lower in the modified model, ceteris paribus, than in the simpler model above. Rulers will therefore be more likely to intervene. If q is lower than or equal to p, the ruler will always intervene, given that w is not a too large negative number.

The empirical prediction from this extension of the model is that external intervention in Africa was more likely to occur where a particular ruler of a country posed a direct threat to the ruler of another country. Are there certain types of intervention that could reduce q, but at the same time keep p relatively low? That is, is it possible to get rid of the dangerous foreign ruler, without generating too high risks of intervention from other actors in the future? Proxy-wars, which Africa has seen many of, may likely represent such a situation, but I will not analyze this hypothesis further here.

7.2.8 The relevance of the OAU

The idea that reciprocal mechanisms such as those described above underly the remarkably low degree of foreign military intervention in African politics is not novel. Herbst (1989) provides an excellent qualitative presentation of this logic, mainly related to border issues, and recognizes the relevance of international regime theory. Herbst (1989, 689) explicitly claims that the reciprocal agreement followed by the African leaders was that "one nation will not attack or be attacked by another as long as minimal administrative presence is demonstrated". The consequence of a conflict over national borders could have produced a feared domino effect throughout the continent, since most countries have problems with secessionist groups or arbitrary borders. This was the case also for relatively larger regional powers, like Nigeria and Zaire, whose leaders could otherwise have had the strongest incentive to attack neighbors.

Herbst also mentions the large number of African states. A large number of actors could increase the probability of a breakdown in a cooperative agreement, especially if there is actor heterogeneity and the actors play "tough" strategies such as grim-trigger. This problem was not explicitly dealt with in the analysis above.

However, Herbst claims that the large number of actors was not crucial in Africa. Actually, the large number of bordering states implied that the consequences of a breakdown of a system would be even more immense, which could be interpreted as a low p in the model above. Moreover, Africa had the OAU, with its likely stabilizing role on the system.

How might an international regime like the OAU matter in the model framework above? As noted above, Keohane (1984) specified the different functions an international regime might have for states interacting, and these functions are also relevant when rulers are the unit of analysis.

The main insight from Keohane (1984) is that the existence of international regimes eases cooperative behavior. The explicit principles of non-interference and sovereignty set out in the OAU provided clear benchmarks for behavioral norms and thereby made it easier for rulers to accurately point out when other rulers breached the cooperation on non-intervention. When it comes to the provision of yardsticks, the OAU also established the principle that the person who controlled the capital was the legitimate leader of the state, thereby clearly defining who were and who were not participants in the international regime. This rule provided "adequate information to allow other powers to understand where they can and, more important, cannot intervene in modern African politics" (Herbst 1989, 688). Additionally, the OAU provided a forum for diplomacy and talks, which again eased the flow of communication between rulers. This likely mitigated uncertainty and unfounded fears of another leader considering intervention.

Information and transaction costs for political leaders were therefore plausibly lower under the OAU than they would have been if no such organization had existed. The OAU could also link localized events between two African countries to a broader framework. By multi-lateralizing African international politics, the OAU could potentially lead to several leaders reacting to breaches of a single country's sovereignty, thereby impending larger costs on the intervener.[19]

How could I have explicitly modeled these possible effects of the OAU? Indeed, several of the parameters in Inequality 7.2.7 could be impacted. First, the likely more rapid response to an intervention by foreign leaders under a regime like the OAU would lead to "shorter time periods" in the model. This could be modeled through an increased discount factor, β. Second, w might decrease if other leaders

[19]There could also be other effects that are not captured by the rational choice framework presented here. If leaders meeting in the OAU developed a certain extent of "community feeling", so that the leaders cared for one another's well-being, or if the OAU-norms were internalized cognitively, the relevance of the OAU for keeping the African Peace would be even stronger than predicted by the framework above.

than the one who faced intervention were more likely to push through different types of formal or informal sanctions on the intervening leader. Third, p might increase under a regime such as the OAU: If intervention leads to an increased probability of one or several forms of retribution by either the leader intervened upon or other leaders, the future probability of losing office will be higher. A high β, a low w and a low p all make it easier, ceteris paribus, for Inequality 7.2.7 to hold.

The main empirical implication from the theoretical framework presented here is therefore that the OAU contributed to reducing the probability of foreign intervention in Africa, potentially through multiple mechanisms. According to former Tanzanian President Julius Nyerere, the OAU developed into "a "trade union" of African leaders, essentially designing rules for their own survival" (Herbst 1989, 676). OAU has also been labeled "a club for dictators" (Meredith 2006, 680). The model provided here helps clarify how the "club" assisted the dictators in securing their vital interest of staying in power.

7.2.9 Illustrative empirical examples

It is admittedly difficult to draw precise conclusions on the empirical relevance of the model presented above. It is for example difficult to evaluate the actual relevance of the OAU. I cannot rerun history and observe the counterfactual, namely post-colonial Africa without the OAU. As Herbst (1989, 690) notes "[t]he OAU itself serves as the nominal "strongman" to remind leaders of the continent's norms and prevent any defections, but given the self-evident dangers, it is unclear if the OAU is even needed to preserve the current boundary system".

Nevertheless, I will tease out different observational implications from the model and try to illustrate how these predictions match up with some broad empirical patterns and a few selected historical cases.

Broad comparisons of regions

First, and as discussed above, statistical analysis indicates that there is an Africa-specific effect on the probability of interstate war. Drawing on the Correlates of War data and using a global sample from 1950–1992, Lemke (2003) found that African countries were significantly less likely to engage in interstate wars, even when controlling for several other variables. The "African Peace" is therefore not only a trait to be found in descriptive statistics:

> Of specific interest is the African Dyad variable. It suggests there

> is something different, something exceptional about Africa in terms of interstate war. The negative coefficient for this variable indicates that African dyads are disproportionately less likely to experience war than are non-African dyads. Not only is the effect statistically significant, but it is also substantively large. The risk ratio indicates that African dyads are only about one-tenth as likely to experience war as are other dyads. Even controlling for all of the "usual suspects," African dyads are disproportionately peaceful according to this analysis (Lemke 2003, 119).

Lemke shows that parts of this effect can be explained by missing data and measurement error. Nevertheless, even after adjusting for these methodological factors, there is still a significant "Africa effect". This result suggests that there was something substantially specific about African international politics from decolonization to the end of the Cold War. My model suggests that the structure of African politics, that is the interaction of national political structures related to personalized politics combined with the existence of the OAU at the international level, may be a vital part of the explanation for why Africa was different.[20]

One indication of the OAU's relevance is based on the comparison of the post-colonial African experience with comparable historical epochs in other regions, applying John Stuart Mill's logic of difference. Three relatively comparable cases can be picked out. These are Asia after decolonization in the second half of the twentieth century, Latin America after decolonization in the nineteenth century, and Europe in the 17th and 18th century when the border and state structures on the continent were still far from frozen. The degree to which state and border structures are settled is one important variable when it comes to affecting the probability of interstate war, but so are the level of economic development and the nature of national political regimes.

As Table 7.2 shows, there are relatively small differences between the four cases in terms of average degree of democracy, measured by the Polity Index, and PPP-adjusted GDP per capita level (taken from Maddison 2006). The Asian case also coincides temporally with the African. The Western European numbers most likely show a higher income level and degree of democracy than the actual numbers in the

[20]Lemke (2003) suggests that if taking into account the many non-state actors, such as guerrilla groups, in Africa, one might end up with different results. Following this suggestion would lead to a washing-out of the distinction between civil and interstate war. Also, when taking into account such non-conventional actors, one would not only increase the number of relevant wars, but also the number of relevant units, and this would at least partly offset the suspected increase in the frequency rate.

Region	Year	GDP pc	PI
W. Eur.+settler col.	1820	1054 (20)	-4.5 (10)
Latin America	1850	720 (3)	-2.8 (18)
Asia excl. Middle East	1965	1503 (22)	-1.8 (18)
Sub-Saharan Africa	1965	1255 (48)	-3.5 (32)

Table 7.2: Descriptive statistics: average income and degree of democracy in selected regions. Number of countries in parenthesis. GDP (PPP-adjusted 2000$) data is taken from Maddison (2006), and Polity Index scores are taken from Polity IV; both are measured as average scores for the countries with data in the region in the given year.

Region	Wars	Av. reg. part.	Country-years	% $\frac{wars}{c.-y.}$	1000 deaths
S. America (1850–1875)	3	2.3	216	1.39	312
Asia (1965–1990)	6	2.7	604	0.99	1073
S.S. Africa (1965–1990)	2	2.5	1182	0.17	9

Table 7.3: Interstate wars involving regional actor on both sides. Asia does not include Middle Eastern countries. The data are drawn from different databases from the Correlates of War Projects. See (Sarkees 2000; Correlates of War Project 2008).

17th and 18th centuries, as the lack of historical data forces me to use 1820 numbers. Degree of development, degree of democracy and the degree to which borders were established do not seem to differ a lot between the four selected cases, and one would therefore not expect large variations in the relative frequency of war between the cases based on these variables.

However, as Table 7.3 shows, Asia (excluding the Middle East) had a higher incidence of wars than Africa from 1965 to 1990. Regarding the number of wars divided by country-years, the ratio was almost six times higher in Asia than in Africa. When it comes to Latin America between 1850 and 1875, the relative frequency of interstate wars was even higher than that in Asia from 1965–1990. It is difficult to find comparable data for 17th and 18th century Europe, but a cursory reading of European history would lead one to believe that there was a much higher incidence rate here than that found in Africa under the OAU, and possibly also than in the other cases.[21]

The incidence rate of war in 19th century Europe is shown by Lake and O'Mahoney (2006) to have been well above that of post-colonial Africa. This was especially true

[21]Some of the most known examples are the Thirty Years' War, The Nine Years' War, The Great Northern War, The War of the Spanish Succession, The War of the Quadruple Alliance, The War of the Austrian Succession, The Seven Years' War and The Revolutionary Wars. Even a moderately strong country such as Sweden fought in more than 20 wars between 1600 and 1820, involving several opponents in some of these ($http://en.wikipedia.org/wiki/List_of_Swedish_wars$).

after the breakdown of one of the first international security regimes, the Vienna Congress System. The system was established after the Napoleonic Wars, but broke down after a few years.[22] The logic of the model above is actually supported by the relatively low incidence of wars during the existence of the Vienna Congress system, as it can be considered a relatively structured European security regime. Such a regime lacked in South America during the period considered in Table 7.3, as Simon Bolivar failed in his attempts to create a union between the newly independent countries.

In Asia, ASEAN was created in 1967, but crucially only included five Southeast Asian countries until 1984. This may have contributed to the higher relative incidence of interstate wars in Asia when compared with Africa. Indeed, Goldsmith provides some evidence for the hypothesis that ASEAN membership significantly reduced the probability of disputes, when studying an Asian sample (Goldsmith 2007, 14).

To sum up, the existence of the OAU in post-colonial Africa separates Africa from the other cases considered above. The other factors, namely lack of historically solidified boundaries, low level of economic development and a high incidence of non-democratic regimes, were relatively similar between the cases. These variable-configurations lend support to the claim that the OAU contributed to the relatively low incidence of interstate wars in Africa.

Empirical examples from post-colonial Africa

Another type of (indirect) evidence for the relevance of the model proposed above are the actions pursued by the OAU and its members when actual conflict or dispute over territory broke out. The norm of territorial integrity was tested eight times after 1973 under the OAU regime (Zacher 2001). Only one of these violations of the territorial norm turned out to be successful for the violator; the Moroccan inclusion of Western Sahara before the territory's decolonization from Spain in the mid-1970s. Most of the OAU members opposed the move, but were unsuccessful in pressuring the Moroccans.

In all the other territorial disputes, the norm of territorial integrity triumphed, and the aggressors came out empty-handed. Also before 1973, the OAU is credited for successfully defending the norm of territorial integrity. In 1964, when Somalia sent troops into Ethiopia and Kenya, "Somalia was pressured by the OAU to withdraw" (Zacher 2001, 230). Likewise in 1965, "the OAU also successfully pressured

[22] See for example Palmer, Colton and Kramer (2002, 460–461).

Ghana to withdraw from a small area of neighboring Upper Volta" (Zacher 2001, 230).

One important implication of these unsuccessful attempts, was their effect on the beliefs of African leaders regarding the probability of gaining territory by invasion, without incurring costs imposed by other members. Since the OAU norms were quite consistently followed by most actors, it would presumably not be likely that future foreign ventures could lead to easy gains. In terms of the model, the estimated w was low, and probably also negative, if large and coordinated sanctions from OAU members, with a high probability, followed attempts at occupying territory in another state. According to Zacher, "[t]he OAU members have exerted significant diplomatic pressure on aggressor states, and they have influenced outside powers to back OAU positions against territorial aggression" (Zacher 2001, 231). This again would lead rational leaders to think twice before intervening in a neighboring country for territorial gain.

An additional argument for the plausibility of the above described effect of the OAU-based security regime is derived from cases where one a priori could have expected that different African actors would have intervened ("most likely cases"), but where intervention did not happen. Clapham (1996*a*, 188–190) assesses three such most likely cases, where actors could have intervened on humanitarian grounds or because of other concerns. These were Amin's regime in Uganda, Bokassa's regime in The Central African Republic and Nguemas' regime in Equatorial Guinea.[23] As Clapham notes, these cases show the malfunctioning of the principles of sovereignty and non-interference when it comes to protecting citizens and humanitarian rights. But, they also illustrate how these principles could function in the interest of African rulers wanting to stay in power. Despite much criticism, other African countries and the OAU as an organization did little to act upon the human rights abuses by the three regimes, and this passivity is congruent with the model framework developed above.

All the three regimes came to an end in 1979, and as the Tanzanian intervention into Uganda reminds us, there are no deterministic regularities in the social sciences.[24] Indeed, Clapham (1996*a*, 189) argues that when the three regimes, notably

[23]Amin eventually fell due to a Tanzanian invasion, a rare example of an African dictator being ousted in this way. However, Clapham argues that one could have expected intervention long before.

[24]Another interesting historical event that suggests that the model framework above describes tendencies rather than deterministic regularities, is that Gabon, Cote d'Ivoire, Tanzania and Zambia supported Biafra under the Nigerian civil war. Even if the model deals mainly with interstate wars, the explicit support for secessionist movements within the boundaries of one of the more powerful actors in the system runs contrary to the self-interested coordination logic proposed above

including that of Amin, were overthrown, "the sense of continental relief was such that external involvement was tacitly ignored". If this is true, and it was known by Nyerere before his invasion of Uganda, the model would suggest that the estimated high p could have been crucial to Nyerere before taking the invasion-decision. Tacit "approval" by other leaders meant a minimal risk of retribution from other actors at a later point in time.

There is actually more to the Tanzanian invasion of Uganda that illustrates the logic of the model above. Amin had before the invasion allowed his soldiers to plunder in Northern Tanzania, and Nyerere's response can therefore be considered as an illustration of the reciprocal logic of the model; Amin's disrespect for the territorial integrity of a neighbor triggered a response that "in the next period" cost him his power. Moreover, Meredith (2006, 238) claims that it was the fear of dissent within Amin's army, his most important backers, which led him to allow troops to go into Tanzania in the first place, in an attempt to divert the soldiers from internal fighting. In terms of the logic of the model, Amin feared that his chance of losing power would be high without intervention, but the intervention triggered a response from a foreign ruler that led to his downfall.

One of the hypotheses derived above was that intervention was more likely if the potential intervened upon country posited a government that was considered threatening to the security of the leader in the potentially intervening country. Regional expansions of civil wars in Africa have come in circumstances where national regimes outside the civil war zone have had large stakes there. Although one is not dealing with traditional interstate wars in such cases, this particular interaction pattern sheds some light on the logic proposed above.

To exemplify, the ECOWAS force, ECOMOG, that intervened in the Liberian civil war in the early 1990s was largely initiated by Nigeria. It can be argued that the "spill-over" potential of this civil war was one factor that led Nigerian and other Western African leaders to intervene in that conflict (Dokken 2008, 64). A spill-over of conflict is definitely not desired by leaders who would like to stay in power. Dokken explicitly claims that the Babangida regime in Nigeria felt threatened and believed that its own government could be overthrown as a consequence of Charles Taylor's successes in Liberia.

Another interesting point, in relation with the above model, is that the Nigerian

(Saideman 2001, 74–83). However, most African regimes supported the Nigerian government, as exemplified by the 36 or more votes to 4 on Nigerian government vs Biafra issues in the OAU (Saideman 2001, 99). The Nigerian civil war was also particularly notable for the degree of external support for the secessionist movement, making it a "special case" in the post-colonial African context (Clapham 1996*a*, 112).

President Babangida actually justified the invasion with a reference to defense of territorial integrity, as Charles Taylor's forces had "killed thousands of Nigerians who were hiding in the Nigerian Embassy" (Dokken 2008, 64). By invoking the norm of territorial integrity after the embassy attack, the Nigerian government could thereby more easily escape reciprocal actions from other actors. Note also that the intervention in Liberia was made under the ECOWAS umbrella. A cooperative intervention reduces the risk of making enemies with other rulers within the "regional security complex" (Buzan 1991), thereby making it possible, in this case, to uphold a cooperative equilibrium after the end of the Liberian conflict.

A second example comes from the Democratic Republic of Congo's bloody civil wars, where several foreign actors intervened. The total collapse of the Congolese state constituted a grave security threat to many neighboring regimes, such as those in Rwanda, Burundi and Uganda. The Kagame regime in Rwanda, for example, felt threatened by the Hutu militias hiding in the Congolese jungles. This security threat was arguably the most important reason for the Kagame regime to intervene, even if some analysts point to many different objectives underlying the intervention, especially in the Second Congo War (Longman 2002). One of the objectives Longman (2002) points to was the importance of using the external enemies in Congo as a means of shoring up support inside Rwanda and uniting the country behind the regime. Although this argument differs from the specific mechanisms proposed in the model above, it is perfectly in line with the more general argument of regime security being a dominating motivation for the conduct of foreign policy.

Several actors intervened in the Second Congo War, and not all of these can be argued to have faced imminent regime threats from the events in the Congo. However, the pattern of several regimes intervening on behalf of the Congolese government, like the regimes of Zimbabwe, Angola, Namibia, Chad, Sudan and Libya, seems to fit the logic of reciprocal intervention, even if these actors did not attack for example Rwandan territory, but operated within Congo itself. The principles of sovereignty and upholding a legal national government in the DRC were the official justifications behind for example the Zimbabwean regime's intervention (Rupiya 2002), although the motivation of obtaining economic resources is likely to have been a key driving force (Koyame and Clark 2002).

Nevertheless, security of regime-considerations was among the most important factors for the first actors intervening in the DRC, and the Congolese War does therefore not undermine the model. One should also note that the Congo Wars were not traditional interstate wars and that they played out in the waning days of the OAU, with the relative decline of the principle of non-interference (Dokken

2008; Francis 2006).

In extension of the last qualification, one of the best tests of the hypotheses deduced above may come from observing the pattern of interstate conflicts in Africa over the next decades. According to African scholars, the international political environment has changed in Africa after the end of the Cold War, temporarily culminating with the construction of the African Union to replace the OAU in 2001.[25] Under the AU regime "the notion of national sovereignty does not have such a strong standing as used to be the case with the OAU" (Dokken 2008, 21). In the words of (Francis 2006, 129) "[p]olitical sovereignty is no longer sacrosanct, and it is now replaced by the right to intervene in member states in situations of state collapse, war crimes, genocide and for human right protection purposes". If one asserts that international regimes and their make-up may matter for conflict patterns, and more specifically accept the proposed theoretical model above, one empirical prediction is that one will see more interstate conflicts in Africa in the years to come. Indeed, the perhaps most clear-cut example of a "traditional" interstate war, the war between Eritrea and Ethiopia, came in the last days of the OAU, after the principles of the "old" international security regime had been weakened.[26]

7.2.10 Some conclusions and implications from the analysis

It may seem strange that a framework developed by Keohane (1984) for understanding the cooperation between states in political economic matters can be modified and applied to security issues on the African continent. However, as Jackson (1987, 521) notes, international regimes are relevant also when it comes to issues of sovereign statehood and intervention.[27] The Keohanian framework was modified so that states were substituted with political leaders as units of analysis. A formal model was specified to provide precision and stringency to the argument: Rational actors engage in voluntary cooperation because of the shadow of the future. In this model, the actors' cooperation relate to not attacking each other's territories.

The OAU has been called a failure by many analysts, for not providing security to

[25]For good discussions on how some of the major African nations' leaders saw it in their interest to reform the OAU and ultimately form the AU, see Francis (2006, 24–31) and Dokken (2008, 122–126).

[26]Saideman (2001) ran statistical tests on the existence of regime support of ethnic groups abroad in the 1990s, and found that such external support was not less prevalent in Africa than other places. Saideman portraits this as a finding that the reciprocal logic utilized here has poor explanatory power in general. However, the model presented here was mainly applicable from 1963 to the end of the Cold War. Moreover, support of ethnic groups is not equivalent to conducting an interstate war.

[27]See also Jackson (1990).

citizens of different African states from internal (civil) war, human rights violations and persecution. This might be true. But, given the identification of the rulers as relevant actors, and given these actors' motivational structure, the OAU was certainly not a failure for the system's main actors themselves. The OAU contributed to relative international stability, thereby bolstering the position of Africa's Big Men, who are famous for their long tenures in power (e.g. Chabal and Daloz 1999, 32–37). As Jackson and Rosberg (1982, 18) acknowledged, "there is a common interest in the support of international rules and institutions and state jurisdictions in the African region that derives from the common vulnerability of states and the insecurity of statesmen", and this insight is core to the analysis above.

One contribution from this section is an elaboration on the link between national regime type and interstate war. The argument does not rock the boat for the "democratic peace thesis". The empirical regularity that democracies seldom fight each other is no doubt one of the strongest regularities in the social sciences.[28] However, the argument in this section could provide insights into the specific conditions that may lead dictators to refrain from engaging in warfare with one another. African dictators were often in power for a long time, and interacted under a clearly specified framework set out by the OAU. Combined with a top priority of continuation in office, these features might have led the dictators to coordinate on a non-intervention equilibrium, out of fear for retribution and loss of office in the future.

The shadow of the future restrained African dictators from following short-term interests in foreign policy in the same way that Olson's (1993) hypothetical dictator with a long time horizon refrains from extracting too many resources from the economy, because of a reduced tax base in the future. Would dictators with a high probability of staying in office despite intervention, dictators with a short time horizon, or dictators interacting under a less well-specified international regime have acted in the same way? I believe not. My proposition is that African dictators did not refrain from international warfare because of an inherent respect for other countries' borders. They by and large minded their own business because they were afraid that acting otherwise could cost them their position in the future.

This result is interesting for the main questions addressed in this thesis, which are related to the economic effects of political regime types, when combined with the analysis in the previous section on security threats and economic policies and outcomes. The relative lack of external security threats in post-colonial Africa, described in this section, would according to the analysis in the previous section imply that African dictators lacked a strong incentive to generate economic growth.

[28] See for example Raknerud and Hegre (1997).

The OAU-based international security regime in Africa may thus, despite its effect on reducing the probability of interstate war, have contributed to the extremely poor economic performances in African dictatorships, although there are also several other plausible factors that may have contributed to this outcome (e.g. Easterly and Levine 1997; Knutsen 2009).

As discussed above, the economic performances of African dictatorships contrast starkly with the performances of some Asian dictatorships after 1960, and countries such as South Korea and Taiwan then also faced a quite different security environment. Also as noted above, I have elsewhere found evidence for the hypothesis that dictatorship is particularly detrimental to economic growth in Sub-Saharan Africa (Knutsen 2009), whereas dictatorship does not seem to have reduced growth rates (in general) in Asia (Knutsen 2010*b*). The differing regional security environments may be one factor contributing to the different economic effects of dictatorship on the two continents.

7.3 Dictatorship types and protection of property rights

The discussion above pointed out security threats to the regime as a vital explanatory variable for diverging development paths among dictatorships. However, as mentioned multiple times above, there are several other factors that may impact on the economic performances of dictatorships. Bueno de Mesquita et al. (2002, 2003) point to the size of winning coalitions, and Besley and Kudamatsu (2007) to the autonomy of winning coalitions. Wintrobe (1990, 1998) investigates the varying policies followed by dictators with different motivational structures, and Jones and Olken (2005) show empirically that individual leader characteristics matter for economic performance in dictatorships. However, the formal-institutional structure in place in a dictatorial country is also likely to have a strong effect on economic performance (e.g. Przeworski et al. 2000; Gandhi 2008).

In Knutsen (2011*b*), I investigated the difference in property rights protection between democracies and dictatorships in general. However, there may be differences in property rights protection also between different dictatorship *types*. Several theoretical models yield testable implications on differences in property protection among different types of dictatorships, and some empirical results exist (Bueno de Mesquita et al. 2002, 2003; Besley and Kudamatsu 2007; Clague et al. 2003). However, I focus here on differences in institutional structures. Hence, in this section,

I investigate whether type of dictatorship, differentiated according to existence of election or not, hereditary succession or not and military control or not, impacts on one of the most important economic-institutional determinants of economic growth, the protection of private property rights.

I utilize the classification from Hadenius and Teorell (2007*b*) to investigate whether different dictatorship types protect property rights differently; more specifically, I test whether the various specific types protect property differently from democracies. Hadenius and Teorell (2007*b*) classify dictatorships accordingly: Traditional Multiparty, Partyless, Dominant Party, Military Multiparty, Military traditional, Rebel regimes, Military no-party, No-party traditional, One-party traditional, One-party monarchy, Traditional monarchy, No-party monarchy, Multiparty monarchy, Civil War, Occupation, Theocracy, Transition and Other (see also Hadenius and Teorell 2007*a*). I collapse military regimes into one category and monarchies into one category. These categories are developed on the basis of the three main institutional distinctions noted above: existence of elections, hereditary succession and military control.

7.3.1 Theoretical arguments, in brief

In Knutsen (2011*b*), and somewhat more briefly in Chapter 1, I reviewed the different theoretical arguments on why democracy may affect property rights protection. Quickly summed up, democracy may hurt property rights protection because of class-based voting and the relatively poor median voters' desire to redistribute from the rich. However, the literature also points out that democracy may improve property rights protection because it provides constraints on political elites, who may grab property because of personal political or economic gain under dictatorship. Interestingly, plausible counter-arguments to these two arguments also have implications for *which types* of dictatorships are more likely to provide decent property rights protection.

The counterfactual regime in the argument that democracy undermines private property rights is often (implicitly or explicitly) a right-wing dictatorship, where "[c]onservative politicians and the military intervene to sustain the property rights of capitalists" (Boix 2003, 16). This description might fit Latin America in the 1960s and 70s, where several right-wing military dictatorships came to power through coups, with either explicit or tacit support from the economic elites (Smith 2005, 82–83). In these countries, the underprivileged landless poor or the workers in urban industries, often supportive of socialist political parties, were considered the

threats to existing (and often highly inegalitarian) private property arrangements. A "strong man" or "strong men" in power were deemed necessary by many in the economic elites in order to prevent these relatively poor groups from altering the existing property distribution.

However, the argument that dictatorship will protect property rights from expropriation by the poor is not necessarily plausible if the dictatorship is a left-wing dictatorship, and particularly if it is Marxist. Marxist regimes have mostly been dictatorships. Collectivization of private property did therefore historically not go hand in hand with ("true") democracy, as Marx predicted, but rather with a specific type of dictatorship that at least claimed to follow Marxist principles. Marxist ideology, with its focus on collective ownership to the means of production, is one obvious explanation of weak private property rights protection in these dictatorships. However, if the Marxist regimes' supporters, their "winning coalitions" (Bueno de Mesquita et al. 2003, 51), include poor industrial workers, nationalization of industrialists' capital might also be a sensible political survival strategy. One likely empirical implication from this short discussion is that left-wing dictatorships are worse at protecting property rights than right-wing dictatorships.[29]

What about the threats to property from a dictator who is not particularly constrained by formal institutional structures? Let me assume dictators are motivated by both present and future personal consumption. If so, some dictators may have incentives to restrain grabbing of property. As already discussed, Olson claims that a stable dictator may act as an "owner" of his country, and thus will have an "incentive to make his property productive" (Olson 2003, 115). Excessive property rights violations will negatively affect the subjects' incentive to produce, thereby reducing the future resource base from which the dictator can extract: "The rational stationary bandit will take only a part of income in taxes, because he will be able to exact a larger total amount of income from his subject if he leaves them with an incentive to generate income that he can tax" (Olson 2003, 115).

One insight from Olson (2003) is the importance of the dictator's time horizon for incentives to protect property rights. Dictators will more likely refrain from confiscation and repudiation of contracts when they expect to stay in power for a long time. Long-term investments are necessary for economic growth. Therefore "an autocrat who is taking a long view will try to convince his subjects that their assets will be permanently protected not only from theft by others but also from expropriation by the autocrat himself. If his subjects fear expropriation, they will

[29] Another implication is of course that the relevance of the argument on class-based threats to property under democracy depends on the type of dictatorship one compares democracy to.

invest less, and in the long run his tax collections will be reduced" Olson (2003, 124).

Analogous reasoning applies to why dynastic regimes may protect property rights relatively well. If the monarch values the welfare of his son, daughter, or any other successor, he may want to give him or her a well-functioning economy as a bequest. Organized succession in dictatorship is often problematic because of lacking institutionalized succession mechanisms and the personalization of power. In democracy, elections provide a nice institutional solution to the succession problem. However, the long dynastic reigns of Royal families in Europe shows that it is possible to institutionalize succession also under dictatorship. Therefore, "dynastic succession can be socially desirable, both because it may reduce the likelihood of succession crises and because it may give monarchs more concern for the long run and the productivity of their societies" (Olson 2003, 126). Hence, monarchic dictatorships may be expected to protect property rights better than other dictatorships.

One empirical implication from the argument above is that dictators who expect to be in power for a long time protect property better than those who expect a short span in office (see also Clague et al. 2003). Military dictatorships generally tend to be short-lived (Geddes 2003*a*, 47–86), and one could expect weak protection of property in such regimes. However, military regimes often voluntarily return to their barracks after having achieved an increase in military budgets (Geddes 2003*a*; Wintrobe 1990). Military budgets arguably increase with GDP, everything else being equal, and military regimes may thus have incentives to protect property rights even if they are short-lived. Moreover, military regimes, at least in Latin America and Southern Europe, have often been supported by the economic elites, and this should generate incentives for protecting property rights (e.g. Przeworski and Limongi 1993; Acemoglu and Robinson 2006*b*; Knutsen 2011*b*). Therefore, the aggregate effect of military dictatorship on property rights protection is difficult to predict.

In multi-party authoritarian regimes, there exist multiple contending power-centers, which should reduce the life-span of the incumbent regime and thereby generate poor property protection. Empirically, these regimes are then also short-lived (Hadenius and Teorell 2007*b*). However, such regimes resemble democracies more closely in terms of power dispersion than other dictatorships, and this should positively affect property rights protection. Thus, also the aggregate effect of multi-party authoritarian regimes on property rights protection is difficult to predict.

7.3.2 Empirical analysis and discussion

In order to test whether there are differences between the various dictatorship types when it comes to property rights protection (or rather if the different types of dictatorships differ significantly from democracy in terms of property rights protections), I use the most parsimonious and the most extensive (short time series) models described in Chapter 4, namely Models I and IV. However, I leave out the FHI and enter the Hadenius and Teorell dummies described above (see Hadenius and Teorell 2006, 2007*a*,*b*). The ICRGPROP index described in Chapter 4, and in Knutsen (2011*b*), is the dependent variable. To quickly sum up, this index incorporates aspects related to expropriation risk, contract repudiation risk, and threats to property stemming from a general lack of law and order in a society. ICRGPROP ranges from 0 to 24 (strongest protection of property rights). Democracy, as defined by Hadenius and Teorell, is the reference category in the regression models below.[30] All estimated effects are therefore the estimated change in ICRGPROP when going from democracy to a particular dictatorship type. I have no suggestions for valid instruments for dictatorship types, and therefore apply OLS with PCSE, random effects (RE) and fixed effects (FE). This means that I do not take endogeneity of regime into account, and the results should thus be interpreted with care. For example, it may be that the military regimes take over in situations where instability and poor property rights protection prevail.

Tables 7.4, 7.5 and 7.6 provide the coefficients and t-values for the most common dictatorship types. Results for some categories with few observations, for example "theocracy", are left out of the tables. Many of the unreported dummies were significantly negative. In general, most reported regime dummies are negative, independent of estimation method. There is no robust evidence that any of the dictatorial regime types protect property rights significantly better than democracy, although the analysis reveals some substantial differences between the dictatorship types.

Particularly dictatorial monarchies and dominant party regimes fare pretty well in terms of providing decent property rights protection. Actually, there is no robust evidence that these regimes protect property worse than democracy. Olson's argument (2003) highlighted the benefits of hereditary succession to property rights, and this may explain the insignificance of the monarchy dummy in all models, except for Model I when using RE (negative effect, significant at the 1% level). For exam-

[30] More specifically, "[u]sing the mean of each country's Freedom House and Polity scores, converted to a scale from 0 (least democratic) to 10 (most democratic), we distinguish democracies from autocracies at a score of 7.5 – the authoritarian family consisting of all regimes with a score below that point" (Hadenius and Teorell 2007*b*, 145).

	Model I		Model IV	
	b	*t*	*b*	*t*
Multi-party	-0.582***	-2.91	-0.615***	-3.07
Dom. party	-0.237	-0.85	-0.118	-0.41
Monarchy	-0.281	-0.43	-0.028	-0.05
Military	-0.870***	-2.98	-0.514*	-1.85
One party	-0.647*	-1.73	0.144	0.38
Ln GDP pc	2.170***	10.54	1.851***	8.01
Ln reg. dur.	0.126**	2.14	.	.
Ln popul.	-0.136	-1.48	0.250**	2.36
Ethn. fr.	0.263	0.42	0.909	1.21
Africa	-2.470***	-3.25	-4.034***	-4.57
Asia	-2.070***	-3.70	-5.744***	-6.85
Lat. Am.	-4.469***	-6.45	-5.240***	-6.37
E.Eur+Sov.	-0.890	-1.61	-0.114	-0.25
MENA	-3.496***	-3.76	-4.084***	-4.08
Abs. lat.			0.005	0.34
Urban.			-0.008	-0.92
Trade			0.013***	4.79
British			-0.216	-0.56
French			-0.660	-1.25
Spanish			0.915	1.27
Portuguese			-0.740	-0.96
Belgian			-3.754***	-4.47
Sunni			1.414	1.03
Shia			0.922	0.64
Catholic			-0.053	-0.04
Protestant			1.498	1.07
Orthodox			-1.823	-1.31
Hindu			3.467**	2.19
Buddhist+			3.694**	2.34
Indigenous			0.933	0.60
1980s			-1.428**	-2.56
1990s			-0.184	-0.42
Constant	0.280	0.10	-3.274	-0.87
N	2468		2276	

Table 7.4: OLS with PCSE analysis. ICRGPROP as dependent variable. 2-year lag on independent variables. Short sample.

	Model I		Model IV	
	b	*t*	*b*	*t*
Multi-party	-1.210***	-6.07	-1.165***	-6.16
Dom. party	-0.455*	-1.77	0.409*	1.70
Monarchy	-1.825***	-2.80	-0.498	-0.84
Military	-2.687***	-10.52	-0.803***	-3.28
One party	-3.644***	-12.25	-0.811***	-2.64
Ln GDP pc	3.152***	14.30	1.753***	7.21
Ln reg. dur.	0.391***	5.44	.	.
Ln popul.	0.908***	6.84	0.424***	3.09
Ethn. fr.	0.059	0.06	0.605	0.61
Africa	3.304***	3.58	-1.856*	-1.75
Asia	0.126	0.16	-4.956***	-4.22
Lat. Am.	-1.085	-1.55	-3.576***	-3.33
E.Eur+Sov.	2.561***	3.59	0.186	0.23
MENA	0.977	1.26	-2.782***	-2.93
Abs. lat.			0.021	0.93
Urban.			-0.013	-1.24
Trade			0.015***	4.93
British			-0.366	-0.72
French			-1.052	-1.50
Spanish			0.541	0.55
Portuguese			-1.245	-1.18
Belgian			-4.355**	-2.52
Sunni			1.641	0.98
Shia			2.286	1.09
Catholic			0.441	0.25
Protestant			1.699	0.95
Orthodox			-1.272	-0.62
Hindu			2.783	1.13
Buddhist+			3.696**	1.97
Indigenous			1.370	0.73
1980s			-3.291***	-19.72
1990s			-1.048***	-8.11
Constant	-28.297***	-8.75	-6.011	-1.51
N	2468		2276	

Table 7.5: Random effects analysis. ICRGPROP as dependent variable. 2-year lag on independent variables. Short sample.

	Model I		Model IV	
	b	*t*	*b*	*t*
Multi-party	-1.085***	-5.98	-1.081***	-5.80
Dom. party	-0.261	-1.13	0.529**	2.19
Monarchy	-0.291	-0.41	-0.465	-0.67
Military	-0.664***	-2.68	-0.222	-0.90
One party	-1.796***	-6.22	-0.698**	-2.23
Ln GDP pc	3.946***	13.44	3.453***	9.75
Ln reg. dur.	0.160**	2.37	.	.
Ln popul.	8.717***	23.39	7.930***	12.75
Urban.			-0.114***	-5.70
Trade			0.011***	3.16
1980s			-1.565***	-6.72
1990s			-0.299**	-2.07
Constant	-161.375***	-26.63	-139.328***	-12.54
N	2563		2276	

Table 7.6: Fixed effects analysis. ICRGPROP as dependent variable. 2-year lag on independent variables. Short sample.

ple, both Saudi Arabia and Quatar scored a decent average, between 16 and 17, on ICRGPROP between 1984 and 2003.

When it comes to dominant party regimes, this category includes regimes such as Singapore under the PAP, Taiwan under the Kuomintang and South Africa under the Apartheid regime (Hadenius and Teorell 2006, 27–28). These regimes resemble the "dictatorship of the rich" in Boix and Acemoglu and Robinson's models addressed in Chapter 1 (Boix 2003; Acemoglu and Robinson 2006*b*) and in Knutsen (2011*b*). Such regimes are theoretically expected to generate strong property rights protection. Indeed, Taiwan, for example, had an average ICRGPROP score of 18.9 between 1984 and 1991. After democratization, between 1992 and 2003, Taiwan's average dropped slightly to 17.9. However, other countries, like South Africa, experienced increased ICRGPROP scores after democratization from a dominant party regime.

Indeed, the dominant party dummy is significantly positive in Model IV for both the RE and FE specifications, at the 10% and 5% levels, respectively. However, this result is not sufficiently robust for me to conclude that such regimes protect property rights better than democracies; in the RE Model I, the dominant party dummy is negative and significant at the 10% level. To sum up, there is no robust evidence that monarchies and dominant party regimes protect property either better or worse than democracies.

The results from the analysis point to a negative effect of having a one-party regime (relative to democracy) on property rights protection. As seen in Tables 7.5 and 7.6, the RE and FE coefficients are always significantly negative at least at

the 5% level. However, as shown in Table 7.4, the OLS with PCSE coefficient is only significant at the 10% level for Model I, and there is no significant effect for Model IV. The lack of a completely robust result on the difference between one-party regimes and democracies may result from one-party regimes having tended to be persistent (Geddes 2003*a*, 82). These regimes have often institutionalized the process of power transfer, which means the regime is expected to outlast the current ruler. This should generate strong protection of property rights according to Mancur Olson's argument presented above.

However, the one-party category is dominated by Communist regimes (see Hadenius and Teorell 2006, 29), which have historically been hostile to private property rights and rather promoted collective ownership of the means to production. For example, Mongolia's average ICRGPROP score was 6.9 when the country was ruled by a Communist one-party regime (after 1984 when the time series for ICRGPROP start), whereas the country's average score as a democracy from 1992 to 2003 was 14.0. Mongolia's increase in ICRGPROP is in the same direction, but larger than, the change predicted by all models. The largest negative estimated effect of having a one-party regime relative to democracy is -3.6 (Model I, RE), but most models predict a smaller effect. Nevertheless, some Communist one-party regimes have guaranteed decent *de facto* property protection; from 1984 to 2003 China's average ICRGPROP score was 14.8 and Vietnam's was 13.5.

As seen in Tables 7.4, 7.5 and 7.6, the effects of military regimes and particularly of authoritarian multi-party regimes are negative, and quite robust. Except for Model IV using fixed effects, the military dummy is significant *at least* at the 10% level in all models. As discussed above, many military regimes have historically been tied to economic elites, which was argued to likely generate strong property protection. However, this (possible) effect seems to be trumped empirically by another effect: Military regimes are generally short-lived, and thus have incentives to grab property before they exit. This seems to have been the case in Nigeria, which experienced several short-lived military regimes that engaged in property grabbing (Meredith 2006). For example, the average ICRGPROP score under General Babangida (1985–93) was only 8.9. Different countries, like Panama, Mali and even Chile, experienced marked increases in their ICRGPROP scores after democratizing from military regimes.

Authoritarian multi-party regimes also significantly reduce property rights protection relative to democracy. Indeed, this effect is negative and significant at the 1% level in all models. Multiple contestants for power shorten the predicted life-span of such regimes and contribute to short time horizons. In addition, the relative lack

of civil and political rights makes the property of ordinary citizens more exposed to greedy or power-hungry rulers than in a democracy, despite the existence of limited political competition in multi-party regimes. For example, Venezuela averaged only 11.4 on ICRGPROP as an authoritarian multi-party regime under Chavez from 1998 to 2003, and the average sank further to 8.2 between 2004 and 2007. As a democracy, from 1984 to 1997, Venezuela averaged 13.4. Chavez' regime has not only engaged in nationalization and expropriation, with varying degrees of compensation, in the petroleum, electricity, telecommunications and media sectors; it has also started redistributing agricultural land (Wilpert 2006). Venezuela's change in ICRGPROP is then also more dramatic than that predicted by the models' estimates, which range from -0.6 (OLS PCSE models) to -1.2 (RE models).

7.4 Summing up the chapter

In this chapter, I have analyzed selected different factors underlying the heterogenous economic performances of relatively dictatorial countries. The empirical result that democratic countries have far more homogeneous economic performances, for example in terms of economic growth, than dictatorial countries is very robust. I briefly presented some explanations from the literature, and elaborated in particular on the argument that different security threats to dictators and their regimes generate quite different incentives for the selection of economic policies, with subsequent effects on economic performance. Specifically, I argued that dictators mainly facing external security threats, in the form of a foreign army, are more likely to promote economic development-enhancing policies.

Furthermore, this explanation, combined with an analysis of the relative lack of external security threats directed against African dictators, was used to explain the poor economic performances of African dictatorships. Indeed, the differences in economic performance between African dictatorships and several Asian counterparts may to a large extent be due to these regimes' differing security-threat environments.

This explanation does not need to contradict with other explanations on the varying economic performances of dictatorships. In Knutsen (2009), I elaborated on an alternative mechanism, namely that the strength of state institutions, or degree of state capacity, has a particularly strong effect on economic performance in dictatorships (relative to the effect in democratic countries). However, a dictatorial country's state capacity is endogenous to the regime's policy choices, at least in the medium to long run. Policy choices may in turn be endogenous to the security-threat environment.

In this chapter, I also investigated how various institutional structures have relevance for differences in property rights protection among dictatorships, and found indications of quite strong effects.

The variation in economic performances among dictatorial regimes is very large empirically, and it is very likely that several mechanisms are at work to produce this outcome. Future research should seek to integrate these mechanisms into a coherent theoretical framework, and to empirically test the various mechanisms' relative importance and how these mechanisms interact.

Chapter 8

An analysis of democracy, income and subjective well being

In this chapter, I discuss and analyze the effects of average national income, income inequality and democracy on subjective well being (SWB). I introduce several explicit mechanisms through which these variables may affect SWB. An empirical analysis on a sample of around 100 countries indicates that GDP per capita has a significant effect on SWB, but there is no significant effect of either income inequality or democracy. The marginal effect of GDP per capita on SWB is, however, decreasing in the level of GDP per capita. Another result is that GDP per capita is not a worse predictor of SWB than the Human Development Index (HDI) or Sen's welfare function.

8.1 Does democracy or income affect subjective well being?

Average national income level, income inequality and political regime type are three of the social sciences' most studied macrovariables. Numerous books and articles have been written on their possible determinants and effects. However, academics and policy makers are often interested in for example economic growth not because they care about GDP numbers in themselves, but because a rich society provides better lives for its citizens. As I will discuss in Section 9.2.1, democracy may be considered as inherently desirable according to some important normative perspectives. However, a utilitarian would judge the desirability of a democratic regime also on the basis of whether it affects people's economic welfare.

Economists have elaborated theoretically on the effects of average income and of income inequality on both individual utility and aggregate social welfare. Historically, the relations between income and utility were mostly made by assumption and were seldom analyzed empirically, at least in "mainstream economics".[1] The traditional utility function in economics assumes a higher level of utility for higher levels of income, and most "social welfare functions" imply higher social welfare when inequality is lower, ceteris paribus.

When it comes to political regime type, political scientists and political philosophers have a long tradition of discussing the nature of the "good political regime". The individual freedom that comes with democracy and the related protection of human rights are argued by contemporary political theorists and political scientists to be crucial for people's possibilities to live good and autonomous lives (e.g. Dahl 1989; Beetham 1999; Inglehart and Welzel 2006). However, only a modest amount of empirical work has been conducted on the relationship between democracy and people's own evaluation of their happiness and life quality; their subjective well being (SWB).

With the invention of cross-national surveys on SWB, for example in the form of self-reported happiness or self-reported life satisfaction, it is possible to add some crude empirical observations and tests to the theoretical and philosophical discussions on factors that affect people's well-being, welfare or utility.[2] This chapter takes

[1] As I will discuss below, however, there now exist quite a few empirical studies on how income likely affects happiness and life satisfaction.

[2] This chapter does not attempt to conduct a thorough discussion on the relations between concepts such as utility, welfare and well-being. The relationship between welfare and average utility, for example, is not straightforward, and depends on the philosophical position on what constitutes welfare (Sen, 1973). Leaving this debate aside, the paper simplifies and assumes that

a closer look at the impact of GDP per capita, income inequality and democracy on SWB.

In Section 8.2, I briefly present the concept of SWB, some general theories related to what determines SWB, and some methodological problems related to studying it. In Section 8.3, I discuss the relations between average income, income inequality and democracy on the one hand and SWB on the other. This section presents theoretical arguments and previous empirical findings. Section 8.4 conducts a regression analysis on a relatively large global sample of countries, with average national SWB as the dependent variable. The main result from this analysis is that there is no significant effect from either income inequality or democracy on average national SWB. However, GDP per capita is a strong predictor of SWB, but the marginal effect of GDP per capita on SWB is strongly decreasing in the level of GDP per capita. Section 8.5 takes a closer look at some "challengers" to GDP per capita as measures of welfare. The Human Development Index is often argued to be a better measure of welfare than GDP per capita (e.g. UNDP 1990), and Sen (1973, 1976) argued convincingly for a welfare measure that incorporates income inequality. However, the analyses of SWB data indicate that GDP per capita is at least as good a proxy for SWB as the HDI and Sen's welfare function.

8.2 The study of subjective well being

Economists have traditionally been skeptical towards empirical measurement and interpersonal comparisons of utility. However, according to Frey (2008, 1), "[t]oday, there are many ways to proxy utility by measuring subjective well-being, the most prominent being global evaluations via surveys of life satisfactions. Methods range from evaluating happiness experiences in everyday life to brain scanning". The academic field studying SWB has expanded quite rapidly over the last years.[3] The study of the determinants of SWB comes mainly from so-called positive psychology, but social scientists from various fields have increasingly become interested in the social, political and economic determinants of SWB. Indeed, the early study by Easterlin (1974) pioneered the field, and this study stills serves as a starting point for modern studies on national income and SWB.

In order to theorize about how macro-determinants may affect SWB, one should first clarify relevant psychological mechanisms at the individual level. Veenhoven

social welfare in a nation is at least correlated with average levels of SWB. Kahneman (2000*b*) and Frey (2008, Chapter 2) provide two interesting discussions on relations between utility and SWB.

[3]For two different overviews, see Frey (2008) and Layard (2005).

and Erhardt (1995) contrast three general, theoretical frameworks of happiness: comparison theory, folklore theory and livability theory.

The first alternative, comparison theory, assumes that an individual's evaluation of his or her life is based on perceptions of actual life compared to a standard of "life as it should be". These standards are, however, not fixed, but endogenous to perceived opportunities (Veenhoven and Erhardt 1995, 1–2). These opportunities, in turn, are determined by among other things the perceptions of others' well-being. Therefore, relative income and relative endowments of different goods are argued to be important for self-reported life satisfaction (see Layard 2005). Although a country becomes richer, or more democratic, self-reported happiness may not increase in the long run. This is because people evaluate their life relatively against what they perceive is the life-quality of others within their society (for example neighbors and celebrities), rather than on the basis of objective endowments.

The second alternative, folklore theory, relates individuals' evaluation of their own life to "a body of widely held notions about life, that is part of national character" (Veenhoven and Erhardt 1995, 2); it is therefore assumed that SWB is not particularly related to "objective qualities of life", such as for example income. Cultural characteristics determine SWB, and these cultural characteristics are assumed by folklore theory to be relatively fixed. It should be noted, however, that "cultural characteristics" is a broad and vague category. It should also be noted that for example Inglehart (1997) and Inglehart and Welzel (2006) have argued convincingly that different attitudes and values, which may again be relevant for SWB (Inglehart et al. 2008), are endogenous to for example income level.

The third alternative, livability theory, assumes that "subjective appreciation of life depends in the first place on the objective quality of life; the better the living-conditions in a country, the happier its inhabitants will be" (Veenhoven and Erhardt 1995, 2). Livability theory is the one among the three theoretical frameworks that most clearly predicts that income level and democracy contribute positively to SWB. However, both the livability and comparison theory could be used to predict an effect of income equality on happiness, if one were to make some extra assumptions (for example decreasing marginal utility of income for livability theory or a stronger negative effect of unfavorable comparisons and a relatively weaker positive effect of favorable comparisons for comparison theory).

When it comes to operationalizing SWB concepts, for example happiness, there are several plausible reasons for why self-reported measures are irreliable. Self-reported levels of happiness can be influenced by different framing effects and cognitive biases (Kahneman 2000*a*). It can therefore be questioned whether self-reported

happiness or self-reported life satisfaction measure actual happiness or actual life satisfaction. However, as Inglehart et al. (2008, 32) note, 97% of the more than 350 000 respondents to the World Values Survey (WVS) answered the questions on SWB. This may indicate that "[h]appiness is an immediately accessible feeling, not something that requires elaborate cognitive processing. Consequently, when people are asked whether they are happy, they can and do give meaningful responses" (Inglehart et al. 2008, 33).

Moreover, if there is only random measurement error in the SWB data, the aggregation procedure from the individual to the national level will mitigate them in macro-studies. There may, however, be validity problems with the SWB measures also at the macro-level; language differences may not be captured in a broad comparative survey, and national reporting of happiness may be influenced by translation.[4] The discussion below on the possible biases in the estimated effects of inequality and democracy on SWB will point to some other potential validity problems.

8.3 Political and economic determinants of subjective well being

8.3.1 Average income and subjective well being

Easterlin (1974) conducted an early groundbreaking study on income and SWB. This study gave rise to the so-called "Easterlin Paradox". Easterlin found that although there had been strong economic growth in the USA over a decent time span, there had been no growth in average reported SWB. How can this result be explained? First, there is the adaptation argument, which is based on psychological and neuro-scientific evidence. This argument indicates that people adapt relatively quickly to new situations. In the case of income, people seem to achieve a higher utility initially after income increases. But, this effect dies out after a small period of time, as people adapt to their new income level (Kahneman 2000*b*). One mechanism that contributes to this result is so-called preference drift; people report that they require more income for living a decent life when they have higher de facto income levels (Frey 2008, 38).

Another argument that triangulates well with the seemingly lacking effect of average income on average SWB is presented by Layard (2005): People's SWB seems

[4]See Chapter 2 in Frey (2008) for a survey of different validity and reliability issues. Many reliability and validity tests indicate that the problems with SWB measures are not as critical as skeptics might think.

to respond strongly to relative incomes, and not necessarily to absolute incomes. People to a large extent evaluate their incomes relatively, comparing it to for example their neighbor's income, the perceived income of people they watch on TV, or the perceived average national income. Hence, growth in GDP may not contribute to average happiness if the distribution of income, in relative terms, is held constant.

Both of the above arguments can be related to what was referred to above as comparison theory. Simpler arguments can be drawn from folklore theory (fixed nation-specific cultural characteristics matter for SWB), or by assuming that other factors in life, like family and religion, are more important than income for SWB (Easterlin 1974). However, is the finding that absolute income does not affect SWB generally valid?

Later studies have been conducted on the relationship between average income and average SWB. For many OECD countries, time series data indicate a small positive effect of GDP growth on average SWB (Veenhoven and Hagerty 2006). For poorer countries, most of the time series available show a positive correlation between GDP growth and average SWB (Veenhoven and Hagerty 2006; Inglehart et al. 2008). Because of the few decent time series available, at least for developing countries, a possibly better way of assessing the effect of income on happiness is through looking at cross-sectional evidence. Such evidence allows for comparisons of very poor and very rich countries, and thus increases the variation in the independent variable. Early cross-section evidence indicates a positive effect of income on SWB (Diener, Diener and Diener 1995). Moreover, the very thorough empirical study by Stevenson and Wolfers (2008) also, and quite convincingly, show that SWB increases with income. This latter study draws on both between-country and within-country (inter-temporal) variation.

8.3.2 Income inequality and subjective well being

If absolute individual income is linked to level of SWB, one would suspect that a high dispersion of income in a society would lead to a high dispersion of SWB. However, there may also be effects of income inequality on average levels of SWB. First, inequality aversion at the social level could stem from decreasing marginal utility of income at the individual level (Lambert 2001, 94–97). Second, if people in a society do not evaluate their incomes primarily against the national median income, but against the top incomes in society, comparison theory indicates that inequality

reduction probably has a positive effect on average SWB.[5] Third, there may be other psychological mechanisms that contribute to a distaste for inequality that are independent of one's own income. There is, for example, evidence indicating that rich left-wing Americans' SWB are negatively affected by high inequality (Di Tella and MacCulloch 2006, 42). One could invoke the concept of 'social preferences' to account for this finding. Fourth, inequality reduction may contribute to social and political stability (Alesina and Perotti 1996) and increased trust and social cooperation (Jordahl 2007), which may again affect average SWB positively.

Nevertheless, the empirical estimates from the literature do not corroborate the hypothesis of a negative effect of income inequality on SWB. Ott (2005) found a strong *positive* correlation between income inequality and average level of happiness in poor countries. Additionally, Ott only found a low correlation between income inequality and happiness inequality, both among rich and poor countries (Ott 2005, 410). Veenhoven (2000*b*) studied the relationship between social security spending and happiness, and found that neither the average level nor the dispersion of happiness scores within a country is related to social security spending. Diener, Diener and Diener (1995) found, when investigating SWB measures from different surveys, that there are positive bivariate correlation coefficients between average income, political and civil rights and income equality on the one hand and SWB on the other. The average income and political and civil rights correlation coefficients were generally significant at the 1% level, whereas the income equality measures were sometimes significant at the 5% and 1% levels and non-significant in other specifications. However, when incorporating control variables, the significant effect of income equality (and political and civil rights) generally disappeared. Helliwell and Huang (2008) do not find any significant positive effect of egalitarian income distributions on SWB either. Thus, there is no strong evidence based on cross national data for a direct effect of inequality on average SWB.

It may be argued that the average national happiness level is not an appropriate measure of general welfare in a society. Veenhoven and Kalmijn (2005) propose an index that is intended to capture both utilitarian concerns and egalitarian concerns. They call this measure Inequality Adjusted Happiness (IAH) index. IAH has a relatively complex construction, but the underlying idea is to give equal weight to utilitarian (average) and egalitarian concerns (inequality based on the standard deviation). The measure is monotonically increasing in the $\frac{mean}{standarddeviation}$ ratio.[6] The

[5] This would clearly depend on how reduction in inequality comes about. The argument indicates that especially redistribution from the top income brackets would have a strong positive effect on SWB.

[6] Kalmijn and Veenhoven (2005) provide an interesting discussion and analysis on nine different

IAH had a strong positive zero-order correlation with wealth and political freedom, when data on IAH from the 1990s for around 80 countries were used. However, income inequality was not found to have a strong correlation with the IAH, and the correlation between political freedom and IAH dropped markedly when controlling for wealth (Veenhoven and Kalmijn 2005, 434).

8.3.3 Democracy and subjective well being

As I will discuss below, plausible arguments can be made for the hypothesis that democracy enhances SWB, although the empirical evidence is mixed. Nevertheless, compelling arguments can be made for the desirability of democracy, also without invoking its possible effect on SWB: Rawls (1999) focused on the distribution of political and civil rights in his treatise on justice. These should, according to Rawls, be lexically prioritized over economic welfare considerations when it comes to choosing the design of "just institutions and policies". Under the Rawlsian veil of ignorance, individuals would not be willing to compromise their political and civil rights for economic gains. Even if this claim could be questioned, most political theorists and philosophers argue that freedom and basic rights and liberties outside the economic realm are normatively valuable in themselves (Sen 1999; Nozick 1974; Beetham 1999). As Rawls (1999) argues, political and civil liberties and rights are important for allowing people to be autonomous; that is, allowing people to be able to define how they want to live their lives, and act accordingly. The abilities to make free choices and live autonomously are also argued to be important for reported SWB (Inglehart et al. 2008).

As was implied by the discussion in Chapter 2, democracy is considered to be the regime type that best secures the protection of individual rights and political freedom. One may therefore assume that individuals value democracy in its own right, and not only because of its instrumental value in bringing forth different economic or other outcomes. Just consider the following thought experiments if you are currently living in a democratic society: How many dollars would you need to accept for agreeing to live under a dictatorship? Would you accept a 20% salary increase in exchange for your freedom of speech? Güth and Weck-Hannemann (1997) performed experiments on how many Deutsche Mark (DM) Germans would need to accept for the destruction of their voting cards in the 1994 election to the German Bundestag. More than 60 percent of the voters rejected to destroy their cards for

measures of inequality in happiness, and argue that the standard deviation is an appropriate indicator. They argue that the Gini coefficient is not suited for measuring happiness inequality because it assumes cardinal measurement level and happiness indexes are not cardinal.

the highest offered sum in the experiment, 200 Deutsche Mark (approximately 100 Euro).

Frey and Stutzer (2000) and Frey (2008) showed that citizens in Switzerland are happier the more extensive direct democracy is in their Canton. Moreover, by separating the effects of direct democracy on people who are and are not able to vote (non-citizens), they show that the positive effect of direct democracy is stronger for people who are able to vote. They take this as an indication that democracy not only produces increased "outcome utility", but also increased "procedural utility". Procedural utility is related to valuation conditions and processes, and not the outcomes that may result from them per se (Frey 2008, 107). Economists tend to focus on outcome utility, but a key result from Frey and Stutzer's study is that "[c]itizens do not only gain utility from the outcome of political processes and its material consequences but also from the democratic process itself. Citizens value the possibility of engaging themselves directly with politically relevant issues, quite irrespective of the outcome" (Frey 2008, 82–83). But, Dorn et al. (2005) re-estimate the effect of direct democracy on SWB in Switzerland, and find that the effect is not robust. In this study, relative income position is controlled for, in addition to the control variables used by Frey and Stutzer (2000).

A quite compelling and similar argument to the argument in Frey and Stutzer (2000) can be made with respect to the comparison of indirect democracies and authoritarian regimes at the national level. Citizens would be expected to value freedom of speech, participating in elections and so forth, independent of outcomes. As Frey notes, democracy could be expected to contribute to procedural utility "because it enhances individuals' perception of self-determination" (Frey 2008, 113). Psychologists have identified three central components that contribute to satisfying the need for self-determination (Frey 2008, 109). These are autonomy, relatedness and competence. The first relates to the desire to organize one's own actions. The second relates to connections to others and to belonging in a social group. The third relates to the desire to control the environment and be capable and effective. It is not far-fetched to argue that for example participation in political processes might affect the competence component, and that freedom of speech and organization might affect the autonomy component. One plausible hypothesis is therefore that there will be a positive direct effect of democracy on SWB, because of procedural utility aspects.[7]

[7]Moreover, if most citizens' preferences are better represented in policy making processes in democracies than in dictatorships, it would be natural to expect higher outcome utility on average in democracies as well. This does not only relate to economic policies and outcomes, as discussed in this dissertation, but for example also to policies on "moral issues".

There have already been conducted some cross-sectional studies of the relationship between democracy and SWB. Inglehart reports that the correlation between Freedom House's political rights and civil liberties indexes and self-reported happiness in the 1990s were "in the .7 to .8 range" (Inglehart 2006, 2). However, as Inglehart notes, the correlation could reflect either an effect of democracy on happiness, an effect of happiness levels on probability of having democratic institutions, or common prior variables affecting both happiness and democracy in the same direction. When Inglehart (2006) controls for GDP per capita, post-materialist values and economic growth, he finds no significant effect of democracy on average happiness levels, when using data from 43 countries. However, drawing on data from 38 countries, he does find evidence for the hypothesis that democratization affects shifts in national happiness levels over time, with some models finding a coefficient significant at the 5% level.

Schyns (1998) and Veenhoven (2000*a*) find a significant correlation between democracy, measured by FHI, and happiness. But, also in these studies the statistically significant link between democracy and happiness does not survive when GDP per capita is controlled for. These studies utilize samples of around 40 countries. However, Dorn et al. (2005), studying 28 countries, find a positive and statistically significant effect of democracy on happiness even after controlling for income and cultural characteristics. Not only is the effect of democracy significant, but the estimated effect is also quite large (see Dorn et al. 2005, 19–20). Helliwell and Huang (2008) use a very extensive sample in terms of number of countries included and find that "measures of the quality of government strongly dominate per capita incomes as determinants of life satisfaction" (Helliwell and Huang 2008, 617), when using quality of governance indices from the World Governance Indicators. However, not all of these indices are directly related to democracy.

8.4 Empirical analysis and discussion

8.4.1 Regression results

In the empirical analysis below, a measure related to life satisfaction, or more precisely experienced life quality, is used as dependent variable.[8] The measure, henceforth referred to as LIFESAT, is based on a question to which respondents may

[8]The focus on life satisfaction rather than on happiness relates the chosen SWB measure to the concept of eudaemonia (Frey 2008, 4–7), much discussed in Aristotle's Nichomacheian etchics (Aristotle 2004). The focus is on satisfaction related to leading a good life, rather than instant pleasure.

answer by choosing a score from 0 to 10, taken from the World Happiness Database (Veenhoven 2008): "Here is a picture of a ladder, suppose that the top represents the best possible life and the bottom the worst possible life. Where on this ladder would you place your current life?"[9]

Inglehart et al. (2008) construct an index from both a life satisfaction and a happiness measure, and claim that this index is more reliable. They are most likely right, as the aggregated index reduces the problem of unsystematic measurement errors and errors due to for example problematic translations of single questions. Inglehart et al. (2008) use panel data analysis on a sample of about 50 countries. The analysis below is in many ways a complement to that study, for example in the sense that the study here strongly expands the number of countries analyzed. Due to data limitations, however, this study is regrettably not based on a panel data analysis and has a less reliable measure than could have been constructed in a data set including a lower number of countries (only those with abundant SWB data).

Nevertheless, the LIFESAT measure has data for a large set of countries, and thus allows me to incorporate more than 100 countries in the analysis.[10] The most important benefit of expanding the number of countries is that I get a better representation of less developed and undemocratic countries, which often tend to be left out of other studies because of lacking data. As discussed in Chapter 4, this should reduce biases related to sample selection problems, which may seriously affect estimates.

As indicated by the literature review in Chapter 3, there are complex interlinkages between GDP per capita, income inequality and political regime type. Here, only the direct contributions to SWB from these variables are estimated, and indirect effects will be left out. A first approximation to the direct effects on SWB of average income, income inequality and democracy is obtained by running a regression with these three variables as independent variables and LIFESAT as dependent variable. All data used in this analysis are collected directly from the World Happiness Database, States of Nations (Veenhoven 2008). Average income is measured by ln PPP-adjusted real GDP per capita (average 2000–2004). Income inequality is measured by the latest available Gini coefficient (until 2005). Democracy is measured by the sum of Freedom House's political rights and civil liberties indexes (FHI)

[9] See Veenhoven and Hagerty (2006, 431).

[10] It should be noted that the scales utilized are only ordinal, and it would perhaps be advisable to use an ordered probit or logit regression instead of a linear regressions. However, this choice does not seem to make a big difference for results in studies on SWB (Ferrer-i Carbonell and Frijters 2004). The baseline methodology used in this chapter is linear regression with robust standard errors.

(average for the years 2000–2004).[11]

A linear regression with robust standard errors, based on 101 countries, indicates that only ln GDP per capita has a significant effect on LIFESAT, when controlling for the two other variables. This significant effect corroborates the results from for example Stevenson and Wolfers (2008). The t-value for ln GDP per capita is 11.6. Democracy has an estimated positive impact on LIFESAT, but the effect is small and insignificant even at the 10% level (t-value of -0.26). The Gini coefficient is also insignificant, with a t-value of 0.96. An increase in the Gini coefficient, which implies a higher level of inequality, actually increases the estimated average level of self-reported life satisfaction in a country.

The results are not different when I enter GDP per capita linearly, or when I run regressions with GDP per capita (both logged and linear) along with only the Gini or with only the FHI: The average income measures are positive and statistically significant at any conventional level, whereas the FHI and Gini are statistically insignificant even at the 10% level. Moreover, there is still no significant effect of democracy on LIFESAT when I use Vanhanen's index of democracy (for 2000), on a sample of 102 countries, or the World Governance Indicators' index on voice and accountability (for 2006), on a sample of 101 countries, together with ln GDP per capita and the Gini.

There may, however, be omitted variable bias driving the results above, as I did not control for exogenous cultural factors. As Inglehart and Welzel (2006) show, cultural characteristics such as tolerance and post-materialist values are relatively endogenous to income level and I do therefore not control for such aspects. However, the composition of people belonging to different religions in a country is relatively fixed over time, and can be treated as exogenous. I enter two variables for the world's two largest religions, one variable for the percentage of Christians in the population (in 2007) and one variable for the percentage of Muslims (in 2004). There may also be omitted exogenous characteristics correlated with a country's region that influence both SWB scores and the three independent variables investigated above. I therefore enter dummies for Africa south of the Sahara, North Africa and the Middle East, Asia, Latin America and a dummy for Eastern Europe and the ex-Soviet republics. I also control for ln population size in 2005. Table 8.1 shows the results from the regression with robust standard errors including these variables.

The main results discussed above are not qualitatively altered when I incorporate

[11] As the data used here are taken directly from the World Happiness Database, the specification is different from the one used previously in this study: Instead of the average of Freedom House's PR and CL, the FHI is now gives as the sum, and thus ranges from 2 (most democratic) to 14.

Variable	Coefficient	(t-value)
Ln GDP per capita***	0.616	(5.42)
Gini	-0.009	(-1.06)
FHI	0.006	(0.21)
Ln population	0.034	(0.61)
Percentage Christians	-0.001	(-0.36)
Percentage Muslims	0.002	(0.69)
Eastern Europe and ex-Soviet	-1.111***	(-5.07)
Sub-Sah. Africa	-0.900***	(-2.71)
Asia	-0.922***	(-3.25)
Middle East and N. Africa	-0.856**	(-2.06)
Latin America	-0.092	(-0.27)
Constant	1.047	(0.88)
N	97	

Table 8.1: Cross-sectional regression with robust standard errors. LIFESAT as dependent variable.

the controls. Ln GDP per capita has a lower t-value in this model, but it is still positive and significant at the 0.1% level. According to the point estimate, a one percent increase in GDP per capita increases the LIFESAT score by about 0.006 points. This is not a negligble effect, especially when considering that the country that scores the highest on LIFESAT, Denmark, only scores about 4.5 points higher than the countries with the lowest scores. In contrast, inequality and democracy are insignificant even at the 10% level. When it comes to the control variables, the religion and population variables are insignificant at conventional levels. However, all of the region dummies, except Latin America, are negative and significant at least at the 5% level. The control group is "Western" countries, so the coefficients show the estimated change in SWB level when going from Western countries to the respective regions, holding other variables constant. The most sizeable negative coefficient belongs to the former Communist countries of Eastern Europe and the Soviet Union.[12]

The results on the lacking importance of democracy and income inequality go contrary to most of the theoretical arguments presented above. But, these results are in line with results from some of the earlier empirical studies on SWB. However, average national income *does* seem to matter for average SWB. Even though time

[12]The results are also robust to the inclusion of other variables. For example, there is no qualitative change to the results when I add economic growth from 1990 to 2005 as a control to the model reported in Table 8.1. Both income inequality and democracy are still insignificant at the 10% level, and ln GDP per capita is still positive and highly significant.

series for richer countries indicate that there is no or little effect of income on SWB, cross country analysis on a broad sample including many developing countries indicates that income matters.[13]

8.4.2 Marginal effect of income on subjective well being

In standard microeconomic theory, researchers most often assume that utility is a concave function of consumption. One extra dollar generates more utility for a poor person than for a rich person. What does the LIFESAT data indicate when it comes to the marginal effect of GDP per capita? Figure 8.1 shows the best fitted line to the data based on an Epanechnikov kernel estimation (30% of points to fit). This moving average estimation does not take the control variables into account, but only shows the bivariate relationship between GDP per capita and average LIFESAT score. Figure 8.1 indicates that the marginal effect of GDP per capita on LIFESAT is much lower between 30000 and 40000$, than it is between 0 and 10000$. The fitted line is probably less reliable as an indication of the relationship at medium income levels, because of the fewer data points here.

One can elaborate further on the (suspected) decreasing marginal effect of income on average SWB. I take the model with the most extensive set of control variables from above, but leave out log GDP per capita. Instead, I first enter a linear GDP per capita term and a squared GDP per capita term. I then do the same for a regression that includes linear, squared and cubed GDP per capita. I subsequently calculate the two estimated marginal effect functions. Figure 8.2 gives the estimated marginal effect of income on LIFESAT for average incomes from 0 to 40000$.

Both of the estimated marginal effect functions in Figure 8.2 show a positive marginal effect of GDP per capita on LIFESAT over the range. However, both functions also show that the marginal effect is decreasing in GDP per capita. The marginal effect of income is according to the cubic specification almost zero for incomes around 40000$. According to these results, there is not much to gain in terms of average SWB by further increasing GDP per capita for very rich countries.[14] Moving from the income level of France to that of the US would not lift SWB

[13]There may however be some endogeneity problems with the estimates, and the plausible direction of these effects indicates that I may overestimate the effect of income on SWB. Studies on individuals have found that happy people tend to have longer time horizons and take more risks (Bosman and van Winden 2006). These two characteristics will probably affect economic growth positively, although it is implausible that such an effect may singlehandedly produce the strong partial correlation reported above.

[14]For a more detailed discussion on the specification of functional form for the income–SWB relationship, see Stevenson and Wolfers (2008).

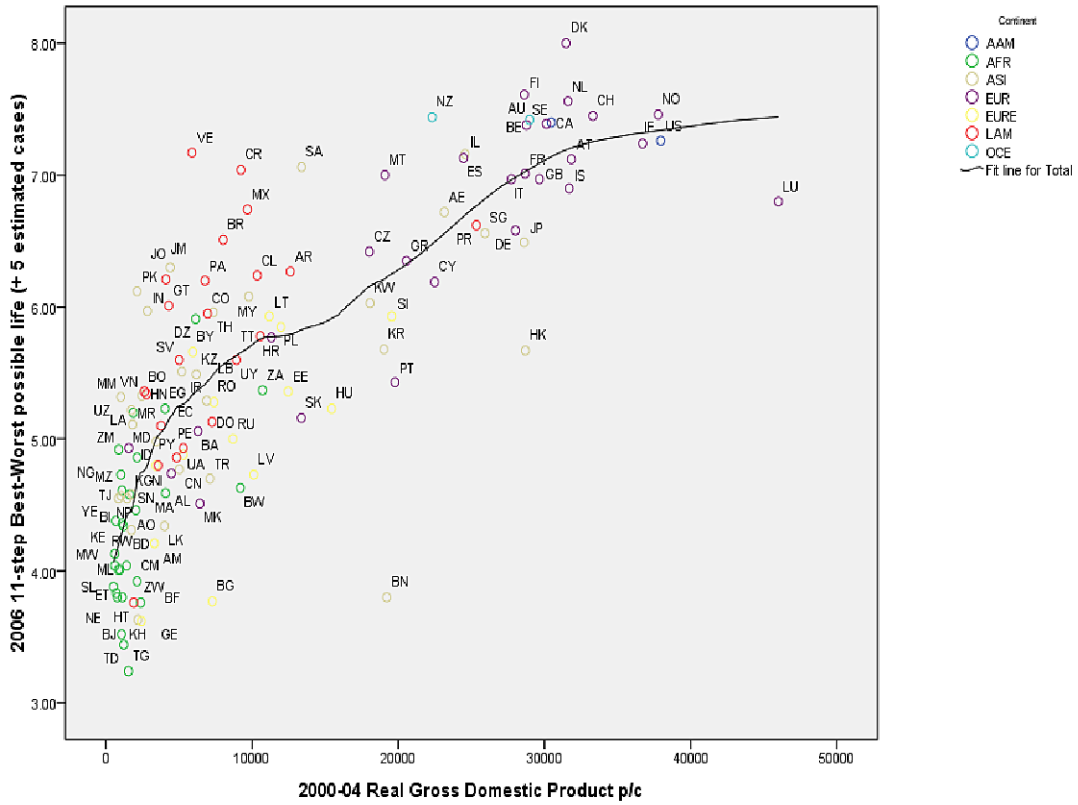

Figure 8.1: Best fit, GDP per capita and LIFESAT (kernel estimation). Source: Data taken from Veenhoven (2008).

substantially, according to this model. Poor and middle income countries, however, can gain considerably in terms of average SWB by growing their economies.

Maslow's theory of a hierarchy of needs (Maslow 1988) and the human development theory by Inglehart and Welzel (2006) can be invoked to explain the concave relationship. According to these theoretical frameworks, material resources are deemed particularly important to needs fulfillment and for expanding individual choice alternatives at lower income levels. Basic needs, such as food and shelter, are extremely important to cover in order to gain an acceptable level of SWB. However, once a certain material threshold is reached, other concerns than material tend to dominate, and are thus more important for SWB. Interestingly, a very concave utility function, as that indicated by the cross country estimates above, helps explain the Easterlin Paradox, since (for example) the US was already relatively rich when measurement of SWB started.

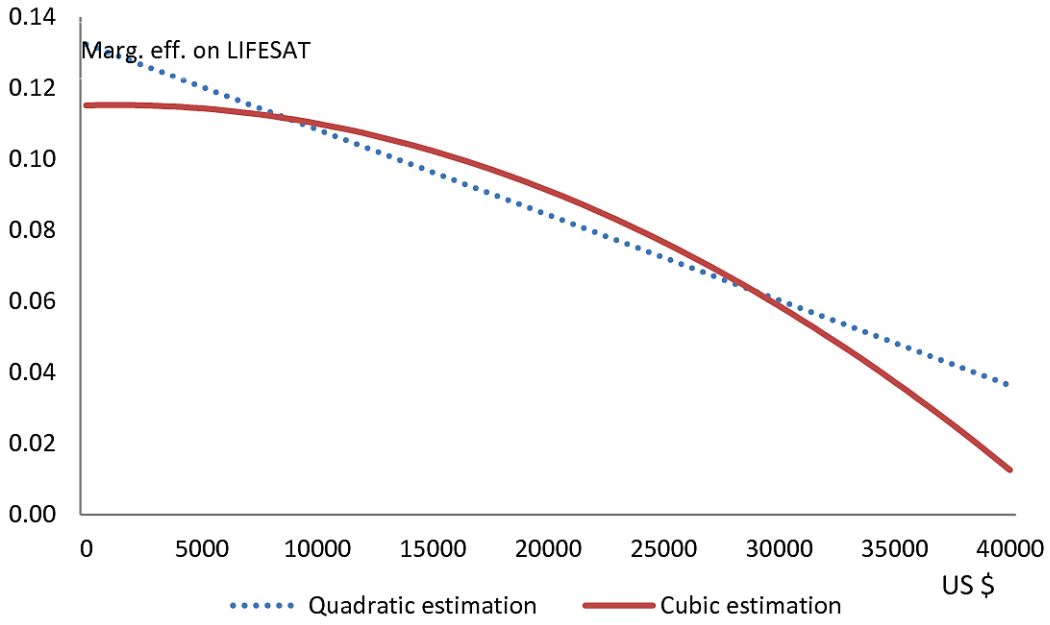

Figure 8.2: The marginal effect on LIFESAT of a 1000 USD increase in GDP per capita, for different levels of GDP per capita (measured in USD). Source: Data taken from Veenhoven (2008).

8.4.3 Why are income inequality and democracy insignificant explanatory variables?

There are three basic explanations for the lack of a robust and significant relationship between income inequality and democracy on the one hand and SWB on the other. The first explanation is that income inequality and democracy simply do not matter very much for average welfare. This argument could be interpreted with a background in folklore theory. Democracy and inequality do not matter for average SWB because cultural, national characteristics are the main determinants of variation in national SWB. This could be backed up by the finding that most region dummies are found to be statistically significant, if one assumes that national culture is more similar to geographical neighbors' cultures than to distant countries'. However, GDP per capita was highly significant, and this cannot be explained by folklore theory.

The second explanation, which is especially relevant when it comes to the effect of democracy, is a version of the hedonic treadmill effect, which can be related

to comparison theory:[15] Changes in political freedom and civil liberties impact on changes in SWB over the short run, but people tend to take them for granted when they have been in place for a while. It may be difficult for individuals to assess the importance of political and civil rights and liberties if the country's experience with dictatorship is in the distant past. There is simply no easily identifiable reference point against which the existence of such liberties and rights can be evaluated. This argument is strengthened by the finding in Inglehart et al. (2008): several countries that experienced *democratization* registered increases in happiness levels in the following years. One counter-argument is that people can compare their political regime and rights and liberties with those in other countries. However, if people's reference points are close neighbors and family members, comparison theory would suggest that political and civil rights should not impact strongly on SWB.

When it comes to income inequality, which tends to be relatively stable over time with some exceptions like in the ex-Soviet countries after the fall of Communism when inequality increased drastically, the same comparison-theoretic argument can be made. Even if other people's income is a natural reference point in an unequal society, the distribution of income itself is often fairly stable, and can thus be perceived by some as "the natural organization" of society. If one combines comparison theory and distaste for inequality, however, one could expect to see large drops in average SWB in countries that experienced large increases in income inequality. This might be an additional explanation to those presented by Inglehart et al. (2008) for why the ex-Soviet republics and Eastern European countries experienced large decreases in life satisfaction and happiness levels after the fall of Communism.

The third explanation of the insignificant income inequality and democracy coefficients is methodological. First, although this analysis utilized data from around 100 countries, this is still a modest number of observations. Additionally, there are likely to be measurement errors in the SWB scores. Some errors may be quite systematic. For example, in the case of democracy, respondents might tend to give wrong answers to survey questions on life quality in dictatorships because of fear of retribution from the government if they believe there is even a small chance that the government might find out their answers. Even a tiny probability of retribution from the government might skew answers if the respondents are rational, since the utility from answering correct is probably small and the cost of retribution is very large. Dictators with unhappy publics might also reject SWB surveying in the first place, and hence contribute to a selection effect.

[15] See Kahneman (2000*b*) for an interesting discussion of treadmill effects, and a nice distinction between happiness and satisfaction treadmills.

Moreover, there may be unsystematic measurement errors related to the SWB measure. The fact that only a single question is used in this study is a drawback, and an index relying on several questions would have had higher reliability. Inglehart et al. (2008) found that democratization had a larger effect on happiness than on life satisfaction, and the question I have used is more closely linked to life satisfaction. In the future, there may be time series for larger samples of countries on several SWB questions. Better empirical tests of a possible relationship between democracy, income inequality and SWB can then be made.

When it comes to the second explanation, related to reference points, and the third explanation, related to methodological problems, the nature of the question used in this study indicates a possible interesting interaction between these two explanations. The question used for operationalizing the dependent variable asks: "Here is a picture of a ladder, suppose that the top represents the best possible life and the bottom the worst possible life. Where on this ladder would you place your current life?" If "best possible" is interpreted not against a hypothetical Eldorado, but against the possibilities within the respondent's own society, people living under a consolidated dictatorship with high income inequality and low social mobility may answer that they live quite good lives, if the implicit comparison is their perceived actually possible lives. However, it would be far-fetched to believe that all respondents interpret the question in this way.

The conclusion of this empirical exercise is that there is no evidence indicating that income inequality and democracy affect average SWB in a country, although there may be methodological factors underlying the lack of significant results. However, there is good reason to believe that GDP per capita affects SWB positively, although the marginal effect is smaller for rich countries than for poor countries. In the next section, I will investigate whether other measures of "welfare", explicitly introduced to improve upon GDP as a welfare measure, can explain cross-national variation in SWB better than GDP per capita.

8.5 Welfare measures and subjective well being

The traditional social welfare functions, W, in economics are often functions of consumption, c. If I simplistically assume that consumption is a fixed share, α, of income, y, I can model welfare as a function of income. That is $W = W(y)$, where $y = \alpha c$. Since more consumption is assumed to improve welfare, $W'(y) > 0$. Economists and others also often assume weakly decreasing marginal utility of consumption, so that $W''(y) \leq 0$. Most often, there is an utilitarian assumption

underlying W so that $W = \Sigma\lambda_i U_i$, where U_i are the individual utility functions and where $\lambda_i$are the Pareto weights. The Pareto weights indicate the relative weight of the different individual utility functions in the social welfare function.

In the case where $U''(y) < 0$, one can have two countries with the same average income level, populations and Pareto weights generating different levels of social welfare. Assume that there are two countries, both with two individuals with similar Us and all $\lambda_i = 1$. In the first country, both individuals earn 5. In the second country, one individual earns 10 and the other 0. Even if average incomes are equal, W is higher in the first case, $2U(5) > U(10) + U(0)$, since U is concave. Therefore, one should include the distribution of income when evaluating W. One example of such an approach comes from Atkinson (1970). However, if all U_i and λ_i are identical and $U_i'' = 0$, *all relevant information are captured by average income levels* within a utilitarian framework.

Below I check the correspondence between (linear) GDP per capita and measures of SWB. I also check the correspondence between SWB and log GDP per capita. This latter measure is concave in average income, but it does not strictly assume anything about the concavity of individual utility functions. However, if I am allowed to be a bit sloppy, I can interpret the measure as if it represents a welfare function based on concave individual utility functions, which represent decreasing marginal utility of income.

One well-known welfare function that does not rest on utilitarian assumptions, W_{Sen}, was developed by Sen (1973, 1976).[16] Sen's proposed welfare function is $W_{Sen} = y(1-G)$, where y is the average level of income and G is the Gini coefficient. The welfare criterion underlying this function is the so-called pairwise maximin criterion (Sen 1973, 33). This criterion states that it is the welfare of the least fortunate among two people (or other units like households), in a comparison of those two, that should count as relevant for the welfare function. Sen's welfare function is an average of the welfare of all such pairwise comparisons (Lambert 2001, 122–123).

Another proxy for national welfare is the Human Development Index (HDI). Although this measure deviates from traditional social welfare functions in its construction, and does not rely on any clearly specified theoretical assumptions, the measure incorporates education and health aspects, which are believed to be im-

[16]Sen's function does not rest on utilitarian assumptions. However, a structurally similar welfare function can be produced on utilitarian assumptions (Lambert 2001, 127–130). This latter welfare function utilizes Atkinson's index $I(e)$, where e is interpreted as inequality aversion, instead of the Gini utilized in Sen's original index. $W(e) = U(y(1 - I(e))$. $W^* = y(1 - I(e))$ is a special case of this class of utilitarian functions.

portant for individual well-being (UNDP 1990). More specifically, the HDI is a composite of three indexes: a longevity of life index, an education index and a standard of living index. The first index is based on life expectancy at birth, the second on literacy rates and enrollment ratios (up until 2009), and the third on log GDP per capita.[17]

I check the correspondence between SWB in different nations and GDP per capita, ln GDP per capita, the HDI and Sen's welfare function. The correspondence with average SWB in a country, measured by LIFESAT, is checked first, playing well with utilitarian social welfare concerns. Table 8.2 shows that ln GDP per capita has the highest correlation with average LIFESAT score. In the 'common data' sample with 112 countries (the countries with data on all measures), even linear GDP per capita has a higher correlation with LIFESAT than Sen's welfare function has. However, the worst performer is the HDI, which is often argued to be a better proxy for life quality than GDP per capita. The relative strength of GDP per capita when it comes to predicting average SWB is quite surprising.[18]

Sample	GDP pc	Ln GDP pc	HDI	W_{Sen}
Large	.787 (127)	.805 (127)	.772 (128)	.796 (112)
Common data	.812 (112)	.817 (112)	.778 (112)	.796 (112)

Table 8.2: Correlation coefficients with LIFESAT. Number of observations (countries) in parentheses. GDP is measured as average from 2000–2004, HDI is measured in 2005 and W_{Sen} is measured in early 2000s.

I can, as mentioned, incorporate distributional concerns related to SWB by using Inequality Adjusted Happiness (IAH) (1995–2000). IAH is intended to incorporate both egalitarian and utilitarian concerns, and should therefore perhaps be viewed as a better measure than average SWB for investigating the correlation between SWB and Sen's welfare function, which is explicitly constructed to incorporate egalitarian aspects (Sen 1973). However, a somewhat unexpected result, shown in Table 8.3, is that IAH has a higher correlation with both linear and log GDP per capita than with Sen's welfare function. Since the measure incorporates the distribution of happiness, one could have expected that Sen's welfare function would produce a better fit. This

[17]See the various *Human Development Reports* for the concrete specification of the three subindexes and the overall aggregation procedure. The method of constructing the HDI was recently changed, and the new methodology may be found in the 2010 report.

[18]However, since I use average SWB as a kind of empirical proxy for national welfare, I rely at least implicitly on utilitarian assumptions on the possibility for aggregating welfare and weighing everyone's well-being equally. Another obvious criticism is that the values related to the question's answers is only of ordinal value, and taking averages of ordinal values is strictly speaking not an allowed operation (Knutsen 2010*c*). Moreover, I have leaped over the question of the possibility of interpersonal comparisons (Frey 2008, 15, 25 and 163).

result adds to the puzzling lack of importance of income inequality for SWB. One should also note that linear GDP per capita has a higher correlation with IAH than the HDI. Relatively speaking, these statistics indicate that GDP per capita does not do a poor job as a welfare measure, even when taking into account the distribution, and not only average level, of SWB.

GDP pc	Ln GDP pc	HDI	W_{Sen}
.711 (91)	.677 (91)	.667 (82)	.586 (90)

Table 8.3: Correlation coefficients with Inequality Adjusted Happiness. Number of observations (countries) in parentheses. GDP is measured as average from 2000–2004, HDI is measured in 2005 and W_{Sen} is measured in early 2000s.

If I take into account that the marginal effect of average income on SWB likely is declining in average income, will a modified version of Sen's welfare function do better? Since $W_{Sen} = y(1-G)$, it follows that $\frac{\partial^2 W}{\partial y^2} = 0$, which implies that the function is not strictly concave in average income. I suggest a modified version of Sen's welfare function: $W_{Smod} = ln(y)(1-G)$. This function has the properties $\frac{\partial W}{\partial y} > 0$, $\frac{\partial W}{\partial G} < 0$ and $\frac{\partial^2 W}{\partial y^2} < 0$. However, this modified version of Sen's welfare function fares even worse in terms of correspondence with both average SWB and IAH than the other four welfare measures tested above. The correlation with average subjective evaluation of life quality is .65 and the correlation is only .36 with the IAH.

8.6 Direct and indirect effects of democracy on subjective well being

The estimated direct effect of GDP per capita on SWB is far more robust and substantially important than those of income inequality and democracy, according to this chapter's empirical analysis. GDP per capita has a positive effect on average SWB, but the effect is declining in income level. When it comes to income inequality, there is little evidence that level of income inequality affects average levels of SWB. Moreover, Sen's welfare function, which incorporates income distributional aspects, did not do a better job of predicting either average levels of LIFESAT or IAH than GDP per capita did. However, the evidence is definitely not conclusive because of the many methodological problems with measuring SWB, the limited amount of

data available and the cross-sectional nature of the tests conducted here.[19]

When it comes to the effect of political regime type on SWB, Inglehart et al. (2008) investigated the effects of changes in democracy, whereas this analysis focused on democracy levels. Inglehart et al. (2008) found that democratization contributes strongly to happiness, whereas the cross section results reported here, based on a large number of countries, show a non-significant effect of democracy on life satisfaction. Might there, as mentioned above, be a kind of "hedonic treadmill effect" of democracy? Inglehart et al. (2008, 35) also argue that in "stable societies", with a high level of development and stable democracy, such treadmill effects might set in. Might political and civil rights be appreciated the most by people who have recently lived without them, and do people who have experienced such rights for a long time take them for granted? However, it should be mentioned that other studies, based on other types of evidence, indicate a positive long-run effect of democratic rights and participation on SWB (Frey 2008).

Maybe the effect of democracy on people's opportunities for living happy lives is more indirect than direct. It may well be that one of the stronger effects of democracy on SWB runs through the positive effect of democracy on economic growth, analyzed in Chapter 6. It may very well be that economic outcomes are what matters most for SWB, but economic outcomes are likely endogenous to the organization of politics. I will return to this issue of direct and indirect effects of democracy on well being in the next chapter, when discussing the normative desirability of democracy according to a utilitarian perspective.

[19]Moreover, the poor quality of data for the Gini coefficients (e.g. Houle 2009) may also impact on the the correlation between the measure of Sen's welfare function and the SWB measures.

Chapter 9

Conclusion

In this concluding chapter, I briefly sum up the main arguments and results from the thesis. Thereafter, I discuss the normative desirability of democracy, given the empirical results presented in previous chapters, for different sets of normative premises. Finally, I sketch out some policy implications in the areas of foreign aid and loans, based on the results from the dissertation.

9.1 A brief summary of the study's main arguments and results

The main conclusions of this study's various analyses have been summed up earlier in the different chapters. I briefly repeat the main results here.

In Chapter 2, I argue that democracy is a multi-dimensional concept, and propose a relatively broad definition of democracy. My preferred core definition of democracy is not based on specific institutional structures, like competitive elections, but rather on two universal principles, drawn from Beetham (1999). These principles are *a)* popular control over public decision making and *b)* political equality. I further specify what I consider a proper democracy concept, including seven second-level dimensions. The discussion of the democracy concept points in favor of applying relatively broad measures of democracy in empirical analyses; the Freedom House Index is one such broad measure.

Already in Chapter 1, I noted that there is no *deterministic* relationship between political regime types, measured along a democracy–dictatorship dimension, and various economic outcomes. The non-deterministic empirical relationship between democracy and economic growth, for example, is perfectly understandable when considering the various theoretical arguments on democracy and growth. As discussed for example in Chapters 1, 3, 5 and 7, there are plausible arguments pointing in different directions when it comes to democracy's effect on growth.

Nevertheless, there are *systematic* relations between democracy and a variety of economic policies and outcomes. For example, Chapter 5 uncovers a likely positive effect on savings rates of having a dictatorial regime. The effect on investment rates is not equally clear, and the fact that democracy likely improves the investment climate through for example better property rights protection is one plausible explanatory factor for this divergence. Previous studies have for example indicated that democracies attract more foreign direct investment. Nevertheless, I find evidence, although not completely robust, for the hypothesis that dictatorships have higher physical capital-induced economic growth.

When it comes to human capital, previous theoretical arguments and empirical studies have convincingly established a positive effect of democracy. The analysis in Chapter 5 also indicates that democracy enhances human capital accumulation when various gross school enrollment ratios are used as proxies for human capital. However, analysis based on a very extensive data material indicates that democracies do not have higher human capital-induced growth, and this goes contrary to previous

results in the literature (e.g. Tavares and Wacziarg 2001; Baum and Lake 2003; Doucouliagos and Ulubasoglu 2008). As discussed in Chapter 5, one explanation for this divergence may be the relatively long time series used in this study, as human capital accumulation may affect short- and medium-term growth rates more strongly than long-term growth rates.[1]

Rather than human capital, this study points out technological change as the main channel through which democracy enhances economic growth. Democracies have significantly higher Total Factor Productivity growth rates than dictatorships, and this relationship is quite robust. The model proposed in Chapter 5 points to a plausible explanation for why dictatorial regimes reduce technological change and dynamic efficiency: Dictators often have incentives to pursue policies that reduce diffusion of new ideas into and within their countries, in order to ensure their own survival in office. This reduces the variety and efficient selection of ideas, both in the marketplace and in the area of public policy. Although dictators may want to only reduce the flow of "politically dangerous ideas", they in practice also reduce the flow of ideas that enhance economic efficiency.

Chapter 6, through drawing on a very extensive data material and applying various statistical models, finds a quite robust effect of democracy on growth in GDP per capita. The models presented in Chapter 6 not only yield a significant positive effect of democracy; the estimated effect is also quite sizeable. There are good reasons to believe that going from a harsh dictatorship to a high-quality democracy increases annual GDP per capita growth with at least 1 percentage point. This effect holds up quite well even when I take into account that country-specific factors may affect both the probability of having a democracy and growth rates, and also when I take into account that democracy may be endogenous to economic growth.

As discussed extensively in Chapter 7, but also for example in Chapter 3, there is far more variation in economic outcomes for relatively dictatorial regimes than for democratic regimes. In Knutsen (2009), I showed that the capacity of state institutions is particularly important for economic performance in dictatorships. However, also for example leaders' personal characteristics matter a lot more for growth in dictatorships than in democracies (Jones and Olken 2005). Chapter 7 proposes a model that shows how the type of main security threat to the dictator affects economic policy selection and hence economic outcomes; dictators facing mainly an external security threat are more likely to follow "developmentalist" policies than

[1]However, it should also be noted that there are several potential types of measurement error associated with the data on human capital-induced growth, as well as with the data on physical capital-induced growth and total factor productivity growth. This may influence the results in Chapter 5. These measurement errors and potential biases were discussed in that chapter.

those facing mainly internal threats.

The latter result, combined with the relative preponderance of external threats to some Asian dictatorial regimes and the relative preponderance of internal threats to African dictatorial regimes, also contributes to explaining why dictatorship has been more hurtful to African economies than to Asian economies after 1960. In Africa, the international security regime tied to the Organization for African Unity contributed to reducing the importance of external security threats to African dictators.

In Chapter 8, I analyzed whether democracy matters for subjective well being (SWB). The empirical analysis in that chapter did not yield any strong, direct effect of democracy on SWB. However, GDP per capita is strongly and positively related to SWB, at least for relatively poor countries. Thus, given the positive effect of democracy on economic growth reported in Chapter 6, democracy likely matters a lot, indirectly, for SWB in the long run through increasing countries' income levels.

I end this dissertation by discussing some plausible normative implications and policy implications from the results and arguments presented above. In Section 9.2.1, I discuss the *normative desirability* of democracy more generally. I discuss, for example, how utilitarian policy makers valuing economic development and/or political freedom should conclude that democracy is desirable, when taking this study's results into account. However, I argue that one does not need to base normative judgements on a utilitarian framework in order to find democracy desirable: One may conclude that democracy is desirable when starting out with a broad range of underlying normative premises, given that one accepts the empirical results presented in this study. Finally, in Section 9.2.2, I briefly discuss some policy implications from this study regarding the provision of loans and aid to poor democracies and to poor dictatorships.

9.2 Some implications from this study

9.2.1 Different normative premises and the desirability of promoting democracy

How do the results and arguments reported in this thesis matter for policy makers in governments, intergovernmental organizations (IGOs) and non-governmental organizations (NGOs)? As Hume (1969, 521) famously pointed out, inferring from descriptive premises to normative conclusions constitutes a logical fallacy. This thesis has mainly considered factual relationships. Thus, one needs to postulate one or

more normative premises before presenting conclusions on how the results presented above may impact on actors' normative judgements.

Interestingly, the results from the above chapters point in the direction of one particular policy implication, even when coupled with sets of quite different normative premises. This policy implication is that policy makers in democratic governments, IGOs and NGOs should work for establishing democracies in non-democratic countries around the world and work to stabilize young, non-consolidated democracies.

This may seem like a trivial implication to many, but history has shown that it is far from it. For example, "culturalist" arguments have been invoked at various points in time to explain why particular countries, among them Germany, Japan, Catholic countries, Islamic countries, Southeast Asian countries and African countries, are unfit for democracy, and *should* thus consider sticking with more authoritarian regime forms. Moreover, strong arguments have been invoked to back up the prescription that poor countries should not aim at establishing democracy in the near future, but rather wait for economic development to happen under a more authoritarian regime, and then possibly, after a period of time, aim for the "luxury good" of democracy. I will consider this latter argument below.

For some normative premises, for example those proposed in Rawls (1999), the prescription of working for establishing and consolidating democracy seems quite uncontroversial. Somewhat simplified, Rawls (1999) argues that concerns related to individuals' political and civil liberties should be lexically ranked over economic concerns. Independent of economic effects, the regime which allows for the most extensive protection of political and civil liberties should be preferred. Thus, democracy, especially when broadly defined as in Chapter 2, is the preferable political system. More generally, deontological ethical theories that argue for the absolute and unquestionable normative desirability of human rights and political liberties generate the policy prescription that various actors should work for establishing and consolidating democracy. Given such normative points of view, the economic effects of democracy discussed in this thesis are more or less irrelevant for generating this prescription.

What about policy makers, and others, who have utilitarian inclinations? For utilitarians, the analysis presented in this thesis may impact on the preferred set of policies and other actions relevant for democratization and democratic stabilization. Let me for illustration consider a utilitarian welfare maximizer with the following simple welfare function: $W = W(Y, D)$, where Y is an economic outcome, for example aggregate GDP in a country, and D is the degree of democracy. The welfare maximizing utilitarian values both a high level of GDP and a high degree

of democracy positively; that is, $\frac{\partial W}{\partial Y} > 0$ and $\frac{\partial W}{\partial D} > 0$. In a world where there is no empirical relationship between GDP and level of democracy, the utilitarian would attempt to influence economic policy so that Y is maximized, and influence for example institutions that affect political participation and civil liberties so as to maximize D.

However, as I have argued in this thesis, democracy may very well affect economic outcomes. In mathematical terms, $Y = Y(D)$. The nature of this empirical relationship could influence the preferred policies for the welfare-maximizing utilitarian. More particularly, if an increase in degree of democracy reduces GDP, $\frac{\partial Y}{\partial D} < 0$, it may be that he would no longer want to maximize degree of democracy. The reason is naturally that there is now both a positive effect on welfare of a higher degree of democracy (the direct effect) and a negative effect (the indirect effect via income); $\frac{\partial W}{\partial D} = W'_D + W'_Y * \frac{\partial Y}{\partial D}$ can be both positive and negative.

The expression above is more likely to be negative if $\frac{\partial Y}{\partial D}$ is (negative and) quite substantial; that is, democracy has a strong negative effect on economic outcomes. Moreover, the expression is more likely to be negative if a particular welfare maximizer values economic outcomes as considerably more important than democracy; that is, if W'_Y is very large relative to W'_D. If there are decreasing welfare returns to both income and democracy, $W''_Y < 0$ and $W''_D < 0$, a given welfare maximizer will also be more likely to advocate reduction in degree of democracy if the country is initially poor or very democratic.

As discussed previously in this thesis, several policy makers and academics have argued that very poor countries in particular should rather stick with less democratic regime forms in order to produce vital economic development. The implicit underlying normative framework for this argument often seems to be the type of welfare function posted above, combined with the *empirical* assumption that democracy hurts economic development. Moreover, the proponents of this argument, although recognizing that democracy may have inherent normative value, often seem to argue that promoting economic development is far more important in poor countries than having a democratic regime with political and civil liberties. In terms of the welfare function above they seem to say that W'_Y is very large relative to W'_D. However, *even if* one accepts this latter statement, and the analysis on subjective well being in Chapter 8 may indeed provide support for it, the conclusion of the argument is wrong. The reason is simply that, as shown in Chapter 6, democracy most likely increases rather than decreases economic growth. Hence, even for utilitarians who downplay the inherent value of democracy relative to material consumption, democracy should be considered normatively desirable. The reason is that democracy has

a positive instrumental value, as it enhances economic development.

The argument that democratization should be postponed in poor countries has often been presented with some interesting twists. An interpretation of Huntington (1968), for example, is that democratization should be postponed in poor countries, as democracy is an unstable regime type in such contexts. When combined with a strict interpretation of Lipset (1959) on the material and other preconditions for democracy, it has been argued that democracy simply is unfeasible in poor countries. At best, governments, IGOs and NGOs waste resources trying to promote democracy in poor countries. At worst, they induce political instability in poor countries, as democracy, if established against all odds, is bound to collapse. Thus, a variant of the argument above is that poor countries should stick with an authoritarian regime until the economic "preconditions for democracy" are in place, and in the meantime grow their economies under a more stable authoritarian regime.

There are many grave problems with this argument. Przeworski and Limongi (1997) show that democratic regimes are indeed more unstable in poor countries than in rich countries. However, this is, as Przeworski and Limongi (1997) also show, the case for dictatorial regimes as well. A Shah may be replaced by an Ayatollah, a Tsar by a Bolshevik Party and a Caudillo by another Caudillo. Moreover, very democratic countries do not seem to experience a higher probability of perhaps the worst form for political instability, namely civil war, than dictatorial regimes do (e.g. Hegre et al. 2001). Therefore, the "stability premise" in the argument above is questionable. Indeed, Feng (2005) shows that democracy actually enhances economic growth through increasing regime stability.

Moreover, the change from a dictatorial to a democratic regime is far from ensured once a country reaches a certain level of economic development. Indeed, although this result is debatable (e.g. Boix and Stokes 2003), Przeworski and Limongi (1997) find that dictatorial regimes may even strengthen their grip on power as an economy develops. Recent results (Acemoglu et al. 2008) question even the more general, and widely accepted, proposition from Lipset (1959) that a higher level of income enhances the probability of a country being democratic.

Therefore, as democracy also likely enhances economic growth, there seems to be little reason to intentionally construct policy so as to "postpone" democratization in poor countries. Luckily for citizens in countries such as Botswana and Mauritius, some developing countries did not follow the prescribed 'Huntington-Lipset trajectory'.

Above, I mainly discussed GDP per capita as the normatively relevant economic

statistic. However, very plausible normative arguments can be made that an egalitarian distribution of a given amount of resources is intrinsically important. The latter statement may be justified on the basis of underlying utilitarian assumptions, and can for example be captured by inequality-averse social welfare functions Atkinson (1970); Lambert (2001). However, the egalitarian framework presented in Sen (1973) provides a more direct argument for why economic equality is normatively important.

In any case, the inclusion of distributional concerns as a normatively relevant factor further strengthens the normative desirability of having a democratic regime. This study has not analyzed the effect of democracy on the distribution of income or other economic goods in depth. However, the theoretical and empirical literature indicates that democracy likely produces more egalitarian distributions of economic resources (e.g. Meltzer and Richards 1981; Muller 1988; Sen 1999; Rodrik 1999*a*, 2000; Acemoglu and Robinson 2000, 2006*b*; Lindert 2005), although this result is not completely robust (e.g. Timmons 2010).

Sen (1999) provides a fascinating normative argument on the value of promoting individual capabilities, and he further ties these capabilities to a range of factors many social scientists consider as important aspects of human capital, or as causes of human capital. However, as Sen discusses, independent of material welfare effects, being educated and knowledgeable and living a long and healthy life are arguably inherently desirable properties.

As discussed in Chapters 3 and 5, the empirical literature finds strong evidence for positive effects of democracy on access to education (e.g. Lindert 2005), on education spending (e.g. Stasavage 2005), on quality of health care (e.g. Lake and Baum 2001), and on longevity of life (Baum and Lake 2003). Also the empirical analysis in Chapter 5 found evidence for the hypothesis that democracy increases the share of children and young people being enrolled in school. Therefore, if one considers individual capabilities (for all citizens) as inherently important and desirable (see e.g. Sen 1999), the positive effect of democracy on access to and quality of education and health services further strengthes the normative desirability of democracy.

Finally, utilitarians are ultimately interested in human well being. Thus for utilitarians, as noted above, the estimates provided in Chapter 8 on the positive effect of GDP per capita on subjective well being yield a strong argument in favor of having a democratic regime, when these estimates are combined with the estimates provided in Chapter 6 on democracy's positive effect on economic growth. Despite the many methodological problems and the uncertainty of the estimates, those who ascribe to Bentham's "principle of utility", which is the principle that "approves or

disapproves of every action whatsoever, according to the tendency which it appears to have to augment or diminish the happiness of the party whose interest is in question" (Bentham 1987, 65), should work to promote democracy as a political regime at home and abroad.

9.2.2 A short note on foreign aid and loans to poor countries

From the discussion above, it seems that almost independent of normative conviction there is little reason for policy makers in different organizations to not work for establishing democracy in poor countries. Moreover, policy makers should design policies so as to stabilize existing non-consolidated democracies. Important policy tools in this regard are the allocation of foreign aid and loans. Poor countries, and countries experiencing economic crises, tend to have relatively high probabilities of regime breakdown, independent of whether their political regime is democratic or dictatorial (Przeworski and Limongi 1997). Therefore, allocating much needed capital in the form of aid and loans to poor democracies may have the benefit of stabilizing these regimes. The same stabilizing effect is likely present for *unconditional* aid and loans to dictatorial regimes (see also Bueno de Mesquita et al. 2003; Bueno de Mesquita and Smith 2009), and the normative desirability of such unconditional aid and loans to dictatorships is therefore questionable. Moreover, as the model on security threats in Chapter 7 indicated, unconditional aid may even induce the dictator to reduce productive public spending and industrial development (see also Wintrobe 1998).

Therefore, given the normative desirability of democracy, this points to a prescription for aid donor countries and IGOs like the World Bank and International Monetary Fund to allocate their aid and loans predominantly to democratic countries. The fact that democratic politicians have stronger incentives to spend the aid "wisely", in terms of providing various public goods (Bueno de Mesquita et al. 2003), expanding and improving education and health services (e.g. Lake and Baum 2001; Lindert 2005; Stasavage 2005) and generally distributing the resources more evenly among citizens (e.g. Rodrik 2000), adds to this argument.

It may of course be argued on utilitarian grounds that the material benefits to an average citizen from an extra dollar of unconditional aid provided to a dictatorial country outweighs the negative effect of stabilizing the regime, even if the regime and its supporters siphon off much of the aid provided. However, given that there is a limited amount of total aid available, due for example to lacking popularity of large aid budgets among citizens in aid donor countries, it is arguably better to channel the

limited resources to relatively democratic poor countries: The alternative cost of aid to dictatorial countries is likely less aid to democratic countries, where the regime-stabilizing effect is beneficial and the direct economic welfare effects for citizens are likely larger. Moreover, the political popularity of foreign aid in donor countries may be endogenous to where the aid is channeled. If electorates in rich Western democracies are willing to accept a larger aid budget when the main bulk of aid goes to democratic countries, and not "to the support of dictators", there is even more reason to allocate the main bulk of foreign aid to poor democratic countries.

One alternative to allocating aid and loans to democracies is to provide such aid and loans to relatively authoritarian regimes, but do so with clear conditionalities attached. More specifically, I am thinking of conditionalities related to the liberalization of the political regime and the protection of various rights and liberties for citizens. Some may argue that imposing such conditionalities are unethical, as they impose the will of an external party on a people who should determine its own policies and the nature of its own domestic institutions. This argument, in the case of dictatorships, is misguided. I will not follow through on this discussion here, but rather ask rhetorically: How plausible is it that the dictator pursues the set of policies desired by most of his country's people, and how does one know that the country's citizens do not desire democracy with political and civil liberties? If anything, conditionalities related to political liberalization, rather than being an unfair imposition of external preferences, likely contributes to *increased* autonomy of an aid-receiving country's citizens in terms of their ability to influence policy.

However, as several analysts have pointed out, enforcing compliance with external conditionalities is difficult, often because donor countries can not or will not make credible threats to sanction violations of the terms of conditionality (see e.g. Crawford 1997). Moreover, dictatorial regimes are likely reluctant to accept aid coming with conditionalities that may strongly reduce their probability of remaining in power.

Nevertheless, conditional aid *may* enhance the probability of political liberalization. As Lindberg (2006) convincingly shows, even fraudulent elections, partly forced by external parties, have generated a positive long-term political liberalization dynamic in several African countries after 1990. Although a dictatorial regime may be able to stay in power through the manipulation of elections, a minimum of political competition may lead to a long-term dynamic that in some instances ultimately forces improved protection of civil liberties and sometimes even government turnover (Lindberg 2006). *If* aid donor governments and IGOs are able to credibly commit to making aid conditional on at least partial political liberalization, and

ensure that the regime can not pocket most of the resources privately, the potential long-term benefits from such a strategy may be large. The reason is that these strategies may enhance prospects for political liberalization, which, as shown in this thesis, also produces long-term economic benefits for the citizens of the country in question.

Appendices

Appendix A

Tables to Section 5.2

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	0.347**	2.34	0.356**	2.30	0.309**	1.98	-0.151	-1.26
Ln GDP pc	2.320***	5.88	2.139***	6.03	2.161***	6.30	1.800***	3.79
Ln reg. dur.	0.569***	4.18	0.677***	5.85	0.674***	5.81	0.555***	4.15
Ln popul.	-0.839***	-2.82	-0.615**	-2.07	-0.535*	-1.93	1.013***	3.66
Ethn. fr.	-5.309***	-3.05	-5.245***	-3.66	-5.071***	-3.56	-1.756	-1.21
Africa	5.866***	4.83	7.897***	6.15	8.532***	6.99	4.387**	2.02
Asia	10.021***	7.85	4.796**	2.02	5.027**	2.18	3.074	1.38
Lat. Am.	2.737***	2.86	0.141	0.05	0.533	0.20	3.022*	1.91
E.E.-Soviet	5.389***	4.42	5.274***	3.32	6.053***	3.93	-0.848	-0.64
MENA	1.929	1.31	1.073	0.60	1.617	0.93	3.100	1.45
British			-1.539**	-2.21	-1.703***	-2.60	-2.636***	-3.61
French			-4.269**	-2.44	-4.155**	-2.40	-0.771	-0.60
Spanish			1.226	0.49	0.925	0.38	-0.933	-0.54
Portuguese			-0.043	-0.02	0.130	0.08	-0.107	-0.06
Belgian			-10.143***	-3.89	-10.481***	-4.37	-7.183***	-3.31
Sunni			1.703	0.79	2.014	0.95	1.545	0.62
Shia			5.967**	2.41	6.815***	2.87	6.320**	2.15
Catholic			2.900	0.98	3.172	1.11	2.416	0.71
Protestant			-0.456	-0.19	-0.143	-0.06	1.786	0.65
Orthodox			-0.467	-0.22	-0.203	-0.10	3.329	1.06
Hindu			3.112	1.09	3.293	1.18	1.108	0.35
Buddhist+			9.130***	2.78	9.402***	3.00	5.429*	1.88
Indigenous			2.154	0.76	2.295	0.81	3.024	1.00
1970s					1.711**	2.26	2.503***	3.22
1980s					0.872	1.32	1.316*	1.92
1990s					0.373	0.73	0.535	1.04
Abs. lat							0.067	1.47
Urbaniz.							-0.089***	-3.20
Trade							0.072***	7.17
Constant	13.172*	1.90	10.173	1.47	7.564	1.16	-15.900**	-2.08
N	3751		3751		3751		3416	

Table A.1: OLS with PCSE analysis. Gross investment as percentage share of total GDP as dependent variable. No lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	0.288**	1.97	0.308*	1.92	0.295*	1.91	0.096	0.79
Ln GDP pc	0.629*	1.71	0.282	0.89	0.335	1.08	-0.105	-0.24
Ln reg. dur.	0.025	0.19	0.128	1.02	0.141	1.12	0.082	0.63
Ln popul.	-1.230***	-4.52	-1.173***	-3.86	-1.143***	-3.73	-0.430	-1.58
Ethn. fr.	-6.555***	-3.57	-5.596***	-3.63	-5.238***	-3.69	-1.745	-1.18
Africa	0.951	0.55	2.308	1.50	2.436*	1.70	0.606	0.34
Asia	7.159***	4.71	1.311	0.51	0.857	0.36	2.250	0.98
Lat. Am.	0.341	0.35	-4.460	-1.29	-4.164	-1.32	-0.067	-0.04
E.E.-Soviet	2.009*	1.75	0.933	0.73	1.157	0.98	-0.786	-0.70
MENA	2.249*	1.76	2.643*	1.70	2.595*	1.71	3.352*	1.78
British			-2.498***	-3.05	-2.434***	-3.11	-2.168***	-2.87
French			-3.301**	-2.09	-3.176**	-2.05	-1.131	-0.96
Spanish			1.685	0.52	1.441	0.49	-2.624	-1.23
Portuguese			-0.423	-0.23	-0.268	-0.15	-0.656	-0.29
Belgian			-13.514***	-5.87	-13.474***	-6.01	-11.873***	-5.36
Sunni			2.185	1.44	2.592*	1.76	3.230**	2.19
Shia			7.334***	3.12	7.761***	3.41	8.227***	3.01
Catholic			5.901***	2.65	6.136***	2.82	6.728**	2.28
Protestant			2.277	1.34	2.529	1.53	4.487**	2.18
Orthodox			1.206	0.75	1.747	1.14	4.665*	1.87
Hindu			5.875**	2.08	6.057**	2.27	4.009	1.54
Buddhist+			10.562***	3.44	11.476***	3.97	11.098***	3.98
Indigenous			1.933	0.95	2.101	1.07	3.932*	1.69
1970s					0.648	0.87	1.047	1.38
1980s					-0.537	-0.79	-0.242	-0.35
1990s					-0.354	-0.73	-0.471	-0.95
Abs. lat							0.047	1.21
Urbaniz.							-0.010	-0.36
Trade							0.015	1.34
Constant	37.213***	6.08	36.483***	5.61	35.137***	5.31	23.196***	3.64
N	3286		3286		3286		2992	

Table A.2: OLS with PCSE analysis. Gross investment as percentage share of total GDP as dependent variable. 5-year lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
FHI	-0.165	-1.56	-0.220**	-2.04	-0.165	-1.58
Ln GDP pc	0.724	1.63	1.445***	2.96	1.398***	2.67
Ln reg. dur.	0.623***	5.23	0.709***	5.92	0.513***	4.41
Ln popul.	-3.866***	-8.15	-1.003	-1.21	1.794**	2.00
1970s			2.572***	4.39	3.424***	5.91
1980s			0.088	0.21	0.942**	2.21
1990s			0.108	0.36	0.606**	1.98
Urbaniz.					-0.127***	-4.39
Trade					0.068***	10.45
Constant	77.444***	9.72	25.393*	1.70	-18.479	-1.16
N	3647		3647		3313	

Table A.3: Fixed effects analysis. Gross investment as percentage share of total GDP as dependent variable. 2-year lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
FHI	-0.221**	-2.03	-0.153	-1.38	-0.153	-1.42
Ln GDP pc	-2.113***	-4.50	-2.550***	-5.06	-2.984***	-5.40
Ln reg. dur.	0.336***	2.78	0.454***	3.74	0.459***	3.87
Ln popul.	-3.569***	-7.05	-4.583***	-5.27	-2.821***	-2.94
1970s			-1.304*	-1.85	-0.853	-1.20
1980s			-2.528***	-4.38	-1.952***	-3.30
1990s			-1.019**	-2.06	-0.891*	-1.74
Urbaniz.					-0.063**	-2.02
Trade					0.036***	5.30
Constant	94.354***	11.02	114.866***	7.38	89.976***	5.33
N	3286		3286		2992	

Table A.4: Fixed effects analysis. Gross investment as percentage share of total GDP as dependent variable. 5-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.006	-0.06	0.002	0.02	-0.124	-1.19	-0.150	-1.51
Ln GDP pc	0.622*	1.83	0.418	1.23	0.991***	2.81	0.978***	2.66
Ln reg. dur.	0.587***	5.10	0.615***	5.34	0.731***	6.33	0.527***	4.74
Ln popul.	-2.029***	-6.82	-1.912***	-6.65	-0.950***	-3.07	0.630**	2.21
Ethn. fr.	-4.951**	-2.19	-5.102**	-2.31	-5.681***	-2.63	-2.000	-0.97
Africa	0.916	0.44	3.189	1.45	6.695***	3.01	4.889**	2.07
Asia	8.874***	4.26	6.709**	2.28	7.060**	2.46	5.391*	1.95
Lat. Am.	-0.275	-0.15	-3.108	-1.21	-1.093	-0.43	3.496	1.36
E.E.-Soviet	2.726	1.44	2.370	1.21	5.281***	2.67	1.029	0.53
MENA	2.645	1.33	2.935	1.26	4.024*	1.77	6.581***	3.06
British			-1.856	-1.31	-1.820	-1.32	-1.545	-1.28
French			-4.953***	-2.91	-4.431***	-2.66	-1.237	-0.81
Spanish			1.439	0.56	1.786	0.71	-1.197	-0.51
Portuguese			1.645	0.53	1.553	0.52	0.874	0.36
Belgian			-11.268***	-3.17	-10.862***	-3.13	-8.141***	-2.75
Sunni			2.287	0.59	2.434	0.65	2.501	0.61
Shia			2.991	0.62	4.415	0.94	4.415	0.92
Catholic			3.519	0.88	2.769	0.71	5.096	1.16
Protestant			0.875	0.21	0.123	0.03	3.061	0.70
Orthodox			-0.008	-0.00	-0.445	-0.11	4.215	0.87
Hindu			0.920	0.18	0.906	0.18	1.605	0.33
Buddhist+			6.003	1.28	6.498	1.42	6.788	1.47
Indigenous			1.089	0.25	1.240	0.29	4.316	0.97
1970s					2.435***	6.36	3.045***	7.40
1980s					-0.023	-0.07	0.673**	2.00
1990s					0.117	0.42	0.537*	1.89
Abs. lat.							0.103**	1.97
Urbaniz.							-0.094***	-4.78
Trade							0.061***	10.61
Constant	48.399***	7.88	46.769***	6.75	25.302***	3.34	-6.125	-0.77
σ_u								
Constant	5.470***	15.21	4.963***	15.03	4.840***	15.57	3.742***	14.16
$sigma_e$								
Constant	5.367***	83.44	5.369***	83.43	5.310***	83.57	4.922***	79.78
N	3647		3647		3647		3313	

Table A.5: Random effects tobit analysis. Gross investment as percentage share of total GDP as dependent variable. 2-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.117	-1.12	-0.093	-0.89	-0.128	-1.21	-0.173*	-1.69
Ln GDP pc	-1.050***	-2.84	-1.292***	-3.54	-1.075***	-2.88	-0.972**	-2.45
Ln reg. dur.	0.272**	2.33	0.296**	2.54	0.413***	3.53	0.371***	3.28
Ln popul.	-2.109***	-6.78	-1.944***	-6.53	-1.483***	-4.55	-0.312	-1.07
Ethn. fr.	-6.339***	-2.68	-5.683**	-2.48	-6.056***	-2.71	-3.174	-1.54
Africa	-4.557**	-2.03	-1.847	-0.80	-0.252	-0.11	-1.272	-0.52
Asia	4.843**	2.20	2.505	0.82	2.581	0.87	2.074	0.74
Lat. Am.	-3.500*	-1.79	-6.606**	-2.48	-5.692**	-2.18	-1.208	-0.46
E.E.-Soviet	-1.286	-0.64	-0.719	-0.35	0.451	0.22	-1.603	-0.81
MENA	0.444	0.21	2.498	1.04	3.008	1.27	5.115**	2.35
British			-1.182	-0.80	-1.167	-0.81	-0.966	-0.78
French			-4.548**	-2.57	-4.368**	-2.53	-2.144	-1.33
Spanish			1.439	0.54	1.578	0.61	-2.689	-1.12
Portuguese			1.680	0.52	1.666	0.53	0.809	0.32
Belgian			-13.440***	-3.65	-13.463***	-3.75	-11.662***	-3.90
Sunni			-0.379	-0.09	-0.424	-0.11	1.791	0.43
Shia			-0.248	-0.05	0.427	0.09	2.000	0.41
Catholic			3.215	0.77	2.865	0.70	6.871	1.56
Protestant+			0.385	0.09	-0.040	-0.01	4.144	0.94
Orthodox			-1.818	-0.42	-2.067	-0.49	3.698	0.76
Hindu			-0.425	-0.08	-0.479	-0.09	2.308	0.47
Buddhist+			5.998	1.23	6.114	1.29	9.705**	2.09
Indigenous			-0.761	-0.17	-0.758	-0.17	4.450	0.99
1970s					0.620	1.13	1.136*	1.94
1980s					-1.343***	-2.64	-0.704	-1.32
1990s					-0.587	-1.22	-0.416	-0.84
Abs. latitude							0.041	0.76
Urbaniz.							-0.045**	-2.14
Tradeshare							0.035***	5.62
Constant	67.105***	10.03	65.248***	8.80	56.143***	6.99	29.775***	3.58
$sigma_u$								
Constant	5.743***	15.04	5.154***	14.99	5.019***	15.24	3.740***	13.55
$sigma_e$								
Constant	5.149***	78.94	5.149***	78.97	5.107***	79.05	4.760***	75.55
N	3286		3286		3286		2992	

Table A.6: Random effects tobit analysis. Gross investment as percentage share of total GDP as dependent variable. 5-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	1.491***	6.17	1.518***	6.42	1.468***	6.15	0.341**	2.17
Ln GDP pc	9.592***	20.44	10.184***	19.80	10.344***	20.08	10.733***	18.10
Ln reg. dur.	0.206	1.15	0.112	0.62	0.130	0.74	0.111	0.69
Ln popul.	1.908***	5.68	1.915***	5.88	1.938***	5.73	2.053***	6.09
Ethn. fr.	14.375***	9.33	13.297***	7.72	12.953***	7.67	8.404***	5.06
Africa	10.442***	5.23	11.441***	5.40	12.942***	6.22	16.573***	8.09
Asia	17.936***	10.96	18.552***	8.68	19.489***	7.78	22.261***	11.93
Lat. Am.	8.475***	5.66	9.755***	3.42	10.795***	3.71	9.843***	5.34
E.E.-Soviet	12.947***	8.46	16.623***	8.73	18.579***	10.12	9.427***	7.44
MENA	6.867***	3.36	8.388***	3.70	9.002***	3.87	18.887***	7.06
British			2.043**	2.01	1.938**	1.99	-2.950***	-2.94
French			1.346	0.87	1.308	0.85	-0.799	-0.64
Spanish			3.142	1.20	3.069	1.18	-3.759*	-1.76
Portuguese			3.104	1.40	3.689	1.63	-1.158	-0.52
Belgian			4.870*	1.78	5.061*	1.84	-6.462***	-2.79
Sunni			14.920***	3.75	14.557***	3.56	30.046***	10.38
Shia			6.914	1.20	7.275	1.24	36.264***	10.61
Catholic			12.261***	3.12	11.600***	2.88	34.835***	9.85
Protestant+			16.294***	4.27	15.905***	3.98	35.346***	11.23
Orthodox			10.725***	2.60	10.013**	2.39	33.225***	6.04
Hindu			18.866***	4.66	18.486***	4.59	36.315***	10.23
Buddhist+			14.518***	4.05	13.864***	3.77	30.518***	10.52
Indigenous			14.731***	3.59	14.524***	3.44	32.872***	9.48
1970s					2.316**	2.28	2.810***	2.71
1980s					0.502	0.57	0.785	0.86
1990s					-0.645	-0.94	-0.302	-0.40
Abs. latitude							-0.261***	-5.03
Urbaniz.							-0.041	-1.47
Trade							0.002	0.21
Constant	-105.45***	-15.23	-126.05***	-14.47	-128.30***	-14.34	-137.68***	-16.99
N	3906		3906		3906		3564	

Table A.7: OLS with PCSE analysis. Domestic savings as percentage share of total GDP as dependent variable. No lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	0.390	1.64	0.426*	1.79	0.434*	1.82	-0.025	-0.15
Ln GDP pc	7.789***	15.20	7.587***	12.82	7.646***	13.09	8.528***	12.10
Ln reg. dur.	-0.234	-1.26	-0.197	-1.05	-0.156	-0.85	-0.342**	-2.11
Ln popul.	1.805***	4.70	1.721***	3.90	1.742***	3.97	1.999***	4.54
Ethn. fr.	12.698***	6.20	12.108***	5.28	11.888***	5.25	8.541***	3.94
Africa	7.769***	4.61	6.652***	3.21	7.140***	3.26	8.631***	3.69
Asia	17.648***	10.15	13.799***	5.85	13.318***	5.49	15.588***	6.38
Lat. Am.	6.767***	5.65	4.534	1.48	4.820	1.51	5.836***	2.69
E.E.-Soviet	9.714***	5.80	11.732***	5.70	11.989***	5.85	7.042***	4.55
MENA	7.120***	2.86	8.299***	3.54	8.302***	3.75	14.473***	4.84
British			0.723	0.43	0.410	0.23	-3.894**	-2.20
French			0.745	0.40	0.784	0.40	-1.089	-0.58
Spanish			2.991	1.06	3.084	1.08	-4.565**	-1.96
Portuguese			3.873	1.54	4.397*	1.77	-0.739	-0.30
Belgian			0.626	0.18	0.803	0.24	-7.674**	-2.48
Sunni			16.343***	4.57	16.946***	4.78	25.167***	7.58
Shia			15.550***	3.46	16.368***	3.71	32.738***	8.30
Catholic			17.220***	5.29	17.306***	5.36	29.853***	7.77
Protestant+			18.629***	5.36	19.187***	5.52	30.821***	9.66
Orthodox			12.104***	3.00	12.642***	3.17	30.151***	7.20
Hindu			21.650***	5.73	22.766***	6.17	33.844***	9.22
Buddhist+			22.365***	6.10	23.687***	6.35	34.348***	9.46
Indigenous			15.010***	3.62	15.615***	3.82	26.731***	6.95
1970s					1.299	1.08	1.797	1.64
1980s					-0.495	-0.46	0.189	0.20
1990s					0.034	0.04	0.461	0.63
Abs. lat.							-0.276***	-5.07
Urbaniz.							-0.033	-0.88
Trade							0.002	0.14
Constant	-83.15***	-10.99	-97.70***	-10.09	-99.30***	-10.43	-108.24***	-11.69
N	3352		3352		3352		3054	

Table A.8: OLS with PCSE analysis. Domestic savings as percentage share of total GDP as dependent variable. 5-year lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
FHI	0.062	0.43	0.182	1.25	0.141	1.00
Ln GDP pc	7.299***	12.14	6.467***	10.14	6.587***	9.02
Ln reg. dur.	-0.268*	-1.68	-0.111	-0.69	-0.322**	-2.05
Ln popul.	-1.385**	-2.11	-3.877***	-3.36	-3.105**	-2.42
1970s			-2.657***	-2.84	-0.937	-0.98
1980s			-3.759***	-4.88	-2.131***	-2.67
1990s			-1.477**	-2.23	-0.558	-0.81
Urbaniz.					0.028	0.67
Trade					0.026***	2.83
Constant	-14.176	-1.26	33.599	1.64	16.695	0.74
N	3352		3352		3054	

Table A.9: Fixed effects analysis. Domestic savings as percentage share of total GDP as dependent variable. 5-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	0.480***	3.87	0.473***	3.81	0.281**	2.24	0.099	0.81
Ln GDP pc	8.906***	19.27	9.067***	19.35	10.106***	20.85	9.006***	17.83
Ln reg. dur.	-0.163	-1.15	-0.174	-1.22	-0.086	-0.61	-0.308**	-2.21
Ln popul.	-1.681***	-3.64	-1.769***	-3.85	1.077**	2.20	1.813***	3.95
Ethn. fr.	13.454***	3.49	13.486***	3.36	11.783***	3.22	5.810	1.64
Africa	9.252***	2.75	8.716**	2.30	15.687***	4.36	17.301***	4.39
Asia	23.342***	6.76	23.803***	4.57	21.910***	4.62	23.313***	4.97
Lat. Am.	7.281**	2.37	6.835	1.50	10.387**	2.48	11.164**	2.55
E.E.-Soviet	10.122***	3.28	10.384***	3.03	16.541***	5.11	7.556**	2.31
MENA	6.611**	1.98	8.146*	1.95	10.494***	2.74	18.642***	5.05
British			0.665	0.26	1.198	0.51	-2.280	-1.11
French			-0.611	-0.20	0.896	0.32	0.162	0.06
Spanish			1.613	0.35	3.053	0.72	-3.245	-0.81
Portuguese			3.582	0.64	3.026	0.60	-0.999	-0.24
Belgian			6.031	0.94	6.386	1.09	-3.509	-0.69
Sunni			18.392***	2.67	17.168***	2.73	28.579***	4.05
Shia			7.853	0.90	9.712	1.23	32.559***	3.93
Catholic			15.621**	2.17	12.825*	1.95	33.369***	4.42
Protestant			16.711**	2.26	14.057**	2.08	33.291***	4.41
Orthodox			17.758**	2.38	14.988**	2.20	35.576***	4.25
Hindu			20.314**	2.24	19.455**	2.35	34.380***	4.11
Buddhist+			14.985*	1.77	16.035**	2.08	28.028***	3.53
Indigenous			15.061*	1.92	13.997**	1.96	28.968***	3.80
1970s					3.590***	7.26	4.377***	8.05
1980s					0.247	0.60	0.987**	2.25
1990s					-0.499	-1.44	0.107	0.30
Abs. lat							-0.118	-1.31
Urbaniz.							-0.025	-0.96
Trade							0.050***	6.77
Constant	-38.206***	-4.40	-54.809***	-5.03	-109.628***	-9.26	-125.143***	-9.70
σ_u								
Constant	9.413***	13.85	9.088***	13.96	8.262***	15.37	6.543***	14.20
σ_e								
Constant	6.469***	79.62	6.466***	79.67	6.371***	80.05	6.043***	77.00
N	3761		3761		3761		3420	

Table A.10: Random effects tobit analysis. Domestic savings as percentage share of total GDP as dependent variable. 2-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	0.257**	2.09	0.260**	2.10	0.247*	1.96	0.144	1.16
Ln GDP pc	6.199***	13.86	6.218***	13.55	6.306***	13.22	6.268***	11.81
Ln reg. dur.	0.040	0.29	0.031	0.22	0.150	1.07	-0.145	-1.04
Ln popul.	-0.038	-0.09	-0.056	-0.14	0.418	0.87	0.787*	1.65
Ethn. fr.	9.852***	2.94	10.833***	3.07	10.359***	2.98	5.115	1.43
Africa	3.707	1.23	2.807	0.82	3.949	1.14	6.856*	1.68
Asia	16.743***	5.48	14.084***	3.09	13.696***	3.05	16.782***	3.56
Lat. Am.	3.866	1.43	1.966	0.49	2.547	0.64	4.105	0.92
E.E.-Soviet	6.059**	2.21	7.769**	2.56	8.535***	2.77	3.982	1.21
MENA	4.669	1.60	6.650*	1.82	7.061*	1.95	13.773***	3.71
British			1.680	0.75	1.766	0.80	-1.275	-0.61
French			0.900	0.33	1.051	0.39	0.583	0.21
Spanish			2.638	0.65	2.849	0.72	-3.139	-0.78
Portuguese			3.089	0.63	3.118	0.65	-0.198	-0.05
Belgian			1.391	0.25	1.171	0.21	-6.515	-1.28
Sunni			11.552*	1.92	11.250*	1.89	23.263***	3.29
Shia			4.198	0.55	4.604	0.61	27.202***	3.28
Catholic			11.374*	1.80	10.928*	1.76	29.445***	3.90
Protestant			12.104*	1.87	11.572*	1.81	29.491***	3.90
Orthodox			9.342	1.43	8.882	1.38	27.080***	3.23
Hindu			14.872*	1.87	14.665*	1.87	29.858***	3.57
Buddhist+			14.919**	2.01	14.893**	2.04	28.197***	3.50
Indigenous			9.329	1.36	9.052	1.34	23.363***	3.05
1970s					-0.131	-0.19	0.794	1.07
1980s					-2.142***	-3.45	-1.119*	-1.68
1990s					-1.176**	-2.02	-0.484	-0.79
Abs. lat.							-0.150	-1.63
Urbaniz.							0.001	0.04
Trade							0.021***	2.66
Constant	-38.639***	-4.66	-50.789***	-5.03	-58.098***	-5.03	-74.905***	-5.63
σ_u								
Constant	8.136***	15.32	7.903***	15.28	7.787***	15.41	6.540***	14.19
σ_e								
Constant	6.069***	75.48	6.069***	75.47	6.019***	75.48	5.742***	72.61
N	3352		3352		3352		3054	

Table A.11: Random effects tobit analysis. Domestic savings as percentage share of total GDP as dependent variable. 5-year lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	-0.006	-0.59	-0.007	-0.65	-0.008	-0.74
Ln GDP pc	0.030	0.14	-0.071	-0.30	-0.192	-0.73
Ln popul.	-0.100	-1.07	-0.120	-1.18	-0.192	-1.16
Ln reg. dur.	-0.013	-0.37	-0.018	-0.51	-0.027	-0.77
Ethn. fr.	-0.456	-1.01	-0.510	-1.26	-0.426	-0.61
E.E.-Soviet	0.259	0.56	0.152	0.34	0.889*	1.96
Africa	-0.318	-0.46	0.144	0.17	-0.531	-0.64
Asia-Pac.	0.941*	1.81	0.022	0.02	-0.533	-0.46
MENA	0.412	0.65	-0.001	-0.00	-1.392	-1.44
Lat. Am.	-0.171	-0.35	-0.018	-0.02	-0.086	-0.08
1830s	-0.633	-0.59	-0.863	-0.80	-1.306	-1.15
1840s	-0.427	-0.43	-0.674	-0.66	-1.098	-1.01
1850s	-0.290	-0.35	-0.531	-0.61	-0.962	-1.02
1860s	-0.179	-0.23	-0.416	-0.52	-0.844	-0.95
1870s	-0.035	-0.05	-0.269	-0.34	-0.696	-0.81
1880s	0.140	0.19	-0.087	-0.11	-0.513	-0.61
1890s	0.347	0.49	0.137	0.19	-0.289	-0.35
1900s	0.504	0.74	0.307	0.43	-0.116	-0.15
1910s	0.142	0.22	-0.037	-0.05	-0.455	-0.60
1920s	0.313	0.48	0.160	0.24	-0.252	-0.34
1930s	0.551	0.86	0.410	0.62	0.023	0.03
1940s	1.038	1.61	0.913	1.38	0.589	0.81
1950s	1.171*	1.89	1.080*	1.72	0.804	1.19
1960s	1.066*	1.79	1.012*	1.68	0.808	1.27
1970s	0.637	1.23	0.603	1.16	0.477	0.87
1980s	0.213	0.54	0.199	0.51	0.137	0.34
British			0.054	0.17	0.262	0.66
French			-0.402	-0.78	-0.413	-0.69
Portuguese			-1.286	-1.30	-0.942	-1.00
Spanish			-0.449	-0.51	0.000	0.00
Belgian			-3.063	-1.56	-2.019	-1.15
Sunni			-2.215	-1.61	-2.655*	-1.88
Shia			1.085	0.64	0.882	0.49
Catholic			-1.598	-1.06	-3.314**	-2.05
Protestant			-2.069	-1.45	-3.545**	-2.24
Orthodox			-1.687	-1.05	-3.241*	-1.80
Hindu			-1.623	-0.91	-2.722	-1.47
Buddhist+			-0.538	-0.40	-1.319	-0.97
Indigenous			-2.712*	-1.87	-3.642**	-2.41
Abs. lat.					0.015	0.73
Frankel-Romer					-0.113	-0.37
Constant	2.667	1.23	5.692*	1.95	8.852**	2.16
N	6918		6918		6666	

Table A.12: OLS with PCSE analysis. Physical capital-induced economic growth as dependent variable. 5-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	-0.037***	-4.24	-0.037***	-4.28	-0.039***	-4.45
Ln GDP pc	1.084***	7.60	1.089***	7.51	0.891***	5.90
Ln popul.	-0.538***	-4.48	-0.605***	-4.93	-0.878***	-5.65
Ln reg. dur.	0.154***	4.04	0.154***	4.03	0.133***	3.42
Ethn. fr.	-1.658*	-1.70	-2.187**	-2.04	-3.003**	-2.29
E.E.-Soviet	0.787	1.07	0.107	0.12	0.722	0.59
Africa	1.619*	1.89	2.342**	2.32	2.059	1.62
Asia-Pac.	3.168***	4.03	3.949***	3.04	3.641**	2.31
MENA	0.079	0.10	-0.610	-0.57	-1.467	-1.20
Lat. Am.	0.063	0.09	0.727	0.57	0.857	0.60
1830s	2.343	1.36	2.256	1.31	1.334	0.76
1840s	0.681	0.85	0.589	0.73	-0.284	-0.34
1850s	1.145**	2.11	1.049*	1.92	0.220	0.38
1860s	1.020**	2.10	0.929*	1.90	0.135	0.26
1870s	1.292***	2.92	1.197***	2.68	0.396	0.82
1880s	0.797*	1.93	0.711*	1.71	-0.024	-0.05
1890s	1.714***	4.50	1.632***	4.23	0.939**	2.24
1900s	1.602***	4.54	1.525***	4.28	0.886**	2.28
1910s	1.183***	3.55	1.114***	3.31	0.519	1.42
1920s	0.523*	1.73	0.460	1.50	-0.086	-0.26
1930s	0.161	0.58	0.102	0.36	-0.431	-1.40
1940s	1.625***	6.09	1.568***	5.82	1.102***	3.76
1950s	2.983***	14.13	2.928***	13.74	2.569***	10.97
1960s	3.064***	18.67	3.019***	18.26	2.712***	14.98
1970s	2.167***	15.36	2.132***	15.05	2.036***	13.51
1980s	-0.108	-0.84	-0.125	-0.97	-0.171	-1.28
British			-0.219	-0.34	-0.172	-0.26
French			-0.395	-0.52	-0.888	-1.13
Portuguese			-1.098	-0.81	-1.758	-1.28
Spanish			-1.519	-1.19	-1.757	-1.38
Belgian			-3.233*	-1.77	-2.613	-1.38
Sunni			-1.161	-0.50	-2.185	-0.97
Shia			2.547	0.94	1.359	0.51
Catholic			-0.668	-0.28	-2.752	-1.13
Protestant			-2.135	-0.88	-4.273*	-1.75
Orthodox			-0.126	-0.05	-1.269	-0.45
Hindu			-1.187	-0.44	-3.210	-1.19
Buddhist+			-2.332	-0.90	-4.324*	-1.67
Indigenous			-2.228	-0.89	-3.059	-1.25
Abs. lat.					0.017	0.57
Frankel-Romer					-1.144***	-2.76
Constant	-3.044	-1.53	-0.852	-0.27	8.522**	1.98
N	7141		7141		6838	

Table A.13: Random effects analysis. Physical capital-induced economic growth as dependent variable. 2-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	-0.053***	-5.91	-0.055***	-6.05	-0.057***	-6.19
Ln GDP pc	0.280*	1.87	0.256*	1.68	0.079	0.50
Ln popul.	-0.746***	-6.21	-0.821***	-6.69	-1.263***	-7.96
Ln reg. dur.	0.105***	2.69	0.105***	2.68	0.082**	2.06
Ethn. fr.	-1.699*	-1.79	-2.160**	-2.08	-2.906**	-2.22
E.E.-Soviet	-0.516	-0.71	-1.048	-1.23	0.239	0.19
Africa	-0.754	-0.89	0.364	0.37	-0.042	-0.03
Asia-Pac.	1.713**	2.22	2.849**	2.25	2.330	1.48
MENA	-1.182	-1.52	-1.308	-1.25	-2.348*	-1.91
Lat. Am.	-1.198*	-1.68	-0.417	-0.34	-0.381	-0.27
1830s	-1.612	-0.92	-1.790	-1.02	-2.923*	-1.65
1840s	-1.443**	-2.04	-1.630**	-2.30	-2.699***	-3.65
1850s	-1.034*	-1.92	-1.217**	-2.24	-2.252***	-3.89
1860s	-0.973**	-1.99	-1.151**	-2.33	-2.155***	-4.06
1870s	-0.969**	-2.16	-1.144**	-2.53	-2.148***	-4.36
1880s	-0.782*	-1.87	-0.943**	-2.23	-1.865***	-4.06
1890s	-0.056	-0.14	-0.209	-0.53	-1.092**	-2.54
1900s	0.087	0.24	-0.052	-0.14	-0.865**	-2.18
1910s	-0.585*	-1.71	-0.711**	-2.06	-1.468***	-3.90
1920s	-0.950***	-3.08	-1.065***	-3.41	-1.766***	-5.18
1930s	-0.597**	-2.09	-0.705**	-2.44	-1.366***	-4.32
1940s	1.251***	4.62	1.149***	4.21	0.583*	1.96
1950s	2.375***	10.79	2.285***	10.29	1.781***	7.31
1960s	2.482***	14.16	2.418***	13.71	2.027***	10.56
1970s	1.126***	7.29	1.081***	6.98	0.915***	5.59
1980s	-0.234	-1.61	-0.256*	-1.77	-0.323**	-2.16
British			-0.316	-0.51	-0.381	-0.58
French			-0.900	-1.23	-1.446*	-1.83
Portuguese			-1.138	-0.86	-2.034	-1.48
Spanish			-1.709	-1.39	-2.044	-1.60
Belgian			-3.932**	-2.22	-2.926	-1.54
Sunni			-1.665	-0.75	-2.972	-1.32
Shia			1.791	0.68	0.167	0.06
Catholic			-0.644	-0.27	-3.283	-1.35
Protestant			-2.062	-0.88	-4.811**	-1.97
Orthodox			-0.305	-0.13	-2.446	-0.87
Hindu			-1.227	-0.47	-3.669	-1.36
Buddhist+			-2.600	-1.04	-4.714*	-1.81
Indigenous			-2.476	-1.02	-3.612	-1.47
Abs. lat.					0.023	0.78
Frankel-Romer					-1.693***	-4.06
Constant	7.017***	3.48	9.547***	3.11	22.303***	5.13
N	6918		6918		6666	

Table A.14: Random effects analysis. Physical capital-induced economic growth as dependent variable. 5-year lag on independent variables. Long sample.

Appendix B

Tables to Section 5.3

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.487	-0.80	1.047*	1.77	1.275**	2.03	-1.446**	-2.22
Ln GDP pc	4.628***	5.25	1.469*	1.93	1.454*	1.82	-0.400	-0.37
Ln reg. dur.	1.186**	2.13	1.056*	1.91	0.473	0.86	0.723	1.11
Ln popul.	-0.018	-0.05	-0.080	-0.22	-0.257	-0.67	1.396***	2.65
Ethn. fr.	-9.405***	-3.62	-3.866	-1.29	-5.516*	-1.71	-5.774	-1.25
Africa	4.808	1.36	1.115	0.37	-0.110	-0.03	12.712***	4.08
Asia	20.924***	7.22	14.334***	3.65	15.477***	3.86	30.407***	6.70
Lat. Am.	16.847***	8.79	-1.730	-0.31	-2.497	-0.38	13.010	1.44
E.E.-Soviet	11.666***	4.92	6.607***	2.69	5.662**	2.13	-1.947	-0.71
MENA	9.692***	3.74	17.308***	5.89	16.207***	5.52	37.299***	8.44
British			0.404	0.23	0.633	0.33	0.289	0.13
French			-10.248***	-3.52	-9.576***	-3.46	-6.014*	-1.75
Spanish			9.107	1.45	8.036	1.12	-10.386	-0.97
Portuguese			-18.269***	-3.85	-17.905***	-3.78	-20.031***	-4.07
Belgian			-27.608***	-5.32	-28.660***	-5.20	-35.617***	-5.62
Sunni			-15.498***	-4.84	-15.499***	-4.76	-3.541	-0.96
Shia			-11.042***	-2.97	-11.755***	-3.02	0.528	0.13
Catholic			7.633***	2.76	8.662***	3.21	35.833***	7.37
Protestant			6.310**	1.96	6.700**	2.20	28.410***	5.90
Orthodox			1.487	0.53	0.474	0.18	35.112***	6.73
Hindu			8.695**	2.18	6.775*	1.86	22.039***	4.40
Buddhist+			-1.003	-0.22	-1.964	-0.41	11.611**	2.11
Indigenous			3.856	0.92	3.740	0.91	19.769***	3.91
1970s					0.000	.	0.000	.
1980s					0.000	.	0.000	.
1990s					-3.672***	-5.12	-3.386***	-4.58
Abs. lat							-0.083	-1.02
Urbaniz.							0.132**	2.21
Trade							0.026	1.37
Constant	55.646***	5.26	78.656***	7.14	86.200***	7.05	46.015***	2.78
N	959		959		959		809	

Table B.1: OLS with PCSE analysis. Gross primary education enrollment ratio as dependent variable. No lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-1.812***	-4.50	-1.800***	-5.01	-1.614***	-4.83	-1.446**	-2.22
Ln GDP pc	8.713***	15.52	8.131***	13.50	8.019***	13.80	-0.400	-0.37
Ln reg. dur.	0.664	1.57	0.424	0.97	-0.049	-0.12	0.723	1.11
Ln popul.	-0.271	-0.72	-0.236	-0.72	-0.318	-1.02	1.396***	2.65
Ethn. fr.	-1.197	-0.59	-1.421	-0.63	-0.995	-0.44	-5.774	-1.25
Africa	-38.908***	-15.31	-37.614***	-15.43	-40.759***	-16.59	12.712***	4.08
Asia	-13.171***	-5.96	-20.923***	-6.46	-22.415***	-6.83	30.407***	6.70
Lat. Am.	-20.183***	-9.51	-13.332***	-5.36	-16.279***	-6.62	13.010	1.44
E.E.-Soviet	11.492***	5.47	11.371***	5.74	8.344***	4.26	-1.947	-0.71
MENA	-11.351***	-4.42	-15.548***	-5.46	-16.798***	-6.54	37.299***	8.44
British			1.866	1.16	1.478	0.94	0.289	0.13
French			-13.804***	-7.87	-13.125***	-7.63	-6.014*	-1.75
Spanish			-4.568	-1.62	-4.303	-1.57	-10.386	-0.97
Portuguese			-14.307***	-4.03	-14.474***	-3.94	-20.031***	-4.07
Belgian			-1.824	-0.59	-3.106	-1.00	-35.617***	-5.62
Sunni			7.009***	2.98	3.639	1.51	-3.541	-0.96
Shia			16.122***	3.94	10.955***	2.98	0.528	0.13
Catholic			-0.521	-0.23	-2.860	-1.16	35.833***	7.37
Protestant			8.895***	3.68	6.722**	2.54	28.410***	5.90
Orthodox			2.449	1.06	-1.119	-0.43	35.112***	6.73
Hindu			2.169	0.60	1.405	0.36	22.039***	4.40
Buddhist+			16.891***	3.96	13.484***	3.28	11.611**	2.11
Indigenous			12.236***	4.43	8.890***	3.16	19.769***	3.91
1990s					-5.322***	-8.49	-3.386***	-4.58
Abs. lat.							-0.083	-1.02
Urbaniz.							0.132**	2.21
Trade							0.026	1.37
Constant	24.325***	2.70	26.289***	3.16	36.903***	4.40	46.015***	2.78
N	894		894		894		809	

Table B.2: OLS with PCSE analysis. Gross secondary education enrollment ratio as dependent variable. No lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-1.214***	-4.33	-1.699***	-5.89	-1.360***	-5.21	-1.369***	-5.24
Ln GDP pc	4.682***	10.37	4.708***	9.65	4.761***	10.32	2.142***	3.83
Ln reg. dur.	1.306***	3.58	1.215***	3.04	0.451	1.25	0.698*	1.92
Ln popul.	1.451***	4.48	1.540***	4.64	1.254***	4.39	0.690**	1.97
Ethn. fr.	1.518	0.71	2.915	1.27	3.841*	1.92	1.429	0.60
Africa	-26.083***	-11.78	-28.794***	-11.89	-31.217***	-13.86	-30.823***	-10.28
Asia	-19.754***	-9.69	-26.342***	-11.31	-27.540***	-11.93	-25.838***	-8.90
Lat. Am.	-18.698***	-10.70	-28.533***	-12.80	-29.460***	-14.47	-31.590***	-13.49
E.E.-Soviet	1.574	0.72	-2.485	-1.04	-4.603**	-2.13	-6.664**	-2.49
MENA	-19.462***	-10.35	-23.206***	-11.44	-24.559***	-13.18	-25.274***	-11.73
British			1.002	0.70	1.274	0.96	4.705***	3.07
French			-0.619	-0.47	-1.159	-1.06	1.367	1.01
Spanish			15.592***	7.71	15.323***	8.02	17.061***	8.32
Portuguese			0.126	0.07	0.041	0.03	2.124	1.26
Belgian			10.850***	4.53	11.586***	6.59	12.854***	5.73
Sunni			-12.795***	-3.78	-12.439***	-3.90	-18.872***	-6.56
Shia			-7.918**	-1.99	-7.970**	-2.19	-17.857***	-5.87
Catholic			-19.243***	-5.27	-18.203***	-5.35	-23.184***	-7.24
Protestant			-14.346***	-3.90	-13.575***	-3.96	-19.950***	-6.41
Orthodox			-8.176**	-2.12	-7.768**	-2.21	-23.856***	-5.24
Hindu			-19.566***	-5.40	-19.207***	-5.56	-23.867***	-7.63
Buddhist+			-6.094	-1.48	-3.062	-0.81	-5.777*	-1.65
Indigenous			-10.867***	-3.03	-11.460***	-3.46	-19.725***	-6.61
1990s					-4.640***	-8.87	-4.898***	-8.98
Abs. lat.							0.115*	1.96
Urbaniz.							0.159***	6.01
Trade							-0.020*	-1.77
Constant	-19.925**	-2.57	-4.260	-0.49	3.833	0.52	27.970***	3.28
N	806		806		806		669	

Table B.3: OLS with PCSE analysis. Gross tertiary education enrollment ratio as dependent variable. No lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-1.527***	-3.37	-1.623***	-3.56	-1.126***	-2.62	-1.082**	-2.22
Ln GDP pc	14.409***	11.27	13.869***	10.65	11.876***	10.54	6.155***	4.14
Ln reg. dur.	1.214***	2.89	1.179***	2.80	0.096	0.23	0.990**	2.11
Ln popul.	3.403***	3.49	2.882***	3.18	1.546**	1.97	1.149	1.40
Ethn. fr.	1.200	0.21	0.188	0.03	-0.815	-0.16	-7.394	-1.29
Africa	-16.612***	-2.61	-18.092***	-2.87	-28.510***	-5.03	-16.881**	-2.48
Asia	-6.205	-1.11	-14.444*	-1.91	-20.245***	-2.89	-5.650	-0.72
Lat. Am.	-6.010	-1.19	-0.119	-0.02	-7.071	-1.15	-0.420	-0.06
E.E.-Soviet	24.533***	4.56	22.873***	4.24	14.853***	3.03	5.206	0.96
MENA	-4.993	-0.96	-10.127*	-1.73	-13.993***	-2.58	-5.989	-0.98
British			0.603	0.17	1.916	0.59	3.641	1.11
French			-10.175**	-2.43	-11.136***	-2.88	-9.812**	-2.28
Spanish			-2.107	-0.33	-1.897	-0.32	-12.905*	-1.90
Portuguese			-7.079	-0.92	-7.373	-1.04	-13.604**	-1.98
Belgian			7.498	0.83	2.459	0.29	-2.368	-0.29
Sunni			9.904	1.04	6.323	0.72	5.511	0.50
Shia			15.447	1.35	9.943	0.94	13.687	1.06
Catholic			-0.806	-0.08	-1.388	-0.15	12.133	1.02
Protestant			9.047	0.90	8.273	0.89	16.340	1.39
Orthodox			6.333	0.62	3.244	0.34	12.823	0.97
Hindu			11.441	0.93	10.200	0.90	15.757	1.21
Buddhist+			18.241	1.58	16.913	1.59	20.159	1.63
Indigenous			12.931	1.21	10.253	1.04	13.289	1.10
1990s					-5.852***	-10.90	-5.667***	-9.36
Abs. lat.							0.117	0.81
Urbaniz.							0.471***	6.01
Trade							0.034*	1.67
Constant	-91.945***	-3.88	-82.313***	-3.40	-33.901	-1.64	-27.535	-1.13
σ_u								
Constant	13.450***	13.45	12.118***	13.22	11.170***	14.87	9.829***	13.31
σ_e								
Constant	7.233***	37.38	7.267***	37.34	6.846***	38.36	6.982***	35.36
N	894		894		894		757	

Table B.4: Random effects tobit analysis. Gross secondary education enrollment ratio as dependent variable. No lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-1.375***	-3.34	-1.670***	-4.04	-1.093***	-2.82	-0.767*	-1.76
Ln GDP pc	8.632***	8.28	8.923***	8.58	7.794***	8.57	7.054***	5.33
Ln reg. dur.	3.130***	7.91	3.145***	7.99	1.849***	4.86	1.658***	3.83
Ln popul.	2.086***	2.98	2.050***	3.17	1.194**	1.98	0.808	1.23
Ethn. fr.	2.335	0.52	3.156	0.73	3.196	0.79	4.635	1.00
Africa	-8.618*	-1.70	-9.590*	-1.94	-17.942***	-3.98	-18.640***	-3.40
Asia	-8.132*	-1.81	-13.163**	-2.21	-18.082***	-3.26	-18.562***	-2.96
Lat. Am.	-8.727**	-2.19	-16.196***	-3.01	-21.519***	-4.29	-26.249***	-4.48
E.E.-Soviet	14.409***	3.38	9.489**	2.29	3.095	0.81	0.093	0.02
MENA	-10.886***	-2.63	-18.138***	-4.00	-21.047***	-4.95	-23.898***	-4.85
British			-4.687*	-1.72	-3.462	-1.36	1.131	0.43
French			-4.017	-1.22	-4.116	-1.33	-0.910	-0.26
Spanish			13.382**	2.57	13.421***	2.74	22.612***	3.84
Portuguese			-2.005	-0.34	-1.904	-0.34	3.419	0.63
Belgian			14.962**	2.13	12.473*	1.90	17.856***	2.70
Sunni			-6.448	-0.88	-9.568	-1.39	-15.263*	-1.76
Shia			4.257	0.48	-0.937	-0.11	-12.776	-1.26
Catholic			-16.583**	-2.20	-17.023**	-2.41	-24.195***	-2.58
Protestant			-10.782	-1.40	-11.301	-1.56	-19.549**	-2.11
Orthodox			-3.041	-0.39	-5.536	-0.75	-21.717**	-2.08
Hindu			-14.662	-1.54	-15.992*	-1.79	-22.885**	-2.24
Buddhist+			-2.859	-0.32	-3.620	-0.43	-6.020	-0.62
Indigenous			-4.573	-0.55	-6.987	-0.90	-15.634*	-1.65
1990s					-5.590***	-11.60	-5.885***	-11.12
Abs. lat.							0.203*	1.77
Urbaniz.							0.028	0.43
Trade							-0.008	-0.47
Constant	-73.771***	-4.24	-62.028***	-3.50	-29.921*	-1.89	-20.188	-1.03
σ_u								
Constant	10.444***	13.79	9.244***	13.49	8.686***	14.63	7.679***	12.49
σ_e								
Constant	6.190***	35.39	6.178***	35.37	5.703***	36.04	5.642***	32.53
N	806		806		806		669	

Table B.5: Random effects tobit analysis. Gross tertiary education enrollment ratio as dependent variable. No lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	-0.002	-1.08	-0.002	-1.16	-0.001	-0.67
Ln GDP pc	0.098**	2.05	0.072	1.48	0.087*	1.77
Ln popul.	-0.061**	-2.48	-0.062**	-2.53	-0.050	-1.27
Ln reg. dur.	-0.017***	-3.08	-0.018***	-3.12	-0.020***	-3.32
Ethn. fr.	0.029	0.31	0.086	0.97	-0.040	-0.34
E.E.-Soviet	0.032	0.37	0.086	1.16	0.036	0.56
Africa	0.150	1.20	0.321**	2.19	0.503***	3.01
Asia-Pac.	0.614***	3.64	0.670***	3.92	0.897***	4.88
MENA	0.579***	4.09	0.780***	4.20	1.082***	6.76
Lat. Am.	0.270***	3.50	0.177	1.34	0.246	1.43
1830s	-0.171	-0.79	-0.233	-1.05	-0.196	-0.87
1840s	-0.131	-0.66	-0.191	-0.94	-0.152	-0.73
1850s	-0.199	-1.06	-0.257	-1.33	-0.216	-1.08
1860s	-0.269	-1.55	-0.323*	-1.81	-0.283	-1.53
1870s	-0.303*	-1.80	-0.355**	-2.05	-0.317*	-1.77
1880s	-0.333**	-2.06	-0.384**	-2.32	-0.349**	-2.03
1890s	-0.343**	-2.25	-0.392**	-2.52	-0.363**	-2.23
1900s	-0.334**	-2.31	-0.382***	-2.60	-0.360**	-2.32
1910s	-0.247*	-1.80	-0.292**	-2.09	-0.276*	-1.87
1920s	-0.182	-1.48	-0.224*	-1.78	-0.214	-1.58
1930s	-0.145	-1.25	-0.185	-1.56	-0.180	-1.42
1940s	-0.052	-0.49	-0.085	-0.79	-0.080	-0.70
1950s	0.021	0.22	-0.000	-0.00	0.004	0.04
1960s	0.093	1.01	0.085	0.91	0.088	0.92
1970s	0.104	1.26	0.102	1.22	0.104	1.24
1980s	0.047	0.74	0.047	0.73	0.048	0.75
British			-0.076	-0.72	-0.083	-0.79
French			-0.171	-1.50	-0.123	-0.91
Portuguese			-0.378**	-2.24	-0.396*	-1.93
Spanish			0.099	0.59	0.025	0.14
Belgian			-0.340	-1.01	-0.558	-1.53
Sunni			0.039	0.10	0.041	0.10
Shia			0.164	0.38	0.244	0.55
Catholic			0.263	0.64	0.593	1.50
Protestant			0.304	0.75	0.633	1.60
Orthodox			0.182	0.44	0.631	1.63
Hindu			0.198	0.46	0.352	0.80
Buddhist+			0.228	0.54	0.296	0.70
Indigenous			0.137	0.32	0.316	0.77
Abs. lat.					-0.002	-0.66
Frankel-Romer					0.032	0.40
Constant	0.689	1.51	0.672	1.07	0.129	0.15
N	6918		6918		6666	

Table B.6: OLS with PCSE analysis. Human capital-induced economic growth as dependent variable. 5-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	-0.000	-0.25	-0.001	-0.36	-0.000	-0.09
Ln GDP pc	0.006	0.26	-0.010	-0.39	0.021	0.85
Ln popul.	0.004	0.19	0.010	0.44	0.009	0.37
Ln reg. dur.	-0.028***	-4.19	-0.028***	-4.17	-0.032***	-4.73
Ethn. fr.	-0.008	-0.04	0.101	0.49	-0.091	-0.55
E.E.-Soviet	-0.052	-0.38	0.136	0.83	0.004	0.03
Africa	-0.119	-0.74	0.122	0.63	0.337**	2.03
Asia-Pac.	0.213	1.45	0.276	1.11	0.659***	3.25
MENA	0.433***	2.88	0.774***	3.77	1.034***	6.54
Lat. Am.	0.162	1.18	0.132	0.54	0.194	1.06
1830s	-0.967***	-3.24	-0.998***	-3.34	-0.949***	-3.13
1840s	-0.289**	-2.08	-0.320**	-2.30	-0.264*	-1.87
1850s	-0.115	-1.21	-0.144	-1.50	-0.089	-0.91
1860s	-0.238***	-2.81	-0.266***	-3.10	-0.211**	-2.41
1870s	-0.324***	-4.17	-0.349***	-4.45	-0.297***	-3.68
1880s	-0.524***	-7.25	-0.549***	-7.49	-0.498***	-6.63
1890s	-0.482***	-7.20	-0.505***	-7.44	-0.457***	-6.57
1900s	-0.551***	-8.89	-0.571***	-9.10	-0.530***	-8.21
1910s	-0.494***	-8.45	-0.513***	-8.66	-0.476***	-7.81
1920s	-0.390***	-7.35	-0.407***	-7.58	-0.376***	-6.78
1930s	-0.436***	-8.94	-0.452***	-9.15	-0.426***	-8.31
1940s	-0.386***	-8.24	-0.399***	-8.44	-0.375***	-7.65
1950s	-0.160***	-4.33	-0.170***	-4.53	-0.154***	-3.94
1960s	0.092***	3.21	0.088***	3.04	0.090***	2.95
1970s	0.441***	17.95	0.440***	17.83	0.442***	17.17
1980s	0.301***	13.52	0.301***	13.50	0.288***	12.44
British			-0.146	-1.18	-0.121	-1.43
French			-0.160	-1.10	-0.101	-0.99
Portuguese			-0.377	-1.44	-0.344*	-1.95
Spanish			0.075	0.31	0.010	0.06
Belgian			-0.575	-1.64	-0.827***	-3.41
Sunni			-0.074	-0.17	-0.032	-0.11
Shia			0.007	0.01	0.183	0.54
Catholic			0.235	0.50	0.581*	1.87
Protestant			0.402	0.86	0.725**	2.32
Orthodox			-0.050	-0.10	0.687*	1.92
Hindu			0.246	0.47	0.343	1.00
Buddhist+			0.352	0.71	0.262	0.79
Indigenous			0.114	0.24	0.272	0.87
Abs. lat.					-0.003	-0.74
Frankel-Romer					0.073	1.28
Constant	0.974***	2.74	0.780	1.34	0.124	0.20
N	7141		7141		6838	

Table B.7: Random effects analysis. Human capital-induced economic growth as dependent variable. 2-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	-0.002	-1.48	-0.002	-1.56	-0.002	-1.14
Ln GDP pc	0.004	0.15	-0.012	-0.46	0.012	0.45
Ln popul.	-0.008	-0.36	-0.004	-0.16	-0.005	-0.21
Ln reg. dur.	-0.029***	-4.37	-0.029***	-4.35	-0.032***	-4.75
Ethn. fr.	-0.024	-0.13	0.060	0.29	-0.114	-0.70
E.E.-Soviet	-0.089	-0.63	0.094	0.56	-0.007	-0.05
Africa	-0.164	-1.01	0.082	0.42	0.267	1.63
Asia-Pac.	0.185	1.24	0.292	1.15	0.615***	3.09
MENA	0.398***	2.62	0.743***	3.56	0.964***	6.21
Lat. Am.	0.135	0.97	0.105	0.43	0.161	0.90
1830s	-0.844***	-2.82	-0.876***	-2.92	-0.838***	-2.76
1840s	-0.151	-1.24	-0.182	-1.49	-0.138	-1.12
1850s	-0.171*	-1.84	-0.201**	-2.13	-0.158*	-1.66
1860s	-0.364***	-4.29	-0.392***	-4.57	-0.351***	-4.03
1870s	-0.459***	-5.88	-0.485***	-6.14	-0.446***	-5.55
1880s	-0.540***	-7.41	-0.565***	-7.65	-0.528***	-7.04
1890s	-0.549***	-8.10	-0.572***	-8.32	-0.538***	-7.70
1900s	-0.586***	-9.33	-0.606***	-9.54	-0.577***	-8.92
1910s	-0.498***	-8.36	-0.517***	-8.57	-0.492***	-7.99
1920s	-0.426***	-7.92	-0.443***	-8.15	-0.423***	-7.58
1930s	-0.456***	-9.18	-0.472***	-9.38	-0.455***	-8.80
1940s	-0.348***	-7.40	-0.362***	-7.61	-0.344***	-7.03
1950s	-0.119***	-3.11	-0.129***	-3.33	-0.120***	-2.99
1960s	0.212***	7.00	0.208***	6.80	0.205***	6.44
1970s	0.408***	15.41	0.407***	15.32	0.404***	14.60
1980s	0.194***	7.87	0.194***	7.87	0.184***	7.22
British			-0.131	-1.05	-0.096	-1.15
French			-0.163	-1.11	-0.103	-1.03
Portuguese			-0.383	-1.45	-0.350**	-2.02
Spanish			0.079	0.32	0.031	0.19
Belgian			-0.610*	-1.71	-0.802***	-3.37
Sunni			0.011	0.02	0.030	0.11
Shia			0.101	0.19	0.238	0.72
Catholic			0.317	0.67	0.591*	1.94
Protestant			0.472	1.00	0.715**	2.34
Orthodox			0.053	0.11	0.682*	1.95
Hindu			0.298	0.57	0.357	1.06
Buddhist+			0.363	0.72	0.267	0.82
Indigenous			0.218	0.45	0.348	1.13
Abs. lat.					-0.002	-0.51
Frankel-Romer					0.050	0.89
Constant	1.150***	3.17	0.892	1.51	0.396	0.65
N	6918		6918		6666	

Table B.8: Random effects analysis. Human capital-induced economic growth as dependent variable. 5-year lag on independent variables. Long sample.

	2-year lag		5-year lag	
	b	*t*	*b*	*t*
PI	-0.000	-0.20	-0.002	-1.45
Ln GDP pc	-0.018	-0.67	-0.024	-0.84
Ln popul.	0.056*	1.78	0.028	0.88
Ln reg. dur.	-0.026***	-3.97	-0.028***	-4.14
1830s	-0.941***	-3.11	-0.846***	-2.79
1840s	-0.264*	-1.81	-0.154	-1.19
1850s	-0.088	-0.85	-0.172*	-1.67
1860s	-0.214**	-2.27	-0.365***	-3.83
1870s	-0.294***	-3.31	-0.456***	-5.11
1880s	-0.498***	-6.05	-0.539***	-6.49
1890s	-0.457***	-5.94	-0.546***	-7.01
1900s	-0.525***	-7.39	-0.582***	-8.09
1910s	-0.471***	-7.06	-0.494***	-7.28
1920s	-0.369***	-6.10	-0.422***	-6.91
1930s	-0.417***	-7.50	-0.452***	-8.00
1940s	-0.364***	-6.87	-0.341***	-6.40
1950s	-0.138***	-3.23	-0.109**	-2.50
1960s	0.117***	3.56	0.227***	6.66
1970s	0.462***	17.39	0.422***	14.97
1980s	0.313***	13.73	0.203***	8.12
Constant	0.715*	1.74	1.050**	2.51
N	7141		6918	

Table B.9: Fixed effects analysis. Human capital-induced economic growth as dependent variable. 2- and 5-year lags on independent variables. Long sample.

Appendix C

Tables to Section 5.4

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.014	1.58	0.010	1.11	0.010	1.28
Ln TFP	-1.040**	-2.05	-1.112**	-2.18	-1.232***	-2.68
Ln popul.	-0.018	-0.24	-0.014	-0.17	-0.214*	-1.80
Ln reg. dur.	0.008	0.30	0.001	0.03	-0.006	-0.23
Ethn. fr.	-1.313**	-2.51	-1.105**	-2.17	-0.818	-1.49
E.E.-Soviet	-1.680***	-3.32	-1.162***	-2.72	-0.490	-1.13
Africa	-1.584***	-3.06	-0.857*	-1.66	-1.149**	-2.25
Asia-Pac.	-1.053**	-2.26	-1.258*	-1.78	-1.246*	-1.80
MENA	-0.001	-0.00	0.854	1.29	0.092	0.16
Lat. Am.	-0.632	-1.49	-1.053	-1.27	-1.133	-1.41
1830s	5.134**	2.04	4.738	1.63	8.837***	2.82
1840s	4.942**	1.99	4.529	1.57	8.621***	2.77
1850s	5.521**	2.24	5.121*	1.79	9.180***	2.97
1860s	5.605**	2.28	5.223*	1.83	9.249***	3.00
1870s	5.774**	2.34	5.425*	1.90	9.409***	3.06
1880s	6.110**	2.47	5.771**	2.02	9.732***	3.16
1890s	6.381**	2.57	6.049**	2.10	9.972***	3.22
1900s	6.407**	2.57	6.104**	2.11	10.009***	3.22
1910s	5.678**	2.27	5.402*	1.86	9.290***	2.98
1920s	6.437**	2.56	6.169**	2.12	10.048***	3.21
1930s	6.418**	2.54	6.138**	2.10	10.023***	3.18
1940s	6.770***	2.65	6.509**	2.21	10.469***	3.29
1950s	6.890***	2.65	6.657**	2.23	10.728***	3.33
1960s	6.845***	2.60	6.632**	2.20	10.776***	3.32
1970s	6.273**	2.36	6.059**	2.00	10.286***	3.14
1980s	5.862**	2.21	5.653*	1.87	9.977***	3.06
1990s+	5.596**	2.11	5.430*	1.80	9.888***	3.04
British			0.008	0.03	0.032	0.10
French			0.103	0.43	0.200	0.87
Portuguese			-1.201	-0.95	-1.205	-0.98
Spanish			0.052	0.07	0.278	0.39
Belgian			-3.247***	-2.91	-2.409**	-2.19
Sunni			-0.370	-0.31	-0.813	-0.68
Shia			-1.894	-1.24	-2.226	-1.49
Catholic			0.913	0.69	-0.353	-0.29
Protestant			0.490	0.40	-0.782	-0.68
Orthodox			-1.605	-1.26	-1.304	-0.99
Hindu			0.184	0.15	-0.868	-0.69
Buddhist+			0.794	0.65	-0.046	-0.04
Indigenous			-1.124	-0.84	-1.871	-1.47
Abs. lat.					0.019*	1.91
Frankel-Romer					-0.483**	-2.57
N	7031		7031		6736	

Table C.1: OLS with PCSE analysis on interpolated data. TFP growth as dependent variable. 2-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.024**	2.47	0.018**	1.98	0.015*	1.73
Ln TFP	-1.998***	-5.22	-2.022***	-4.99	-2.018***	-4.88
Ln popul.	-0.098	-1.17	-0.125	-1.22	-0.286**	-2.20
Ln reg. dur.	-0.045*	-1.75	-0.045*	-1.71	-0.052**	-2.03
Ethn. fr.	-1.238**	-2.26	-1.080**	-2.16	-0.393	-0.64
E.E.-Soviet	-0.877*	-1.90	-0.817*	-1.88	-0.953**	-2.13
Africa	-2.259***	-4.92	-1.909***	-3.28	-1.487**	-2.54
Asia-Pac.	-1.475***	-3.49	-1.590**	-2.05	-0.751	-1.01
MENA	-0.367	-0.95	-0.238	-0.49	0.156	0.32
Lat. Am.	-0.893*	-1.89	-2.326***	-2.65	-2.012**	-2.39
1830s	10.781***	5.89	12.401***	5.92	13.308***	5.04
1840s	10.764***	6.04	12.350***	6.02	13.241***	5.09
1850s	10.713***	6.08	12.303***	6.04	13.196***	5.13
1860s	10.851***	6.16	12.453***	6.12	13.339***	5.20
1870s	11.220***	6.39	12.830***	6.32	13.708***	5.36
1880s	11.208***	6.37	12.826***	6.31	13.710***	5.35
1890s	11.293***	6.38	12.938***	6.33	13.812***	5.38
1900s	11.376***	6.40	13.057***	6.37	13.941***	5.42
1910s	11.590***	6.48	13.297***	6.45	14.207***	5.49
1920s	11.867***	6.61	13.584***	6.56	14.518***	5.59
1930s	12.031***	6.66	13.763***	6.60	14.713***	5.62
1940s	12.518***	6.86	14.256***	6.78	15.234***	5.76
1950s	12.549***	6.73	14.316***	6.69	15.339***	5.71
1960s	12.270***	6.47	14.071***	6.49	15.128***	5.54
1970s	12.000***	6.24	13.785***	6.30	14.867***	5.38
1980s	11.873***	6.17	13.648***	6.24	14.779***	5.34
1990s+	11.763***	6.02	13.542***	6.12	14.693***	5.26
British			-0.016	-0.06	0.043	0.15
French			0.145	0.40	0.593*	1.67
Portuguese			1.290	1.56	1.184	1.31
Spanish			1.180	1.61	1.208	1.63
Belgian			-1.694	-1.48	-0.973	-0.81
Sunni			-1.785*	-1.94	-2.054**	-2.16
Shia			-2.653**	-2.51	-3.120***	-2.93
Catholic			-1.118	-1.18	-1.144	-1.20
Protestant			-1.493*	-1.76	-1.750**	-2.01
Orthodox			-2.166**	-2.14	-2.093**	-1.98
Hindu			-1.846*	-1.81	-2.462**	-2.21
Buddhist+			-1.277	-1.30	-1.190	-1.23
Indigenous			-3.877***	-3.84	-4.047***	-3.89
Abs. lat.					0.033***	3.28
Frankel-Romer					-0.365*	-1.88
N	5982		5982		5860	

Table C.2: OLS with PCSE analysis on interpolated data. TFP growth as dependent variable. 10-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
CL	-0.064	-1.44	-0.049	-1.15	-0.020	-0.46
Ln TFP	-1.651**	-1.98	-1.541*	-1.80	-1.924**	-2.44
Ln popul.	-0.022	-0.23	0.027	0.34	-0.239	-1.30
Ln reg. dur.	0.030	0.57	0.034	0.67	0.016	0.33
Ethn. fr.	-3.864***	-3.98	-3.511***	-3.46	-2.852**	-2.01
E.E.-Soviet	-3.233***	-3.45	-1.865**	-2.18	-1.368*	-1.81
Africa	-1.096	-1.24	-0.439	-0.42	-1.308	-1.38
Asia-Pac.	-1.202	-1.63	-0.960	-0.98	-0.957	-0.98
MENA	-0.930	-1.54	0.059	0.10	-1.008*	-1.75
Lat. Am.	-1.107	-1.00	-2.480*	-1.89	-2.564**	-2.09
1970s	10.370**	2.28	.	.	15.410**	2.54
1980s	10.165**	2.26	-0.225	-1.04	15.237**	2.53
1990s+	9.985**	2.21	-0.409	-1.46	15.115**	2.50
British			-0.081	-0.35	0.189	0.83
French			0.534	1.24	0.712	1.44
Portuguese			-0.487	-0.48	0.210	0.21
Spanish			0.823	0.81	1.120	1.22
Belgian			-3.354**	-2.20	-2.005	-1.09
Sunni			-1.883*	-1.86	-2.174*	-1.95
Shia			-5.302**	-2.44	-5.468**	-2.46
Catholic			0.001	0.00	-1.509	-1.25
Protestant			-0.909	-1.12	-2.454**	-2.40
Orthodox			-3.812***	-3.21	-3.865**	-2.03
Hindu			-0.998	-1.17	-2.230**	-2.27
Buddhist+			-1.001*	-1.74	-1.517	-1.64
Indigenous			-2.743***	-2.70	-3.825***	-3.96
Abs. lat.					0.027**	2.57
Frankel-Romer					-0.312	-1.06
Constant	.	.	9.948**	1.97	.	.
N	2822		2822		2638	

Table C.3: OLS with PCSE analysis on interpolated data. TFP growth as dependent variable. 5-year lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
CL	-0.149***	-3.51	-0.119***	-3.02	-0.088**	-2.35
Ln TFP	-2.126***	-3.65	-2.267***	-3.95	-2.116***	-3.73
Ln popul.	0.104	1.64	0.084	1.14	-0.024	-0.18
Ln reg. dur.	-0.054	-1.32	-0.052	-1.16	-0.053	-1.31
Ethn. fr.	-2.937**	-1.99	-2.511*	-1.78	-1.929	-0.98
E.E.-Soviet	-2.184***	-5.83	-1.940***	-5.16	-2.114***	-6.10
Africa	-2.201***	-3.56	-2.069**	-2.25	-1.424*	-1.75
Asia-Pac.	-2.334***	-4.42	-3.316***	-3.86	-2.151**	-2.53
MENA	-1.319***	-6.33	-1.065**	-2.20	-0.892**	-2.24
Lat. Am.	-2.384***	-2.89	-4.197***	-5.14	-3.586***	-4.32
1970s	12.175***	3.59	.	.	14.154***	2.89
1980s	12.213***	3.60	0.026	0.47	14.218***	2.91
1990s+	12.157***	3.58	-0.034	-0.47	14.178***	2.89
British			-0.003	-0.01	0.180	0.65
French			-0.030	-0.07	0.349	0.70
Portuguese			0.794	0.71	0.829	0.66
Spanish			1.869*	1.87	1.931**	2.22
Belgian			-2.541	-1.09	-1.807	-0.75
Sunni			-2.452***	-9.41	-2.774***	-10.85
Shia			-5.350***	-2.68	-5.605***	-2.81
Catholic			-1.912***	-3.04	-2.143***	-4.89
Protestant			-2.100***	-4.91	-2.447***	-3.99
Orthodox			-3.353***	-3.87	-4.390***	-3.14
Hindu			-1.241***	-3.09	-1.970**	-2.05
Buddhist+			-1.046***	-2.61	-1.056	-1.39
Indigenous			-4.116***	-6.90	-4.351***	-8.97
Abs. lat.					0.034***	3.88
Frankel-Romer					-0.138	-0.52
Constant	.	.	15.100***	4.16	.	.
N	2153		2153		2076	

Table C.4: OLS with PCSE analysis on interpolated data. TFP growth as dependent variable. 10-year lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.009	1.38	0.009	1.31	0.010	1.52
Ln TFP	-0.926***	-6.33	-0.932***	-6.37	-1.047***	-7.45
Ln popul.	-0.860***	-8.47	-0.822***	-8.13	-0.841***	-8.24
Ln reg. dur.	-0.006	-0.21	-0.004	-0.15	0.002	0.08
Ethn. fr.	-1.889**	-2.21	-1.621*	-1.83	-1.670***	-2.62
E.E.-Soviet	-3.631***	-5.67	-2.570***	-3.58	-0.285	-0.47
Africa	-2.402***	-3.43	-1.382*	-1.70	-1.442**	-2.33
Asia-Pac.	-0.568	-0.86	0.697	0.66	-0.410	-0.53
MENA	-1.436**	-2.09	-0.294	-0.33	-0.692	-1.15
Lat. Am.	-1.907***	-3.03	-2.444**	-2.35	-2.098***	-3.03
1830s	-1.289	-0.99	-1.233	-0.95	-1.274	-0.99
1840s	-1.625**	-2.47	-1.577**	-2.39	-1.636**	-2.51
1850s	-1.462***	-3.91	-1.419***	-3.79	-1.513***	-4.09
1860s	-1.516***	-4.76	-1.476***	-4.64	-1.576***	-5.00
1870s	-1.207***	-4.13	-1.163***	-3.98	-1.277***	-4.40
1880s	-0.782***	-2.89	-0.742***	-2.75	-0.853***	-3.18
1890s	-0.624**	-2.54	-0.587**	-2.39	-0.699***	-2.86
1900s	-0.366	-1.59	-0.329	-1.43	-0.440*	-1.92
1910s	-1.279***	-5.92	-1.243***	-5.76	-1.351***	-6.28
1920s	0.168	0.84	0.201	1.01	0.093	0.47
1930s	-0.197	-1.07	-0.166	-0.90	-0.211	-1.14
1940s	0.675***	3.81	0.705***	3.98	0.697***	3.91
1950s	1.461***	10.23	1.488***	10.43	1.438***	10.02
1960s	1.895***	16.00	1.919***	16.22	1.774***	14.92
1970s	0.728***	6.64	0.743***	6.78	0.703***	6.40
1980s	-0.221**	-2.22	-0.214**	-2.15	-0.297***	-2.97
British			-0.116	-0.22	-0.110	-0.34
French			-0.025	-0.04	0.084	0.21
Portuguese			-0.055	-0.05	-0.447	-0.66
Spanish			-0.081	-0.08	0.071	0.11
Belgian			-3.186**	-2.11	-1.625*	-1.76
Sunni			-0.364	-0.19	-1.439	-1.31
Shia			-0.496	-0.22	-2.176*	-1.68
Catholic			1.439	0.72	-0.965	-0.81
Protestant			0.481	0.24	-1.677	-1.41
Orthodox			-1.361	-0.66	-1.468	-1.08
Hindu			-0.104	-0.05	-1.661	-1.26
Buddhist+			-0.820	-0.38	-1.337	-1.05
Indigenous			-1.275	-0.61	-2.350**	-1.96
Abs. lat.					0.018	1.25
Frankel-Romer					-1.273***	-5.64
Constant	13.649***	9.19	12.444***	5.11	18.164***	7.57
N	7031		7031		6736	

Table C.5: Random effects models on interpolated data. TFP growth as dependent variable. 2-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.039***	5.86	0.039***	5.83	0.040***	6.15
Ln TFP	-3.419***	-22.40	-3.419***	-22.41	-3.366***	-22.78
Ln popul.	-1.361***	-13.07	-1.332***	-12.84	-1.501***	-13.73
Ln reg. dur.	-0.116***	-4.04	-0.113***	-3.94	-0.120***	-4.20
Ethn. fr.	-1.124	-1.26	-0.973	-1.05	-0.969	-1.33
E.E.-Soviet	-5.905***	-8.82	-5.031***	-6.68	-1.678**	-2.45
Africa	-4.953***	-6.81	-3.690***	-4.37	-3.794***	-5.39
Asia-Pac.	-1.851***	-2.71	-0.322	-0.29	-2.006**	-2.29
MENA	-1.086	-1.52	-0.056	-0.06	-0.482	-0.70
Lat. Am.	-3.016***	-4.61	-3.832***	-3.54	-3.595***	-4.55
1830s	-2.671**	-2.13	-2.616**	-2.09	-2.839**	-2.29
1840s	-2.611***	-4.09	-2.565***	-4.01	-2.759***	-4.36
1850s	-3.131***	-8.48	-3.092***	-8.38	-3.290***	-8.93
1860s	-2.908***	-9.19	-2.872***	-9.08	-3.062***	-9.66
1870s	-2.854***	-9.75	-2.814***	-9.62	-3.024***	-10.25
1880s	-2.408***	-8.88	-2.372***	-8.76	-2.563***	-9.39
1890s	-2.245***	-9.07	-2.213***	-8.94	-2.397***	-9.60
1900s	-2.199***	-9.47	-2.167***	-9.34	-2.349***	-10.01
1910s	-2.213***	-10.15	-2.182***	-10.02	-2.359***	-10.70
1920s	-1.327***	-6.56	-1.298***	-6.42	-1.467***	-7.16
1930s	-1.050***	-5.62	-1.023***	-5.48	-1.118***	-5.87
1940s	0.067	0.37	0.093	0.52	0.032	0.17
1950s	1.106***	7.54	1.128***	7.69	0.986***	6.60
1960s	1.610***	13.04	1.629***	13.21	1.436***	11.47
1970s	0.758***	6.58	0.768***	6.68	0.631***	5.44
1980s	0.197*	1.86	0.201*	1.90	0.095	0.89
British			-0.374	-0.68	-0.609	-1.64
French			-0.560	-0.86	-0.677	-1.52
Portuguese			0.382	0.33	-0.587	-0.76
Spanish			0.056	0.05	-0.067	-0.09
Belgian			-3.527**	-2.25	-1.602	-1.52
Sunni			0.562	0.28	-1.014	-0.81
Shia			0.889	0.38	-1.782	-1.21
Catholic			2.321	1.11	-0.820	-0.60
Protestant			1.029	0.49	-1.934	-1.42
Orthodox			-0.486	-0.23	-1.747	-1.12
Hindu			0.670	0.29	-1.379	-0.92
Buddhist+			-0.400	-0.18	-1.104	-0.76
Indigenous			-0.747	-0.35	-2.158	-1.58
Abs. lat.					0.020	1.24
Frankel-Romer					-2.161***	-8.62
Constant	31.525***	20.70	29.746***	11.80	39.342***	14.96
N	6636		6636		6407	

Table C.6: Random effects models on interpolated data. TFP growth as dependent variable. 5-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.041***	6.13	0.040***	5.99	0.039***	5.91
Ln TFP	-3.827***	-24.28	-3.875***	-24.42	-4.192***	-26.18
Ln popul.	-1.063***	-10.77	-1.123***	-11.10	-1.680***	-13.50
Ln reg. dur.	-0.181***	-6.24	-0.180***	-6.18	-0.198***	-6.84
Ethn. fr.	-0.592	-0.78	-0.547	-0.66	-0.198	-0.20
E.E.-Soviet	-2.638***	-3.42	-2.120**	-2.30	-2.285**	-2.52
Africa	-5.147***	-8.32	-5.098***	-6.42	-4.801***	-5.18
Asia-Pac.	-2.452***	-4.31	-2.595**	-2.56	-2.689**	-2.33
MENA	-0.641	-1.08	-1.147	-1.29	-0.187	-0.21
Lat. Am.	-2.824***	-5.23	-4.167***	-4.43	-4.010***	-3.84
1830s	-2.661**	-2.21	-2.758**	-2.29	-3.644***	-3.05
1840s	-2.000***	-3.16	-2.106***	-3.32	-2.976***	-4.68
1850s	-2.921***	-7.46	-3.038***	-7.72	-3.963***	-9.76
1860s	-2.696***	-7.77	-2.809***	-8.05	-3.675***	-10.14
1870s	-2.623***	-8.01	-2.740***	-8.31	-3.670***	-10.58
1880s	-2.285***	-7.37	-2.396***	-7.67	-3.256***	-9.93
1890s	-2.285***	-7.84	-2.389***	-8.14	-3.194***	-10.36
1900s	-2.730***	-9.75	-2.827***	-10.03	-3.586***	-12.13
1910s	-1.419***	-5.27	-1.505***	-5.56	-2.195***	-7.76
1920s	-1.526***	-5.91	-1.604***	-6.18	-2.239***	-8.28
1930s	-0.819***	-3.32	-0.887***	-3.58	-1.364***	-5.29
1940s	0.189	0.78	0.127	0.52	-0.297	-1.18
1950s	1.173***	5.33	1.125***	5.10	0.732***	3.22
1960s	0.947***	4.59	0.919***	4.45	0.665***	3.16
1970s	0.226	1.12	0.210	1.04	0.024	0.12
1980s	0.277	1.40	0.271	1.37	0.222	1.12
British			0.076	0.16	-0.466	-0.94
French			-0.380	-0.67	-0.765	-1.31
Portuguese			0.888	0.87	-0.744	-0.73
Spanish			1.111	1.17	0.167	0.18
Belgian			-1.408	-1.02	-0.826	-0.59
Sunni			0.692	0.41	-0.450	-0.27
Shia			0.416	0.21	-1.790	-0.92
Catholic			0.444	0.24	-0.468	-0.26
Protestant			-0.111	-0.06	-1.646	-0.91
Orthodox			-1.389	-0.66	-1.596	-0.78
Hindu			0.505	0.25	-0.943	-0.48
Buddhist+			-0.094	-0.05	-0.598	-0.31
Indigenous			-1.352	-0.73	-1.862	-1.03
Abs. lat.					0.031	1.42
Frankel-Romer					-2.347***	-7.50
Constant	30.829***	21.26	31.584***	13.59	45.260***	14.20
N	5982		5982		5860	

Table C.7: Random effects models on interpolated data. TFP growth as dependent variable. 10-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
SumPI	0.069***	2.64	0.071***	2.67	0.070***	2.76
Ln TFP	-1.837***	-3.65	-1.795***	-3.57	-1.709***	-3.53
Ln popul.	-0.029	-0.54	-0.054	-0.93	-0.143	-1.40
Ln reg. dur.	-0.047	-0.55	-0.028	-0.31	-0.018	-0.23
Ethn. fr.	-1.176	-1.08	-0.867	-0.89	-0.951	-0.95
E.E.-Soviet	-0.164	-0.33	-0.103	-0.24	-0.306	-0.62
Africa	-1.230***	-3.17	-1.064*	-1.70	-0.712	-1.00
Asia-Pac.	-1.119**	-2.47	-1.286**	-2.08	-0.927	-1.29
MENA	0.205	0.38	0.303	0.39	0.338	0.45
Lat. Am.	-0.671*	-1.91	-1.839**	-2.08	-1.721*	-1.95
1850s	.	.	10.255***	3.73	11.528***	3.58
1860s	-0.377	-0.48	9.860***	3.77	11.042***	3.65
1870s	-0.159	-0.18	10.147***	3.85	11.273***	3.71
1880s	0.173	0.20	10.369***	3.93	11.513***	3.77
1890s	0.213	0.23	10.460***	3.99	11.617***	3.86
1900s	0.463	0.55	10.630***	4.10	11.766***	3.96
1910s	0.548	0.66	10.746***	4.11	11.867***	3.99
1920s	-0.430	-0.50	9.746***	3.73	10.857***	3.63
1930s	1.201	1.35	11.433***	4.53	12.590***	4.34
1940s	0.721	0.99	10.946***	4.01	12.096***	3.90
1950s	1.979**	2.45	12.209***	4.47	13.313***	4.31
1960s	2.043***	2.86	12.270***	4.44	13.466***	4.28
1970s	2.490***	3.54	12.731***	4.60	13.760***	4.35
1980s	1.160	1.60	11.441***	3.92	12.647***	3.78
1990s+	-0.066	-0.10	10.185***	3.67	11.412***	3.55
British			-0.156	-0.59	-0.273	-0.92
French			0.594	1.41	0.609	1.37
Portuguese			1.775**	2.07	1.493	1.51
Spanish			0.943	1.03	0.770	0.82
Belgian			-0.319	-0.25	-0.400	-0.29
Sunni			-1.280	-1.13	-1.689	-1.49
Shia			-1.343	-1.03	-1.628	-1.19
Catholic			-0.773	-0.62	-0.953	-0.81
Protestant			-1.002	-0.92	-1.321	-1.28
Orthodox			-1.128	-0.83	-1.477	-1.08
Hindu			-1.392	-1.34	-1.839	-1.63
Buddhist+			-0.501	-0.45	-0.927	-0.88
Indigenous			-2.698*	-1.85	-3.016**	-2.06
Abs. lat.					0.007	0.93
Frankel-Romer					-0.296	-1.26
Constant	9.412***	3.79	.	.	.	.
N	607		607		594	

Table C.8: OLS with PCSE analysis. TFP growth as dependent variable. Periodic observations. Long sample.

	RE I		RE II		RE III		FE	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
SumPI	0.069***	3.53	0.073***	3.40	0.073***	3.38	0.045	1.52
Ln TFP	-1.971***	-6.71	-1.920***	-6.43	-1.887***	-6.13	-4.994***	-9.20
Ln popul.	-0.070	-0.77	-0.089	-0.96	-0.229	-1.57	-3.213***	-6.23
Ln reg. dur.	-0.060	-0.69	-0.036	-0.40	-0.024	-0.27	-0.138	-1.28
Ethn. fr.	-1.273**	-2.32	-0.914	-1.54	-1.062	-1.54		
E.E.-Soviet	-0.272	-0.45	-0.191	-0.28	-0.420	-0.60		
Africa	-1.363**	-2.41	-1.161	-1.64	-0.870	-1.11		
Asia-Pac.	-1.173**	-2.42	-1.311	-1.51	-0.996	-1.04		
MENA	0.210	0.41	0.294	0.38	0.330	0.41		
Lat. Am.	-0.797**	-2.06	-1.931***	-2.59	-1.898**	-2.32		
1850s	-0.151	-0.11	-0.092	-0.07	-0.148	-0.11	-0.851	-0.50
1860s	-0.437	-0.45	-0.411	-0.43	-0.524	-0.55	-0.441	-0.33
1870s	-0.180	-0.16	-0.115	-0.10	-0.283	-0.26	.	.
1880s	0.051	0.06	0.053	0.06	-0.115	-0.14	-0.479	-0.38
1890s	0.140	0.19	0.166	0.23	0.022	0.03	0.413	0.34
1900s	0.362	0.58	0.328	0.52	0.163	0.26	0.784	0.66
1910s	0.463	0.76	0.443	0.72	0.264	0.43	1.300	1.08
1920s	-0.525	-0.97	-0.553	-1.02	-0.743	-1.33	0.839	0.71
1930s	1.122**	2.05	1.127**	2.04	0.989*	1.77	2.704**	2.24
1940s	0.705	1.38	0.705	1.38	0.573	1.09	3.091**	2.55
1950s	1.974***	3.78	1.974***	3.75	1.807***	3.39	4.395***	3.61
1960s	2.066***	5.49	2.051***	5.40	1.981***	5.10	5.464***	4.47
1970s	2.531***	7.61	2.524***	7.52	2.305***	6.80	6.949***	5.44
1980s	1.236***	4.32	1.265***	4.38	1.237***	4.31	6.677***	5.00
1990s+	.	.	.	.	.	.	6.116***	4.40
British			-0.198	-0.56	-0.373	-0.90		
French			0.532	1.08	0.484	0.92		
Portuguese			1.732**	1.98	1.356	1.48		
Spanish			0.927	1.25	0.696	0.90		
Belgian			-0.393	-0.32	-0.543	-0.42		
Sunni			-1.174	-0.93	-1.589	-1.24		
Shia			-1.194	-0.82	-1.489	-1.01		
Catholic			-0.683	-0.49	-0.864	-0.61		
Protestant			-0.951	-0.69	-1.317	-0.93		
Orthodox			-1.084	-0.71	-1.415	-0.89		
Hindu			-1.291	-0.84	-1.746	-1.10		
Buddhist+			-0.451	-0.31	-0.893	-0.60		
Indigenous			-2.604*	-1.84	-2.917**	-2.04		
Abs. lat.					0.006	0.40		
Frankel-Romer					-0.410	-1.46		
Constant	10.546***	5.74	11.162***	4.92	13.593***	4.12	49.356***	8.56
N	607		607		594		616	

Table C.9: Random and fixed effects analysis. TFP growth as dependent variable. Periodic observations. Long sample.

	OLS		OLS		OLS		Tobit		Tobit		Tobit	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*	*b*	*t*	*b*	*t*
CL	-0.011**	-2.26					-0.011**	-2.35				
HistoryCL10			-0.016***	-2.64					-0.016***	-2.76		
HistoryCL20					-0.020***	-2.82					-0.020***	-2.96
Ln GDP pc	0.100***	10.27	0.101***	9.43	0.099***	8.72	0.100***	10.68	0.101***	9.86	0.099***	9.13
Ln popul.	0.005	1.09	0.004	0.89	0.002	0.51	0.005	1.13	0.004	0.94	0.002	0.54
Ln reg. dur.	0.007	1.13	0.006	1.00	0.007	1.11	0.007	1.17	0.006	1.05	0.007	1.16
Ethn. fr.	-0.014	-0.51	-0.012	-0.41	-0.016	-0.54	-0.014	-0.53	-0.012	-0.43	-0.016	-0.56
E.E.-Soviet	-0.067**	-2.53	-0.067*	-1.84	-0.034	-0.86	-0.067***	-2.63	-0.067*	-1.93	-0.034	-0.90
Africa	-0.164***	-5.05	-0.143***	-4.13	-0.122***	-3.42	-0.164***	-5.25	-0.143***	-4.32	-0.122***	-3.58
Asia-Pac.	-0.141***	-5.09	-0.118***	-3.94	-0.101***	-3.19	-0.141***	-5.29	-0.118***	-4.13	-0.101***	-3.34
MENA	-0.117***	-4.10	-0.094***	-2.98	-0.082**	-2.49	-0.117***	-4.26	-0.094***	-3.12	-0.082**	-2.60
Lat. Am.	-0.142***	-5.59	-0.127***	-4.81	-0.119***	-4.42	-0.142***	-5.81	-0.127***	-5.04	-0.119***	-4.63
Constant	-0.382***	-3.52	-0.384***	-3.27	-0.341***	-2.73	-0.382***	-3.66	-0.384***	-3.42	-0.341***	-2.86
sigma												
Constant							0.064***	17.09	0.065***	15.94	0.065***	15.81
N	146		127		125		146		127		125	

Table C.10: OLS and tobit regressions (cross-sectional) with ArCo-index (measured in year 2000) as dependent variable.

	OLS		OLS		OLS		Tobit		Tobit		Tobit	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*	*b*	*t*	*b*	*t*
PI	0.002	1.65					0.002*	1.72				
HistoryPI10			0.002	1.44					0.002	1.51		
HistoryPI20					0.003	1.55					0.003	1.63
Ln GDP pc	0.104***	11.03	0.110***	10.26	0.110***	9.35	0.104***	11.48	0.110***	10.78	0.110***	9.85
Ln popul.	0.004	0.91	0.003	0.59	0.001	0.25	0.004	0.95	0.003	0.62	0.001	0.26
Ln reg. dur.	0.011*	1.69	0.009	1.20	0.006	0.76	0.011*	1.76	0.009	1.27	0.006	0.80
Ethn. fr.	-0.013	-0.47	-0.005	-0.15	-0.016	-0.45	-0.013	-0.49	-0.005	-0.16	-0.016	-0.48
E.E.-Soviet	-0.065**	-2.40	-0.070*	-1.79	-0.058	-1.41	-0.065**	-2.50	-0.070*	-1.88	-0.058	-1.49
Africa	-0.157***	-4.73	-0.143***	-3.76	-0.135***	-3.39	-0.157***	-4.93	-0.143***	-3.95	-0.135***	-3.57
Asia-Pac.	-0.145***	-5.22	-0.132***	-4.32	-0.119***	-3.71	-0.145***	-5.43	-0.132***	-4.54	-0.119***	-3.90
MENA	-0.129***	-4.48	-0.121***	-3.62	-0.111***	-3.12	-0.129***	-4.67	-0.121***	-3.80	-0.111***	-3.28
Lat. Am.	-0.143***	-5.54	-0.135***	-4.76	-0.133***	-4.57	-0.143***	-5.77	-0.135***	-5.00	-0.133***	-4.82
Constant	-0.474***	-4.65	-0.519***	-4.43	-0.489***	-3.85	-0.474***	-4.84	-0.519***	-4.66	-0.489***	-4.05
sigma												
Constant							0.065***	16.85	0.068***	15.23	0.069***	14.90
N	142		116		111		142		116		111	

Table C.11: OLS and tobit regressions (cross-sectional) with ArCo-index (measured in year 2000) as dependent variable.

Appendix D

Tables to Chapter 6

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.178*	-1.88	-0.243**	-2.47	-0.232**	-2.40	-0.159*	-1.66
Ln GDP pc	0.402*	1.89	0.277	1.26	0.219	0.99	0.512**	2.07
Ln reg. dur.	0.403***	2.88	0.536***	3.58	0.601***	4.25	0.351***	2.70
Ln popul.	0.149**	1.96	0.186**	2.36	0.191**	2.31	0.327***	3.17
Ethn. fr.	-2.180***	-3.46	-2.112***	-3.44	-2.306***	-3.63	-0.660	-1.17
Africa	2.450***	2.92	3.280***	3.24	3.280***	3.09	0.370	0.42
Asia	3.917***	5.12	3.906***	3.33	3.750***	3.19	1.156	1.11
Lat. Am.	1.139*	1.65	0.743	0.76	0.748	0.74	-0.331	-0.45
E.E.-Soviet	2.058	1.26	2.145	1.49	1.884	1.44	1.860*	1.94
MENA	2.270***	3.40	2.609***	2.89	2.584***	2.85	0.883	1.09
British			-0.999**	-2.19	-1.020**	-2.08	-0.461	-0.91
French			-0.654	-1.43	-0.730	-1.60	0.054	0.12
Spanish			0.082	0.09	0.011	0.01	1.208	1.45
Portuguese			0.340	0.45	0.406	0.54	1.494*	1.92
Belgian			-1.760	-1.54	-2.020*	-1.75	-0.232	-0.17
Sunni			1.589**	2.18	1.356*	1.66	-0.037	-0.05
Shia			3.224*	1.80	3.064*	1.72	0.342	0.26
Catholic			2.181**	2.12	2.001*	1.86	-0.288	-0.22
Protestant+			1.575**	2.08	1.264	1.58	-0.367	-0.39
Orthodox			1.354	1.07	1.288	1.07	-0.311	-0.20
Hindu			1.179	1.44	0.924	0.99	-0.715	-0.83
Buddhist+			2.631***	4.05	2.517***	3.30	0.983	1.21
Indigenous			0.753	0.90	0.516	0.59	-1.110	-1.43
1970s					0.243	0.36	0.178	0.31
1980s					-1.655**	-2.52	-1.349**	-2.49
1990s					-1.044	-1.50	-0.773	-1.41
Abs. lat.							0.022	1.24
Urban							-0.050***	-3.98
Trade							0.010**	2.18
constant	-5.249**	-2.01	-6.650**	-2.22	-5.379*	-1.65	-6.215**	-2.37
N	3984		3984		3984		3572	

Table D.1: OLS with PCSE analysis. Exchange rate-adjusted GDP per capita growth as dependent variable. No lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.249**	-2.53	-0.241**	-2.23	-0.159	-1.53	-0.131	-1.32
Ln GDP pc	-0.573*	-1.74	-0.893***	-2.68	-0.994***	-2.93	-1.225***	-2.91
Ln reg. dur.	-0.022	-0.17	0.042	0.30	0.048	0.36	-0.123	-0.91
Ln popul.	0.136*	1.65	0.203**	2.28	0.142	1.51	0.505***	4.37
Ethn. fr.	-2.425***	-3.23	-2.487***	-4.35	-2.538***	-4.25	-2.197***	-3.81
Africa	-1.259	-1.42	-1.352	-1.39	-1.850*	-1.95	-2.814***	-3.03
Asia	1.551*	1.88	0.764	0.64	0.334	0.29	-1.374	-1.23
Lat. Am.	-1.021	-1.37	-2.356**	-2.10	-2.595**	-2.25	-2.298**	-2.41
E.E.-Soviet	0.155	0.12	0.297	0.22	-0.482	-0.40	-0.295	-0.46
MENA	0.058	0.09	-0.176	-0.24	-0.463	-0.65	-1.611**	-2.17
British			-0.033	-0.09	-0.056	-0.14	-0.041	-0.09
French			-0.222	-0.53	-0.259	-0.62	-0.008	-0.02
Spanish			0.981	0.87	0.834	0.73	0.359	0.45
Portuguese			0.269	0.30	0.203	0.22	0.372	0.45
Belgian			-1.984	-1.44	-2.231	-1.54	-0.347	-0.24
Sunni			-1.642**	-2.44	-2.075***	-2.92	-1.485**	-2.08
Shia			0.381	0.36	-0.183	-0.18	-0.912	-0.80
Catholic			-1.040	-1.43	-1.278*	-1.70	-1.538	-1.48
Protestant+			-1.423**	-2.38	-1.702***	-2.82	-1.486*	-1.71
Orthodox			-2.296**	-2.21	-2.570***	-2.59	-2.323**	-1.97
Hindu			-2.791***	-2.71	-2.881***	-2.66	-1.691	-1.64
Buddhist+			-0.337	-0.39	-0.795	-0.88	-0.136	-0.15
Indigenous			-2.241***	-2.93	-2.627***	-3.36	-1.965**	-2.28
1970s					-1.468**	-2.25	-0.709	-1.33
1980s					-2.141***	-3.59	-1.383***	-2.95
1990s					-1.508**	-2.42	-0.992**	-2.17
Abs.latitude							0.007	0.43
Urban							0.010	0.77
Trade/GDP							0.019***	4.05
Constant	6.194*	1.70	9.348**	2.54	13.001***	3.31	7.103*	1.86
N	3518		3518		3518		3167	

Table D.2: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 2-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.223**	-2.18	-0.209*	-1.80	-0.107	-1.00	-0.185	-1.64
Ln GDP pc	-0.340	-1.28	-0.601**	-2.15	-0.702**	-2.49	-0.586	-1.42
Ln reg. dur.	-0.081	-0.65	-0.038	-0.28	-0.004	-0.03	-0.038	-0.28
Ln popul.	0.155*	1.79	0.213**	2.36	0.143	1.63	0.264**	2.20
Ethn. fr.	-1.587*	-1.89	-1.756***	-3.22	-1.701***	-3.11	-1.017*	-1.81
Africa	-1.037	-1.24	-1.479*	-1.70	-2.161***	-2.64	-1.653*	-1.88
Asia	1.793**	2.15	0.425	0.34	-0.179	-0.15	0.110	0.09
Lat. Am.	-1.032	-1.47	-2.724**	-2.54	-3.138***	-2.87	-2.045**	-2.07
E.E.-Soviet	2.838***	3.20	2.787***	3.35	1.433*	1.88	0.796	1.32
MENA	0.062	0.10	-0.556	-0.72	-0.968	-1.36	-0.688	-0.95
British			0.333	0.74	0.395	0.91	0.227	0.45
French			0.148	0.31	0.129	0.28	0.166	0.32
Spanish			1.567	1.38	1.598	1.41	0.792	0.98
Portuguese			1.253	1.39	1.287	1.43	0.965	1.16
Belgian			-1.375	-0.93	-1.534	-1.01	-0.827	-0.52
Sunni			-1.730***	-2.82	-2.233***	-3.42	-1.293*	-1.77
Shia			-0.768	-0.73	-1.596	-1.46	-0.559	-0.40
Catholic			-1.659***	-2.67	-1.984***	-3.41	-1.205	-1.19
Protestant+			-1.870***	-3.21	-2.318***	-4.11	-1.429	-1.56
Orthodox			-2.547***	-3.06	-2.784***	-3.52	-2.036*	-1.79
Hindu			-2.443***	-2.59	-2.526***	-2.60	-1.805	-1.59
Buddhist+			-0.022	-0.03	-0.572	-0.69	-0.290	-0.28
Indigenous			-2.657***	-3.61	-3.156***	-4.13	-2.073**	-2.31
1970s					-2.442***	-3.53	-2.318***	-3.53
1980s					-2.144***	-3.33	-1.948***	-3.17
1990s					-0.834	-1.34	-0.805	-1.35
Abs. lat.							0.013	0.82
Urban							-0.003	-0.25
Trade							0.003	0.66
Constant	3.560	1.25	6.757**	2.42	10.637***	3.61	6.071	1.61
N	3095		3095		3095		2809	

Table D.3: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 5-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
Polity	0.089***	3.46	0.093***	3.43	0.062**	2.52	0.063***	2.68
Ln GDP pc	-0.469	-1.36	-0.751**	-2.21	-0.831**	-2.46	-1.081***	-2.58
Ln reg. dur.	0.150	1.24	0.181	1.34	0.160	1.22	-0.012	-0.09
Ln popul.	0.102	1.11	0.128	1.41	0.102	1.08	0.470***	4.13
Ethn. fr.	-2.465***	-3.68	-2.434***	-4.18	-2.522***	-4.19	-2.164***	-3.64
Africa	-0.633	-0.76	-0.789	-0.87	-1.283	-1.47	-2.178***	-2.58
Asia	2.007**	2.52	1.548	1.34	1.058	0.95	-0.590	-0.57
Lat. Am.	-0.607	-0.89	-2.099**	-2.06	-2.329**	-2.25	-2.137***	-2.68
E.E.-Soviet	0.730	0.66	0.966	0.92	0.262	0.27	0.149	0.26
MENA	0.617	1.03	0.670	0.90	0.228	0.32	-0.696	-0.96
British			-0.046	-0.12	-0.059	-0.15	-0.095	-0.20
French			0.186	0.53	0.076	0.21	0.387	0.94
Spanish			1.115	1.01	0.957	0.85	0.660	0.86
Portuguese			0.669	0.75	0.547	0.62	0.847	1.04
Belgian			-1.939	-1.42	-2.172	-1.51	-0.442	-0.32
Sunni			-0.900	-1.38	-1.472**	-2.15	-0.866	-1.20
Shia			0.210	0.19	-0.326	-0.31	-0.459	-0.39
Catholic			-0.114	-0.15	-0.522	-0.67	-0.604	-0.58
Protestant+			-0.449	-0.71	-0.937	-1.48	-0.538	-0.59
Orthodox			-1.732*	-1.73	-2.075**	-2.16	-1.541	-1.33
Hindu			-1.836*	-1.81	-2.173**	-2.05	-0.893	-0.86
Buddhist+			0.222	0.27	-0.330	-0.38	0.396	0.44
Indigenous			-1.530**	-2.11	-1.993***	-2.71	-1.315	-1.55
1970s					-1.243*	-1.88	-0.421	-0.79
1980s					-1.994***	-3.33	-1.153**	-2.46
1990s					-1.420**	-2.31	-0.887**	-2.00
Abs. lat.							0.008	0.47
Urban							0.007	0.55
Trade							0.020***	4.42
Constant	3.896	1.00	6.482*	1.71	9.948**	2.54	4.082	1.10
N	3403		3403		3403		3070	

Table D.4: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 2-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
AREG	-0.705**	-2.13	-0.681*	-1.87	-0.369	-0.99	-0.132	-0.41
Ln GDP pc	-0.564	-1.62	-0.917***	-2.61	-1.012***	-2.85	-1.188***	-2.73
Ln reg. dur.	-0.065	-0.49	-0.009	-0.07	0.010	0.07	-0.179	-1.31
Ln popul.	0.084	0.98	0.147	1.59	0.117	1.20	0.517***	4.39
Ethn. fr.	-2.535***	-3.23	-2.588***	-4.38	-2.635***	-4.27	-2.337***	-3.89
Africa	-1.813**	-2.11	-2.068**	-2.21	-2.393***	-2.58	-3.431***	-3.83
Asia	1.118	1.39	0.229	0.19	-0.085	-0.07	-1.895*	-1.71
Lat. Am.	-1.517**	-2.06	-3.011***	-2.62	-3.074***	-2.63	-2.514***	-2.65
E.E.-Soviet	-0.781	-0.55	-0.507	-0.36	-1.093	-0.86	-0.770	-1.16
MENA	-0.420	-0.72	-0.747	-1.08	-0.918	-1.35	-2.221***	-3.11
British			0.098	0.25	0.031	0.08	0.103	0.21
French			-0.088	-0.20	-0.183	-0.42	0.104	0.21
Spanish			1.075	0.90	0.870	0.72	0.297	0.36
Portuguese			0.281	0.30	0.135	0.14	0.352	0.41
Belgian			-2.094	-1.45	-2.341	-1.56	-0.219	-0.15
Sunni			-1.763***	-2.62	-2.165***	-2.98	-1.890***	-2.66
Shia			0.095	0.09	-0.355	-0.33	-1.547	-1.35
Catholic			-1.125	-1.51	-1.320*	-1.70	-2.028*	-1.92
Protestant+			-1.550**	-2.55	-1.787***	-2.85	-1.957**	-2.24
Orthodox			-2.737***	-2.67	-2.917***	-2.89	-3.055***	-2.59
Hindu			-2.780***	-2.63	-2.888**	-2.57	-1.985*	-1.86
Buddhist+			-0.539	-0.62	-0.916	-0.99	-0.463	-0.50
Indigenous			-2.461***	-3.24	-2.726***	-3.50	-2.294***	-2.68
1970s					-1.324*	-1.83	-0.580	-1.01
1980s					-1.974***	-2.94	-1.218**	-2.37
1990s					-1.356**	-1.96	-0.834*	-1.66
Abs. lat.							0.010	0.63
Urban							0.007	0.57
Trade							0.021***	4.16
Constant	6.897*	1.75	10.565***	2.67	13.579***	3.28	6.956*	1.74
N	3382		3382		3382		3051	

Table D.5: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 2-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.465***	-5.34	-0.414***	-4.58	-0.242***	-2.63	-0.224**	-2.53
Ln GDP pc	-1.589***	-6.57	-1.911***	-7.60	-2.260***	-8.96	-1.512***	-5.78
Ln reg. dur.	0.160	1.57	0.168	1.61	0.156	1.50	-0.051	-0.52
Ln popul.	0.002	0.02	0.079	0.62	-0.127	-0.98	0.224*	1.81
Ethn. fr.	-3.221***	-3.91	-2.969***	-3.46	-2.919***	-3.41	-2.240***	-2.95
Africa	-2.067**	-2.35	-1.984**	-2.08	-3.525***	-3.65	-2.314**	-2.49
Asia	0.598	0.75	-1.168	-1.00	-1.867	-1.60	-1.410	-1.32
Lat. Am.	-1.842***	-2.59	-3.318***	-3.26	-4.203***	-4.13	-1.892**	-1.98
E.E.-Soviet	0.764	1.00	0.779	0.93	-0.811	-0.95	0.243	0.31
MENA	-0.063	-0.08	0.173	0.18	-0.541	-0.57	-1.180	-1.37
British			0.118	0.22	0.168	0.31	0.260	0.58
French			-0.333	-0.49	-0.535	-0.79	-0.428	-0.74
Spanish			0.954	0.98	0.796	0.82	-0.364	-0.42
Portuguese			0.309	0.26	0.131	0.11	-0.152	-0.16
Belgian			-4.315***	-3.18	-4.824***	-3.56	-2.668**	-2.44
Sunni			-2.939*	-1.91	-3.522**	-2.30	-1.485	-1.00
Shia			-1.221	-0.64	-2.256	-1.19	-1.022	-0.58
Catholic			-1.422	-0.89	-1.523	-0.96	-1.160	-0.72
Protestant+			-1.849	-1.14	-2.039	-1.26	-1.358	-0.85
Orthodox			-2.714	-1.62	-3.016*	-1.81	-2.268	-1.23
Hindu			-1.809	-0.93	-1.989	-1.03	-0.267	-0.15
Buddhist+			0.276	0.15	-0.324	-0.18	0.850	0.51
Indigenous			-3.217*	-1.85	-3.620**	-2.09	-1.660	-1.02
1970s					-2.761***	-7.78	-1.853***	-5.13
1980s					-2.873***	-9.51	-1.918***	-6.20
1990s					-1.982***	-7.03	-1.366***	-4.75
Abs. lat.							0.008	0.42
Urban							0.013	1.28
Trade							0.010**	2.24
Constant	18.351***	5.48	21.790***	5.92	30.818***	8.15	14.952***	4.07
N	3377		3377		3377		3048	

Table D.6: Random effects models. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
PI	0.158***	7.62	0.150***	7.04	0.092***	3.94	0.075***	3.41
Ln GDP pc	-1.641***	-6.82	-1.978***	-7.83	-2.256***	-8.89	-1.556***	-5.79
Ln reg. dur.	0.347***	3.11	0.353***	3.10	0.275**	2.41	0.019	0.18
Ln popul.	-0.074	-0.59	-0.004	-0.03	-0.142	-1.08	0.217*	1.69
Ethn. fr.	-3.256***	-3.92	-3.086***	-3.51	-3.071***	-3.51	-2.426***	-3.07
Africa	-1.838**	-2.11	-1.748*	-1.83	-3.202***	-3.28	-2.195**	-2.27
Asia	0.799	1.00	-0.695	-0.59	-1.528	-1.29	-1.237	-1.11
Lat. Am.	-1.689**	-2.38	-3.211***	-3.13	-4.016***	-3.90	-1.856*	-1.87
E.E.-Soviet	1.002	1.32	1.224	1.44	-0.311	-0.35	0.449	0.54
MENA	0.410	0.53	0.817	0.85	-0.074	-0.08	-0.804	-0.89
British			0.137	0.25	0.192	0.35	0.289	0.62
French			-0.291	-0.42	-0.503	-0.73	-0.383	-0.63
Spanish			1.020	1.03	0.854	0.87	-0.362	-0.40
Portuguese			0.292	0.24	0.103	0.08	-0.250	-0.26
Belgian			-4.213***	-3.00	-4.506***	-3.22	-2.430**	-2.07
Sunni			-2.323	-1.50	-3.121**	-2.02	-1.022	-0.66
Shia			-0.991	-0.48	-2.021	-0.98	-0.754	-0.41
Catholic			-0.843	-0.52	-1.200	-0.75	-0.591	-0.35
Protestant+			-1.313	-0.80	-1.720	-1.05	-0.814	-0.49
Orthodox			-2.542	-1.51	-2.914*	-1.74	-1.897	-0.99
Hindu			-1.641	-0.84	-1.869	-0.95	0.126	0.07
Buddhist+			0.493	0.27	-0.143	-0.08	1.214	0.70
Indigenous			-2.574	-1.46	-3.137*	-1.79	-1.039	-0.61
1970s					-2.401***	-6.41	-1.533***	-4.06
1980s					-2.677***	-8.47	-1.729***	-5.39
1990s					-1.943***	-6.79	-1.327***	-4.56
Abs. lat.							0.007	0.35
Urban							0.015	1.36
Trade							0.010**	2.26
Constant	17.325***	5.22	20.650***	5.60	28.970***	7.55	13.533***	3.54
N	3266		3266		3266		2954	

Table D.7: Random effects analysis. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
AREG	-1.609***	-5.65	-1.491***	-5.11	-0.746**	-2.44	-0.290	-1.00
Ln GDP pc	-1.508***	-6.35	-1.843***	-7.45	-2.194***	-8.83	-1.454***	-5.58
Ln reg. dur.	0.140	1.39	0.150	1.45	0.136	1.32	-0.089	-0.90
Ln popul.	-0.058	-0.46	0.025	0.19	-0.147	-1.13	0.212*	1.69
Ethn. fr.	-3.121***	-3.74	-2.937***	-3.40	-2.905***	-3.39	-2.272***	-2.94
Africa	-2.483***	-2.84	-2.390**	-2.53	-3.784***	-3.97	-2.772***	-2.96
Asia	0.304	0.38	-1.444	-1.23	-2.073*	-1.78	-1.835*	-1.70
Lat. Am.	-2.274***	-3.19	-3.842***	-3.77	-4.497***	-4.43	-2.190**	-2.27
E.E.-Soviet	0.195	0.26	0.423	0.51	-1.027	-1.21	-0.059	-0.07
MENA	-0.504	-0.67	-0.267	-0.28	-0.860	-0.92	-1.811**	-2.15
British			0.331	0.60	0.289	0.53	0.382	0.84
French			-0.295	-0.43	-0.521	-0.77	-0.476	-0.80
Spanish			1.191	1.21	0.915	0.94	-0.278	-0.31
Portuguese			0.458	0.38	0.188	0.16	-0.180	-0.19
Belgian			-4.391***	-3.22	-4.898***	-3.61	-2.782**	-2.50
Sunni			-2.879*	-1.86	-3.581**	-2.33	-1.915	-1.27
Shia			-1.231	-0.65	-2.367	-1.25	-1.600	-0.90
Catholic			-1.480	-0.92	-1.631	-1.03	-1.653	-1.01
Protestant+			-1.872	-1.15	-2.118	-1.31	-1.809	-1.12
Orthodox			-3.019*	-1.80	-3.270**	-1.96	-2.962	-1.60
Hindu			-1.844	-0.94	-2.021	-1.04	-0.467	-0.26
Buddhist+			0.201	0.11	-0.439	-0.24	0.447	0.27
Indigenous			-3.291*	-1.88	-3.726**	-2.14	-2.087	-1.26
1970s					-2.710***	-7.50	-1.926***	-5.23
1980s					-2.835***	-9.25	-1.975***	-6.29
1990s					-1.979***	-7.01	-1.393***	-4.84
Abs. lat.							0.010	0.50
Urban							0.014	1.35
Trade							0.010**	2.23
Constant	18.048***	5.39	21.589***	5.87	30.334***	8.02	14.793***	3.97
N	3378		3378		3378		3049	

Table D.8: Random effects analysis. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.044***	3.34	0.042***	3.10	0.024	1.64
Ln GDP pc	-0.461**	-2.02	-0.687***	-2.81	-0.690***	-2.88
Ln popul.	0.034	0.60	0.018	0.31	-0.102	-1.26
Ln reg. dur.	-0.026	-0.42	-0.014	-0.22	-0.063	-1.04
Ethn. fr.	-1.115***	-3.37	-0.717**	-2.03	-0.206	-0.52
E.E.-Soviet	-0.103	-0.24	-0.082	-0.19	-0.300	-0.77
Africa	-1.621***	-3.18	-1.646***	-2.74	-2.023***	-3.55
Asia-Pac.	-0.288	-0.65	-1.341	-1.62	-0.824	-1.15
MENA	-0.051	-0.13	0.597	1.06	-0.002	-0.00
Lat. Am.	-0.632**	-2.17	-2.317***	-3.96	-1.553***	-3.17
1820s	4.071**	2.13	.	.	-1.004	-0.87
1830s	4.492**	2.35	0.407	0.35	-0.558	-0.50
1840s	4.971***	2.58	0.929	0.80	.	.
1850s	4.766**	2.50	0.702	0.63	-0.184	-0.17
1860s	5.184***	2.73	1.119	1.04	0.261	0.26
1870s	4.653**	2.46	0.613	0.59	-0.237	-0.24
1880s	4.736**	2.48	0.714	0.69	-0.085	-0.09
1890s	5.176***	2.68	1.189	1.14	0.430	0.44
1900s	5.657***	2.89	1.704	1.62	0.986	0.99
1910s	4.566**	2.30	0.640	0.60	-0.012	-0.01
1920s	4.481**	2.26	0.561	0.53	0.029	0.03
1930s	6.192***	3.09	2.270**	2.16	1.540	1.54
1940s	6.337***	3.14	2.450**	2.35	1.696*	1.71
1950s	6.889***	3.42	3.115***	3.10	2.520***	2.66
1960s	7.198***	3.51	3.555***	3.55	3.135***	3.33
1970s	6.287***	3.00	2.670***	2.62	2.169**	2.27
1980s	4.793**	2.27	1.179	1.15	0.862	0.89
1990s+	6.039***	2.80	2.436**	2.32	2.051**	2.11
British			0.122	0.45	0.044	0.14
French			-0.433	-1.48	-0.528	-1.56
Portuguese			1.031*	1.91	0.323	0.63
Spanish			1.373**	2.47	0.606	1.30
Belgian			-0.426	-0.39	0.243	0.23
Sunni			-1.164*	-1.82	-1.630**	-2.37
Shia			-2.320**	-2.27	-2.754**	-2.26
Catholic			-0.299	-0.37	-1.147	-1.31
Protestant			-0.539	-0.73	-1.423*	-1.74
Orthodox			-0.896	-0.96	-1.497	-1.38
Hindu			-0.608	-0.72	-1.921**	-2.16
Buddhist+			0.864	1.04	0.044	0.05
Indigenous			-1.817***	-2.59	-2.226***	-3.00
Abs. Lat.					0.018*	1.76
Frankel-Romer					-0.256	-1.58
Constant	.	.	6.196***	2.94	8.809***	3.86
N	9137		9137		8384	

Table D.9: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.038***	2.83	0.036***	2.65	0.023	1.57
Ln GDP pc	-0.390*	-1.76	-0.631***	-2.67	-0.657***	-2.74
Ln popul.	0.012	0.21	-0.005	-0.09	-0.124	-1.47
Ln reg. dur.	-0.064	-1.01	-0.038	-0.62	-0.068	-1.09
Ethn. fr.	-1.000***	-2.71	-0.604	-1.63	-0.263	-0.65
E.E.-Soviet	0.275	0.73	0.289	0.78	-0.121	-0.31
Africa	-1.587***	-3.16	-1.720***	-2.94	-1.926***	-3.27
Asia-Pac.	-0.119	-0.28	-1.430*	-1.70	-0.987	-1.30
MENA	-0.090	-0.22	0.570	1.01	0.224	0.35
Lat. Am.	-0.558*	-1.94	-2.429***	-4.24	-1.545***	-3.14
1820s	3.866**	2.08	6.048***	2.97	-0.813	-0.68
1830s	4.287**	2.31	6.473***	3.17	-0.355	-0.30
1840s	4.562**	2.44	6.795***	3.31	.	.
1850s	4.740**	2.57	6.952***	3.43	0.199	0.18
1860s	4.889***	2.68	7.074***	3.52	0.341	0.32
1870s	4.346**	2.38	6.555***	3.25	-0.155	-0.15
1880s	4.209**	2.29	6.437***	3.17	-0.241	-0.23
1890s	5.010***	2.70	7.265***	3.54	0.626	0.61
1900s	4.609**	2.44	6.904***	3.31	0.303	0.29
1910s	5.225***	2.74	7.533***	3.58	1.009	0.95
1920s	4.506**	2.37	6.820***	3.24	0.286	0.27
1930s	5.142***	2.68	7.470***	3.52	0.865	0.83
1940s	6.419***	3.32	8.779***	4.11	2.282**	2.20
1950s	6.534***	3.38	9.029***	4.26	2.608***	2.62
1960s	6.867***	3.49	9.512***	4.37	3.185***	3.23
1970s	5.319***	2.66	7.974***	3.60	1.552	1.55
1980s	4.495**	2.24	7.127***	3.20	1.041	1.03
1990s+	6.149***	3.10	8.807***	4.00	2.304**	2.26
British			0.210	0.78	0.136	0.43
French			-0.550*	-1.73	-0.648*	-1.83
Portuguese			1.174**	2.19	0.305	0.60
Spanish			1.591***	2.88	0.647	1.41
Belgian			-0.030	-0.03	0.478	0.41
Sunni			-0.942	-1.53	-1.347**	-2.03
Shia			-3.046***	-3.12	-3.336**	-2.50
Catholic			-0.279	-0.34	-0.889	-1.00
Protestant			-0.529	-0.70	-1.246	-1.51
Orthodox			-0.942	-1.05	-1.415	-1.30
Hindu			-0.395	-0.44	-1.460	-1.60
Buddhist+			1.238	1.44	0.647	0.76
Indigenous			-1.667**	-2.46	-1.899***	-2.63
Abs. Lat.					0.018	1.64
Frankel-Romer					-0.295*	-1.70
Constant	.	.	.	.	8.585***	3.68
N	8822		8822		8129	

Table D.10: OLS with PCSE analysis. PPP-adjusted GDP per capita growth as dependent variable. 5-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.038***	2.76	0.032**	2.28	0.022	1.61
Ln GDP pc	-1.174***	-6.98	-1.472***	-8.35	-1.332***	-7.76
Ln popul.	-0.246***	-2.82	-0.249***	-2.77	-0.419***	-3.24
Ln reg. dur.	-0.004	-0.06	-0.005	-0.09	-0.120**	-2.00
Ethn. fr.	-1.888***	-3.24	-1.213*	-1.87	-1.178*	-1.69
E.E.-Soviet	-1.175**	-2.26	-1.007*	-1.66	-0.713	-1.01
Africa	-3.296***	-5.28	-2.916***	-4.14	-3.794***	-4.84
Asia-Pac.	-1.231**	-2.24	-1.673*	-1.90	-2.007**	-2.11
MENA	-0.911*	-1.67	0.603	0.81	-0.482	-0.64
Lat. Am.	-1.758***	-3.63	-3.098***	-3.83	-2.503***	-2.96
1820s	-4.678***	-5.72	-5.491***	-6.60	-5.801***	-6.87
1830s	-3.510***	-4.61	-4.299***	-5.54	-4.550***	-5.78
1840s	-3.367***	-4.32	-4.117***	-5.20	-4.302***	-5.42
1850s	-3.356***	-5.05	-4.070***	-6.00	-4.288***	-6.25
1860s	-3.047***	-5.08	-3.720***	-6.08	-3.935***	-6.28
1870s	-2.863***	-5.49	-3.489***	-6.53	-3.755***	-6.70
1880s	-2.810***	-5.52	-3.398***	-6.53	-3.606***	-6.65
1890s	-2.325***	-4.82	-2.877***	-5.83	-3.018***	-5.89
1900s	-1.913***	-4.22	-2.426***	-5.24	-2.575***	-5.34
1910s	-3.198***	-7.17	-3.679***	-8.10	-3.775***	-8.03
1920s	-1.643***	-4.23	-2.083***	-5.25	-2.121***	-5.13
1930s	-1.333***	-3.59	-1.753***	-4.62	-1.931***	-4.87
1940s	-0.504	-1.37	-0.878**	-2.36	-1.078***	-2.79
1950s	0.093	0.32	-0.191	-0.64	-0.466	-1.47
1960s	1.148***	4.74	1.013***	4.15	0.778***	3.03
1970s	0.302	1.33	0.225	0.99	0.217	0.92
1980s	-1.287***	-5.86	-1.327***	-6.03	-1.235***	-5.56
British			-0.047	-0.12	-0.227	-0.57
French			-0.993**	-1.98	-1.397***	-2.86
Portuguese			-0.125	-0.13	-0.775	-0.89
Spanish			0.998	1.26	-0.224	-0.29
Belgian			-2.139*	-1.70	-1.367	-1.16
Sunni			-1.322	-0.84	-1.668	-1.20
Shia			-2.438	-1.44	-2.686*	-1.74
Catholic			0.466	0.28	-0.996	-0.67
Protestant			0.413	0.25	-0.993	-0.66
Orthodox			-0.282	-0.16	-1.033	-0.62
Hindu			0.378	0.21	-0.695	-0.42
Buddhist+			0.724	0.42	-0.247	-0.16
Indigenous			-1.022	-0.60	-1.463	-0.97
Abs. Lat.					-0.004	-0.26
Frankel-Romer					-0.600**	-2.20
Constant	15.770***	8.47	18.169***	7.22	22.414***	6.83
N	9295		9295		8513	

Table D.11: Random effects analysis. PPP-adjusted GDP per capita growth as dependent variable. 2-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.036***	2.59	0.030**	2.12	0.016	1.15
Ln GDP pc	-1.374***	-7.89	-1.678***	-9.20	-1.358***	-7.74
Ln popul.	-0.309***	-3.34	-0.306***	-3.21	-0.449***	-3.37
Ln reg. dur.	-0.004	-0.07	-0.007	-0.12	-0.090	-1.50
Ethn. fr.	-1.770***	-2.86	-1.053	-1.52	-1.091	-1.52
E.E.-Soviet	-0.958*	-1.74	-0.683	-1.06	-0.629	-0.86
Africa	-3.885***	-5.90	-3.585***	-4.79	-4.044***	-5.01
Asia-Pac.	-1.590***	-2.73	-2.294**	-2.45	-2.237**	-2.28
MENA	-1.212**	-2.09	0.253	0.32	-0.746	-0.96
Lat. Am.	-1.981***	-3.84	-3.448***	-3.99	-2.561***	-2.94
1820s	-5.055***	-6.14	-5.871***	-7.01	-5.661***	-6.66
1830s	-4.609***	-5.97	-5.400***	-6.86	-5.156***	-6.47
1840s	-3.793***	-4.84	-4.545***	-5.71	-4.273***	-5.35
1850s	-3.941***	-5.86	-4.656***	-6.79	-4.414***	-6.36
1860s	-3.504***	-5.79	-4.176***	-6.75	-3.960***	-6.26
1870s	-3.630***	-6.87	-4.256***	-7.87	-4.119***	-7.27
1880s	-3.493***	-6.78	-4.079***	-7.74	-3.914***	-7.15
1890s	-2.931***	-5.99	-3.479***	-6.96	-3.266***	-6.30
1900s	-2.322***	-5.05	-2.831***	-6.03	-2.630***	-5.39
1910s	-3.374***	-7.47	-3.853***	-8.38	-3.593***	-7.56
1920s	-2.983***	-7.58	-3.418***	-8.51	-3.136***	-7.50
1930s	-1.406***	-3.72	-1.818***	-4.72	-1.689***	-4.20
1940s	-1.105***	-2.98	-1.473***	-3.91	-1.486***	-3.80
1950s	-0.189	-0.64	-0.468	-1.55	-0.527*	-1.65
1960s	0.871***	3.55	0.740***	2.99	0.723***	2.78
1970s	-0.223	-0.97	-0.293	-1.28	-0.246	-1.03
1980s	-1.461***	-6.59	-1.494***	-6.73	-1.295***	-5.75
British			-0.034	-0.08	-0.207	-0.51
French			-1.009*	-1.89	-1.388***	-2.76
Portuguese			-0.080	-0.08	-0.741	-0.83
Spanish			1.173	1.39	-0.197	-0.25
Belgian			-2.126	-1.59	-1.263	-1.04
Sunni			-1.674	-1.00	-1.969	-1.38
Shia			-2.818	-1.57	-2.999*	-1.89
Catholic			0.052	0.03	-1.414	-0.92
Protestant			0.079	0.04	-1.434	-0.93
Orthodox			-0.921	-0.50	-1.919	-1.11
Hindu			0.368	0.19	-0.873	-0.52
Buddhist+			0.651	0.35	-0.502	-0.31
Indigenous			-1.272	-0.70	-1.690	-1.09
Abs. Lat.					-0.004	-0.22
Frankel-Romer					-0.647**	-2.31
Constant	18.401***	9.49	21.166***	7.99	23.502***	6.97
N	9137		9137		8384	

Table D.12: Random effects analysis. PPP-adjusted GDP per capita growth as dependent variable. 3-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.037***	2.67	0.032**	2.26	0.024*	1.66
Ln GDP pc	-1.364***	-7.71	-1.621***	-8.80	-1.339***	-7.44
Ln popul.	-0.325***	-3.55	-0.311***	-3.33	-0.435***	-3.23
Ln reg. dur.	-0.038	-0.63	-0.042	-0.68	-0.072	-1.17
Ethn. fr.	-1.419**	-2.32	-0.753	-1.12	-0.944	-1.31
E.E.-Soviet	-0.136	-0.25	0.147	0.23	-0.293	-0.40
Africa	-3.930***	-6.01	-3.817***	-5.20	-3.784***	-4.66
Asia-Pac.	-1.494***	-2.59	-2.593***	-2.83	-2.084**	-2.11
MENA	-1.170**	-2.05	-0.048	-0.06	-0.335	-0.43
Lat. Am.	-1.959***	-3.86	-3.657***	-4.37	-2.386***	-2.72
1820s	-5.201***	-6.33	-5.855***	-7.02	-5.431***	-6.32
1830s	-4.658***	-5.95	-5.290***	-6.66	-4.851***	-5.95
1840s	-4.050***	-5.17	-4.651***	-5.86	-4.203***	-5.20
1850s	-3.959***	-5.85	-4.531***	-6.59	-4.091***	-5.80
1860s	-3.731***	-6.16	-4.272***	-6.93	-3.870***	-6.05
1870s	-3.957***	-7.47	-4.459***	-8.25	-4.135***	-7.20
1880s	-3.940***	-7.62	-4.410***	-8.37	-4.088***	-7.36
1890s	-3.073***	-6.24	-3.511***	-7.00	-3.151***	-5.97
1900s	-3.269***	-7.05	-3.676***	-7.79	-3.332***	-6.70
1910s	-2.764***	-6.08	-3.150***	-6.82	-2.689***	-5.55
1920s	-3.180***	-8.01	-3.530***	-8.75	-3.174***	-7.45
1930s	-2.453***	-6.39	-2.786***	-7.14	-2.467***	-5.98
1940s	-0.976***	-2.61	-1.274***	-3.36	-1.033***	-2.59
1950s	-0.446	-1.48	-0.667**	-2.18	-0.558*	-1.70
1960s	0.460*	1.83	0.368	1.45	0.553**	2.05
1970s	-1.127***	-4.76	-1.173***	-4.94	-0.978***	-3.94
1980s	-1.703***	-7.39	-1.721***	-7.46	-1.272***	-5.36
British			0.105	0.25	-0.113	-0.27
French			-1.056**	-2.04	-1.384***	-2.73
Portuguese			0.184	0.19	-0.705	-0.78
Spanish			1.626**	1.99	-0.150	-0.19
Belgian			-1.377	-1.05	-0.970	-0.79
Sunni			-1.388	-0.86	-1.568	-1.09
Shia			-2.990*	-1.72	-2.894*	-1.81
Catholic			-0.274	-0.16	-0.964	-0.62
Protestant			-0.143	-0.08	-1.057	-0.68
Orthodox			-1.203	-0.68	-1.690	-0.97
Hindu			0.351	0.19	-0.589	-0.35
Buddhist+			0.882	0.49	0.016	0.01
Indigenous			-1.235	-0.70	-1.249	-0.80
Abs. Lat.					-0.002	-0.10
Frankel-Romer					-0.623**	-2.21
Constant	18.741***	9.62	21.180***	8.12	22.515***	6.62
N	8822		8822		8129	

Table D.13: Random effects analysis. PPP-adjusted GDP per capita growth as dependent variable. 5-year lag on independent variables. Long sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.249	-0.79	-0.296	-0.90	-0.294	-0.74	-0.318	-0.99
Ln GDP pc	-1.663***	-5.19	-3.056***	-8.44	-3.905***	-11.01	-1.465***	-5.25
Ln reg. dur.	0.189	1.39	0.314**	2.16	0.407***	2.63	0.022	0.18
Ln popul.	-0.142	-0.76	0.024	0.09	-0.615**	-2.20	0.304**	2.05
Ethn. fr.	-3.555***	-2.97	-3.401*	-1.88	-3.333*	-1.73	-1.634*	-1.72
Africa	-4.582***	-3.59	-6.913***	-3.73	-9.880***	-4.66	-4.089***	-3.06
Asia	-1.405	-1.14	-6.037**	-2.46	-6.974***	-2.67	-3.606**	-2.48
Lat. Am.	-2.870***	-2.77	-6.453***	-3.06	-8.162***	-3.59	-2.382*	-1.92
E.E.-Soviet	-1.420	-1.25	-2.610	-1.58	-5.243***	-2.77	0.717	0.68
MENA	-0.796	-0.58	-0.714	-0.35	-1.369	-0.62	-1.924	-1.32
British			0.262	0.22	0.214	0.17	0.139	0.24
French			-0.991	-0.71	-1.484	-1.01	-0.566	-0.81
Spanish			0.981	0.47	0.601	0.27	0.034	0.03
Portuguese			-0.294	-0.12	-0.243	-0.09	0.440	0.39
Belgian			-7.290**	-2.49	-8.338***	-2.66	-1.903	-1.39
Sunni			-4.979	-1.52	-5.381	-1.53	-1.064	-0.51
Shia			-1.014	-0.25	-1.754	-0.40	-1.376	-0.55
Catholic			-1.667	-0.50	-1.103	-0.31	-1.657	-0.74
Protestant+			-2.366	-0.69	-2.008	-0.55	-1.581	-0.72
Orthodox			-5.565	-1.58	-5.441	-1.46	-4.149*	-1.67
Hindu			-3.675	-0.89	-4.097	-0.93	-0.467	-0.21
Buddhist+			0.081	0.02	-0.302	-0.07	1.621	0.71
Indigenous			-4.851	-1.34	-5.107	-1.32	-1.935	-0.88
1970s					-2.041***	-4.22	-0.019	-0.04
1980s					-3.055***	-7.75	-1.171***	-3.29
1990s					-1.873***	-6.28	-0.717**	-2.55
Abs. lat.							0.010	0.39
Urban							0.006	0.43
Trade							0.023***	5.01
Constant	20.685***	4.09	33.264***	5.01	53.271***	7.76	11.793***	2.90
N	3856		3856		3856		3463	

Table D.14: RE2GSLS results for models with WAVE as instrument. PPP-adjusted GDP per capita growth as dependent variable. Second-stage regressions with 2-year lag on independent variables. Short sample.

	Model I		Model II		Model III		Model IV	
	b	*t*	*b*	*t*	*b*	*t*	*b*	*t*
FHI	-0.458	-1.14	-0.076	-0.15	-0.010	-0.02	-0.490	-0.93
Ln GDP pc	-0.473	-1.47	-0.609*	-1.77	-0.735**	-2.15	-0.397	-1.08
Ln reg. dur.	-0.463***	-2.89	-0.574***	-3.03	-0.569***	-2.99	-0.380**	-2.33
Ln popul.	-0.079	-0.51	-0.004	-0.03	-0.081	-0.51	0.411***	2.78
Ethn. fr.	-2.016**	-2.07	-2.132**	-2.06	-2.165**	-2.07	-1.515*	-1.69
Africa	-1.694	-1.32	-3.708**	-2.31	-4.311***	-2.59	-2.102	-1.46
Asia	1.382	1.22	-3.058*	-1.79	-3.377*	-1.94	-1.789	-1.23
Lat. Am.	-1.308	-1.46	-4.644***	-3.53	-4.969***	-3.71	-1.533	-1.26
E.E.-Soviet	-1.614	-1.21	-1.665	-1.12	-1.957	-1.29	-0.597	-0.53
MENA	0.993	0.64	-1.811	-0.90	-2.119	-1.03	-0.051	-0.03
British			1.361**	2.02	1.361**	2.00	1.159*	1.96
French			-0.186	-0.24	-0.314	-0.41	0.283	0.43
Spanish			2.920**	2.54	2.873**	2.48	0.889	0.76
Portuguese			1.577	1.17	1.427	1.05	1.209	1.14
Belgian			-3.702**	-2.21	-4.002**	-2.35	-1.785	-1.40
Sunni			-1.363	-0.49	-1.713	-0.61	0.013	0.01
Shia			1.033	0.33	0.612	0.19	1.457	0.52
Catholic			-1.593	-0.56	-1.785	-0.61	-0.665	-0.26
Protestant+			-1.831	-0.66	-2.007	-0.72	-0.675	-0.28
Orthodox			-3.254	-0.96	-3.550	-1.03	-1.029	-0.36
Hindu			0.204	0.07	-0.016	-0.01	0.779	0.36
Buddhist+			1.945	0.64	1.618	0.52	2.533	1.03
Indigenous			-2.937	-1.07	-3.221	-1.15	-1.218	-0.53
1980s					-1.813***	-3.96	-0.816*	-1.94
1990s					-1.064***	-3.37	-0.821***	-3.00
Abs. lat.							-0.005	-0.17
Urban							-0.008	-0.58
Trade							0.015***	3.21
Constant	10.947**	2.39	12.463***	2.60	15.994***	3.34	2.370	0.60
N	1984		1984		1984		1859	

Table D.15: RE2GSLS results for models with WAVE and FHI in $t-15$ as instruments. PPP-adjusted GDP per capita growth as dependent variable. Second-stage regressions with 2-year lag on independent variables. Short sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.048	1.35	0.036	1.00	0.050	1.47
Ln GDP pc	-1.206***	-6.27	-1.773***	-8.70	-1.256***	-6.84
Ln popul.	-0.263***	-3.13	-0.326***	-3.28	-0.364***	-2.97
Ln reg. dur.	-0.000	-0.00	0.001	0.01	-0.066	-1.01
Ethn. fr.	-1.713***	-3.09	-1.051	-1.45	-1.056	-1.64
E.E.-Soviet	-0.632	-1.10	-0.699	-0.96	-0.257	-0.36
Africa	-3.296***	-5.21	-3.707***	-4.58	-3.349***	-4.40
Asia-Pac.	-1.187**	-2.18	-2.368**	-2.40	-1.775**	-1.98
MENA	-0.824	-1.28	0.293	0.32	-0.139	-0.17
Lat. Am.	-1.671***	-3.46	-3.523***	-3.88	-2.190***	-2.78
1820s	-4.376***	-5.14	-6.047***	-6.70	-4.700***	-5.28
1830s	-3.953***	-4.93	-5.570***	-6.55	-4.233***	-5.06
1840s	-3.172***	-3.91	-4.704***	-5.50	-3.398***	-4.07
1850s	-3.369***	-4.87	-4.809***	-6.54	-3.625***	-5.03
1860s	-2.970***	-4.80	-4.325***	-6.55	-3.235***	-4.95
1870s	-3.147***	-5.89	-4.396***	-7.64	-3.464***	-5.97
1880s	-3.044***	-5.90	-4.216***	-7.64	-3.320***	-5.99
1890s	-2.513***	-5.19	-3.616***	-7.01	-2.732***	-5.28
1900s	-1.934***	-4.27	-2.961***	-6.13	-2.137***	-4.41
1910s	-3.021***	-6.81	-3.976***	-8.48	-3.155***	-6.72
1920s	-2.671***	-6.92	-3.526***	-8.60	-2.750***	-6.67
1930s	-1.102***	-2.90	-1.907***	-4.72	-1.276***	-3.12
1940s	-0.830**	-2.19	-1.544***	-3.87	-1.095***	-2.70
1950s	0.017	0.06	-0.526*	-1.68	-0.243	-0.75
1960s	1.007***	3.90	0.714***	2.67	0.952***	3.48
1970s	-0.128	-0.48	-0.285	-1.05	-0.035	-0.13
1980s	-1.405***	-5.71	-1.482***	-6.00	-1.158***	-4.70
British			-0.064	-0.14	-0.266	-0.70
French			-1.037*	-1.86	-1.250***	-2.73
Portuguese			-0.127	-0.12	-0.576	-0.71
Spanish			1.168	1.32	-0.152	-0.21
Belgian			-2.216	-1.58	-1.178	-1.07
Sunni			-1.627	-0.90	-1.299	-0.94
Shia			-2.805	-1.45	-2.232	-1.46
Catholic			0.158	0.08	-0.726	-0.49
Protestant			0.185	0.10	-0.793	-0.53
Orthodox			-0.850	-0.43	-1.146	-0.69
Hindu			0.449	0.22	-0.483	-0.31
Buddhist+			0.738	0.37	0.167	0.11
Indigenous			-1.200	-0.62	-1.113	-0.76
Abs. Lat.					-0.005	-0.33
Frankel-Romer					-0.517**	-2.02
Constant	16.191***	8.67	22.076***	8.05	20.250***	6.51
N	9137		9137		8384	

Table D.16: RE2GSLS results for models with WAVE as instrument. PPP-adjusted GDP per capita growth as dependent variable. Second-stage regressions with 3-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.055	1.57	0.042	1.17	0.056	1.64
Ln GDP pc	-1.173***	-6.05	-1.589***	-7.87	-1.212***	-6.47
Ln popul.	-0.268***	-3.31	-0.296***	-3.26	-0.342***	-2.81
Ln reg. dur.	-0.034	-0.53	-0.036	-0.54	-0.053	-0.80
Ethn. fr.	-1.375***	-2.59	-0.743	-1.14	-0.907	-1.43
E.E.-Soviet	0.193	0.34	0.259	0.38	0.080	0.11
Africa	-3.201***	-5.24	-3.631***	-4.88	-3.050***	-4.05
Asia-Pac.	-0.999*	-1.91	-2.469***	-2.74	-1.598*	-1.80
MENA	-0.665	-1.07	0.102	0.12	0.267	0.33
Lat. Am.	-1.566***	-3.41	-3.557***	-4.37	-1.992**	-2.57
1820s	-4.383***	-5.21	-5.607***	-6.37	-4.430***	-4.98
1830s	-3.870***	-4.82	-5.050***	-6.01	-3.889***	-4.60
1840s	-3.304***	-4.12	-4.423***	-5.29	-3.293***	-3.94
1850s	-3.274***	-4.76	-4.326***	-6.00	-3.265***	-4.50
1860s	-3.096***	-5.07	-4.085***	-6.36	-3.111***	-4.77
1870s	-3.387***	-6.41	-4.293***	-7.67	-3.449***	-5.94
1880s	-3.413***	-6.67	-4.260***	-7.91	-3.463***	-6.23
1890s	-2.586***	-5.36	-3.376***	-6.67	-2.584***	-4.96
1900s	-2.819***	-6.22	-3.553***	-7.48	-2.808***	-5.74
1910s	-2.357***	-5.32	-3.041***	-6.59	-2.224***	-4.69
1920s	-2.829***	-7.33	-3.437***	-8.52	-2.769***	-6.65
1930s	-2.105***	-5.50	-2.685***	-6.71	-2.034***	-4.89
1940s	-0.663*	-1.75	-1.181***	-3.00	-0.634	-1.55
1950s	-0.224	-0.75	-0.602*	-1.93	-0.269	-0.82
1960s	0.604**	2.31	0.420	1.57	0.781***	2.79
1970s	-1.023***	-3.79	-1.125***	-4.11	-0.776***	-2.77
1980s	-1.646***	-6.52	-1.691***	-6.68	-1.145***	-4.47
British			0.085	0.20	-0.171	-0.45
French			-1.028**	-2.05	-1.236***	-2.73
Portuguese			0.224	0.24	-0.522	-0.65
Spanish			1.631**	2.06	-0.096	-0.14
Belgian			-1.325	-1.05	-0.868	-0.79
Sunni			-1.214	-0.74	-0.909	-0.67
Shia			-2.818	-1.62	-2.142	-1.42
Catholic			-0.129	-0.07	-0.294	-0.20
Protestant			-0.018	-0.01	-0.430	-0.29
Orthodox			-1.062	-0.60	-0.935	-0.57
Hindu			0.415	0.23	-0.217	-0.14
Buddhist+			1.041	0.58	0.672	0.43
Indigenous			-1.094	-0.62	-0.685	-0.47
Abs. Lat.					-0.003	-0.20
Frankel-Romer					-0.486*	-1.93
Constant	16.160***	8.74	20.468***	8.05	18.976***	6.16
N	8822		8822		8129	

Table D.17: RE2GSLS results for models with WAVE as instrument. PPP-adjusted GDP per capita growth as dependent variable. Second-stage regressions with 5-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.077***	2.67	0.066**	2.12	0.071**	2.47
Ln GDP pc	-1.118***	-5.67	-1.440***	-6.89	-1.119***	-5.96
Ln popul.	-0.227**	-2.43	-0.239**	-2.39	-0.269**	-2.18
Ln reg. dur.	-0.047	-0.71	-0.046	-0.66	-0.069	-1.04
Ethn. fr.	-1.787***	-2.96	-1.287*	-1.81	-0.796	-1.25
E.E.-Soviet	-0.319	-0.49	-0.431	-0.54	-0.015	-0.02
Africa	-2.590***	-3.85	-2.949***	-3.57	-3.039***	-4.02
Asia-Pac.	-0.412	-0.72	-2.006**	-2.02	-1.409	-1.57
MENA	-0.274	-0.44	0.372	0.40	0.347	0.44
Lat. Am.	-1.366***	-2.81	-4.118***	-4.73	-2.082***	-2.66
1820s	-3.652***	-4.34	-4.614***	-5.29	-3.814***	-4.44
1830s	-3.381***	-3.16	-4.313***	-3.95	-3.515***	-3.30
1840s	-2.506***	-3.07	-3.382***	-4.02	-2.633***	-3.20
1850s	-2.821***	-3.99	-3.648***	-4.97	-2.950***	-4.11
1860s	-2.485***	-3.84	-3.272***	-4.87	-2.620***	-3.98
1870s	-2.672***	-4.71	-3.385***	-5.74	-2.859***	-4.86
1880s	-2.564***	-4.85	-3.240***	-5.90	-2.758***	-5.03
1890s	-2.042***	-4.11	-2.679***	-5.19	-2.182***	-4.24
1900s	-1.491***	-3.17	-2.088***	-4.28	-1.605***	-3.31
1910s	-2.695***	-5.83	-3.245***	-6.80	-2.728***	-5.74
1920s	-2.319***	-5.61	-2.816***	-6.59	-2.295***	-5.38
1930s	-0.744*	-1.88	-1.224***	-2.98	-0.848**	-2.05
1940s	-0.425	-1.11	-0.856**	-2.16	-0.637	-1.59
1950s	0.412	1.23	0.074	0.21	0.316	0.91
1960s	1.241***	4.22	1.011***	3.36	1.128***	3.67
1970s	0.183	0.68	0.107	0.39	0.147	0.53
1980s	-1.166***	-4.92	-1.204***	-5.03	-0.954***	-3.99
British			0.348	0.79	-0.109	-0.28
French			-0.809	-1.48	-1.271***	-2.68
Portuguese			1.212	1.13	0.074	0.08
Spanish			2.462***	2.91	0.082	0.11
Belgian			-1.663	-1.19	-0.854	-0.72
Sunni			-0.804	-0.48	-0.202	-0.15
Shia			-1.613	-0.90	-1.238	-0.83
Catholic			0.386	0.21	0.136	0.09
Protestant			0.053	0.03	-0.029	-0.02
Orthodox			-0.269	-0.14	-0.497	-0.31
Hindu			0.863	0.45	0.254	0.16
Buddhist+			1.642	0.88	1.333	0.87
Indigenous			-0.726	-0.40	-0.082	-0.06
Abs. Lat.					-0.006	-0.39
Frankel-Romer					-0.381	-1.51
Constant	14.744***	7.28	17.661***	6.44	16.423***	5.31
N	7588		7588		7153	

Table D.18: RE2GSLS results for models with WAVE and PILAG as instruments. PPP-adjusted GDP per capita growth as dependent variable. Second-stage regressions with 3-year lag on independent variables. Long sample.

	Model I		Model II		Model III	
	b	*t*	*b*	*t*	*b*	*t*
PI	0.079***	2.69	0.069**	2.17	0.070**	2.47
Ln GDP pc	-1.139***	-5.55	-1.470***	-6.73	-0.960***	-5.10
Ln popul.	-0.271***	-2.81	-0.297***	-2.86	-0.273**	-2.30
Ln reg. dur.	0.001	0.01	0.011	0.16	-0.052	-0.79
Ethn. fr.	-1.423**	-2.28	-0.899	-1.21	-0.356	-0.58
E.E.-Soviet	-0.161	-0.24	-0.209	-0.25	0.245	0.38
Africa	-2.561***	-3.69	-2.869***	-3.35	-2.652***	-3.65
Asia-Pac.	-0.251	-0.43	-1.732*	-1.68	-1.109	-1.28
MENA	-0.268	-0.42	0.470	0.49	0.650	0.84
Lat. Am.	-1.342***	-2.68	-4.472***	-4.93	-2.154***	-2.86
1820s	-3.734***	-4.39	-4.700***	-5.33	-3.360***	-3.97
1830s	-2.783**	-2.47	-3.711***	-3.23	-2.378**	-2.15
1840s	-2.732***	-3.32	-3.615***	-4.25	-2.353***	-2.90
1850s	-2.800***	-3.89	-3.627***	-4.85	-2.459***	-3.45
1860s	-2.602***	-3.98	-3.387***	-4.98	-2.276***	-3.50
1870s	-2.829***	-4.91	-3.538***	-5.90	-2.573***	-4.43
1880s	-2.917***	-5.43	-3.593***	-6.42	-2.679***	-4.93
1890s	-2.175***	-4.28	-2.812***	-5.33	-1.883***	-3.68
1900s	-2.418***	-5.03	-3.015***	-6.04	-2.131***	-4.41
1910s	-1.987***	-4.21	-2.532***	-5.20	-1.593***	-3.36
1920s	-2.405***	-5.70	-2.893***	-6.63	-2.164***	-5.09
1930s	-1.797***	-4.41	-2.263***	-5.36	-1.591***	-3.84
1940s	-0.308	-0.79	-0.722*	-1.79	-0.179	-0.45
1950s	0.286	0.84	-0.029	-0.08	0.421	1.20
1960s	0.993***	3.29	0.786**	2.55	1.092***	3.51
1970s	-0.674**	-2.42	-0.723**	-2.56	-0.580**	-2.06
1980s	-1.375***	-5.59	-1.390***	-5.60	-0.970***	-3.93
British			0.431	0.94	0.024	0.06
French			-0.658	-1.15	-1.158**	-2.50
Portuguese			2.181*	1.91	0.842	0.95
Spanish			2.791***	3.17	0.357	0.51
Belgian			-2.291	-1.57	-1.257	-1.08
Sunni			-0.953	-0.55	-0.093	-0.07
Shia			-2.032	-1.09	-1.597	-1.11
Catholic			0.349	0.19	0.223	0.16
Protestant			-0.072	-0.04	-0.014	-0.01
Orthodox			-0.432	-0.21	-0.509	-0.33
Hindu			0.300	0.15	-0.025	-0.02
Buddhist+			1.428	0.74	1.437	0.97
Indigenous			-1.370	-0.72	-0.383	-0.27
Abs. Lat.					-0.005	-0.34
Frankel-Romer					-0.340	-1.41
Constant	15.288***	7.29	18.428***	6.47	14.650***	4.90
N	7319		7319		6904	

Table D.19: RE2GSLS results for models with WAVE and PILAG as instruments. PPP-adjusted GDP per capita growth as dependent variable. Second-stage regressions with 5-year lag on independent variables. Long sample.

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