Democracy, Consolidation and Growth*

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Abstract
This paper studies the empirical relation between types of political systems, their consolidation, and growth. I find long standing democratic regimes to be relatively more successful than autocracies with the same history of duration. While there are initial costs associated with young democracies, democracies tend to improve their economic performance over time while the performance of autocracies deteriorates.

Keywords: Democracy, Growth, Consolidation, Political Systems

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1 Introduction

Despite a large theoretical and empirical body of research, there is still no consensus on the nature of the relationship between democracy and economic development. The direct effect of democracy on economic development is, in general, concluded to be ambiguous (e.g. when a measure of democracy is directly included in a growth regression). Instead, as will later be surveyed in this paper, the effect on growth of the type of political system tends to work via channel variables. As democracy has an indirect positive effect via some of those variables and a negative effect via others, the conclusion whether democracy is, on balance, good or bad for economic development also tends to remain ambiguous.

In this paper, I argue that an important aspect to consider is how consolidated political systems are. As pointed out in Fidrmuc (2003), in two years (between 1989 and 1991), the average transition country in post-communist Europe went from political freedoms similar to those of Iran to a level like that of Brazil. It does not seem plausible to expect that for these countries, the effect of being a democracy should be the same as for older, but equally democratic, countries. Instead, the effect of being a democracy should be expected to depend on how consolidated is the regime. New democracies do often not perform well at the beginning, but their performance tends to improve over time. For example, from the approval of the democratic constitution in 1978 until 2002, the average yearly growth rate of Spain has been around two per cent. However, in the first five-year period (1978-1982), growth was almost zero, whereas after 1982, the five-year average yearly growth rates have ranged between just below two and slightly above three per cent. Moving to the developing world, Benin had its first free elections in 1991 and has had non-negative per capita growth during its whole democratic experience (averaging almost two per cent for 1991-2002). The first five-year period had an average per capita growth rate of one per cent (with the yearly growth rates varying between 0.4 and 1.8 per cent) followed by 2.5 per cent in 1996-2002 (varying between 1.9 and 3.1 per cent). Finally, The Dominican Republic is coded as democratic since 1978. The first fifteen years are characterized by low and volatile growth rates (an average of 1% with a standard deviation of 3.6). Since 1992, the growth rate has been higher and less volatile (average 3.9%, s.d. 2.1). While these figures are suggestive, a rigorous analysis must control for other factors affecting economic growth.
The goal of this paper is to show that even when such factors are considered, the effect of political systems change systematically with the consolidation of that particular regime.

To be able to make a comparison between the results in this paper and those in earlier studies, I start my analysis by ignoring the effect of consolidation. I find that when including my measure of democracy and its square, without controlling for consolidation, the effect of democracy tends to be U-shaped. More autocratic as well as more democratic countries are more beneficial to growth than intermediate levels of democracy. Then, I introduce as a measure of consolidation the longevity of a certain political system. Controlling for consolidation, my results suggest that there are initial costs associated with fledgeling democracies, but that democracies tend to outperform other types of polity over time. Moreover, the performance of dictatorships tends to deteriorate as they grow older. This delayed effect of the payoff from democratization gives a role to the international community during a new democracy’s initial fragile phase. This role would also tend toward a moral obligation, if aid donors’ conditionality includes democratization.

My findings are submitted to a number of robustness tests, such as the influence of outliers, fledgeling as well as very long standing regimes, and the potential endogeneity of the democracy variables. The benchmark results seem to perform well. However, the results are fragile to the inclusion of some additional variables, but this rather seems to be due to the resulting reduction in sample size than to the included variable per se. The results also appear to be more pronounced in poorer countries as well as in Sub-Saharan African and European countries.

The next section starts with a brief overview of previous theoretical and empirical studies concerning the relationship between democracy and growth, followed by a rationale for why different types of systems may have different economic effects as they consolidate. Section 2.4 presents the hypothesis of this paper. Section 3 describes the data, and section 4 reports the empirical

\footnote{This result is contrary to that of Barro (1996, 1997), who finds an inverse U-shaped nonlinearity. However, when extending the data set in time (Barro, 1999b), the effect is no longer significant. Furthermore, the robustness of the nonlinearity I find is questioned in the robustness section and does not seem to be very robust to sample changes.}
results when introducing longevity of polities followed by robustness tests. 
Section 5 concludes.

2 Theoretical perspectives, earlier empirical results, and hypothesis

This section starts with an overview of the theoretical and empirical body of research on the relationship between democracy and economic growth, followed by a review of the literature on consolidation of regimes. Since the main thrust of my argument is that these two literatures are related, I then present the more limited literature on this potential interaction, and further expand the relation between the type of political system and its consolidation. In the last part of this section, my hypothesis is presented.

2.1 Political systems and economic development

Theories predicting that democracy may be detrimental to growth often point at the confiscatory behavior of the majority, when the politically pivotal group is poorer than the agent with the average income or wealth. If the extension of franchise results in expropriation and/or reallocation of funds towards immediate consumption at the expense of investments, or if redistribution mainly favours a few interest groups, a negative effect on economic development would be expected (see e.g. Huntington and Nelson, 1976). However, the extent and the nature of redistribution and majority confiscation depend on a number of factors, among these the initial income distribution as well as its level. Acemoglu and Robinson (2000) argue that majority voting may sometimes have a positive effect on human capital and growth via the expansion of public education, although in other cases, it has a negative impact via increased distortionary redistribution.

Other theories point at the inherent inefficiency of the democratic pro-

\footnotesize{\textsuperscript{2}}Wintrobe (1997) provides a survey, and a critique, of several models. Note, however, that the effect on growth of redistribution is an unresolved question, especially since the effects may differ depending on whether it is income or wealth that is redistributed (see e.g. Bénabou, 1996; Perotti, 1996). Furthermore, it may be discussed whether the masses exploit the rich after democratization or whether the masses are exploited prior to democratization (see e.g. Rodrik, 1999a; Przeworski et al., 2000).}
cess. If economic expansion is linked to efficient decision making, democracy may have a paralyzing effect on the economy while, due to the amount of discretion in directing resources, authoritarian regimes might be more efficient in directing the economy toward a development goal.\(^3\) This presupposes that the autocrat does not behave in a predatory way. McGuire and Olson (1996) present a model where an autocrat (a "stationary bandit") rationally satisfies (some) of the desires of his subjects. This is due to the ruler’s encompassing interest in the economy, i.e. since the autocrat consumes a share of the output, he will have incentives to choose less than total confiscation as well as to provide at least some public goods that would tend to have a positive effect on output.\(^4\) However, the authoritarian effectiveness in pursuing a development strategy is of little value if the strategy itself is not a good one.\(^5\)

As pointed out by Olson (2000), while democracies may behave in an expropriative way, the majority typically consume a larger share of output than does an autocrat. Hence, the encompassing interest of democratic governments may lead to policies promoting economic growth. Furthermore, both types of regimes may have a tendency to favour special interest groups. In a democracy, incumbent politicians may direct resources to segments of the electorate to retain power, or overspend in election years leading to political business cycles. Since an autocrat is not dependent on a majority to remain in power, he need only attract crucial interest groups (e.g. the military or the economic elite). Whether this will be harmful or beneficial for the development of the country will ultimately depend on the type of policy favoured by the specific special interests. Further, by definition, autocrats lack the possibility of credibly committing themselves not to plunder the society (Olson, 1991). Only democratic institutions can constrain the state to act in the general interest, and only under the freedom for individuals to channel and direct their own demand, without risk of arbitrary confiscation, will the most competitive technologies emerge. Hence, economic freedom can never be se-

\(^3\) In addition, there has been a theoretical controversy as to whether military rule is a more or less efficient type of authoritarian regime, i.e., whether military efficiency can act as a progressive modernizing force or if military leaders are too obsessed with maintaining order and power (see Sirowy and Inkeles (1990), and the references therein).


\(^5\) That those strategies are often detrimental to society has been argued by King (1981), referred to in Sirowy and Inkeles (1990).
cure under non-democracy. This argument has been very similarly phrased by Douglas North and Mancur Olson.\(^6\)

Przeworski et al. (2000, Chap. 3) note that the arguments in favour of autocracy and those in favour of democracy are not necessarily incompatible. That is, given that the difference between democracy and autocracy can be seen as more subtle than a binary choice between the two, autocratic and democratic features may interact to produce a non linear relation between the type of political system and growth. Assume the potential for capital formation to be higher in autocracies while the potential for technological development is higher in democracies. Then, some intermediate form of system (an 'autocratic democracy' or a 'democratic autocracy') may be more conducive to growth than the alternative systems, which would lead to an inverse U-shaped relation between democracy and growth. If the system were instead a combination of the worst features of the respective system (say arbitrary confiscation and inefficiency), the relation would be U-shaped.

Out of a total of 22 empirical studies surveyed by Przeworski and Limongi (1993) and Sirowy and Inkeles (1990), eight found a positive effect of democracy on growth, six found results in favor of authoritarianism, and eight found no difference between regimes or presented mixed results. In a panel of 89 countries between 1965 and 1990, Barro (1996) finds a statistically significant support for an inverse U-shaped nonlinearity where democracy is initially beneficial to growth but becomes detrimental as it expands. This result is summarized in Barro (1999a, p. 159) as: "[I]n the worst dictatorships, an increase in democracy tends to stimulate growth because the benefit from limitations on government power is the key matter. But in places that have already achieved a moderate amount of democracy, a further increase impairs growth because the dominant effect comes from the intensified concern with...

\(^6\)"Well specified and enforced property rights, a necessary condition for economic growth, are only secure when political and civil rights are secure; otherwise arbitrary confiscation is always a threat. (...) Indeed the search for efficient economic organization leads us to political organization, since it is the polity that defines and enforces the economic rules of the game." (North, 1993, pp. 1-2.) "Since an autocrat, no matter how secure and forward-looking he may be, can suffer reverses or other changes that give him a short-time horizon, the subjects in an autocracy always face some risk that their capital will be confiscated, their loans repudiated, or their coin or currency debased. (...) [T]he only societies where individual rights to property and contract are confidently expected to last across generations are the securely democratic societies." (Olson, 2000, pp. 26, 42.)
social programs that redistribute resources”). However, in Barro (1999b), the sample is extended in time (but the number of countries is reduced to 87) and the nonlinearity is no longer significant. Durham (1999) finds no statistically significant influence from the democracy index he uses (or when adding this variable squared) on growth in a panel of 105 countries from 1960 to 1989. Running separate regressions for different GDP per capita levels, discretion seems to decrease growth in advanced areas, and inhibit investments in poorer countries. In a panel of 100 countries between 1975 and 1992, Wu and Davis (1999) find that only economic, and not political, freedom is associated with economic growth. They conclude that: ”After the country becomes economically prosperous, political democracy will tend to grow naturally and stand firmly.”

More recent research focuses on the indirect effects of democracy on economic development. de Haan and Sturm (2003) find that democracy does lead to greater economic freedom in a sample of at most 68 developing countries between 1975 and 1990, and de Haan and Sturm (2000) find that positive changes in economic freedom foster economic growth (but the level of economic freedom is not related to growth). Pitlik and Wirth (2003) also find a positive effect of democracy on economic freedom, using a worldwide sample of 100 countries between 1970 and 1999. Dethier et al. (1999) obtain the same result in a sample of 25 post-communist countries between 1992 and 1997. Fidrmuc (2003) uses the same countries between 1990-2000 and also obtains a positive effect of democratization on economic reform. He finds a strong positive effect of economic reforms on growth. Feng (2003) finds that political freedom Granger-causes economic freedom, but that the reverse relationship is not supported. Clague et al. (1996) find autocrats who have been in power for some time to be associated with better property and contract rights than those autocrats in power for a shorter period. Democracies generally provide better rights than autocracies, but for short-lived democracies, these rights tend to be poor. Tavares and Wacziarg (2001) find that democracy tends to have a positive effect on growth via the accumulation of human capital and by reducing income inequality. On the other hand, it tends to slow down growth via a negative effect on the accumulation of physical capital and larger government spending. The overall effect is found to be moderately negative. Feng (2003, p. 295) concludes that ”democracy enhances growth by establishing and enforcing rules that protect property rights, promote general education, allow accumulation of private capital, re-
duce income inequality, and facilitate demographic transitions”. He does not compute any total effect, however.

An overall assessment of the effect of democracy on growth depends on which channels are considered. One channel normally not included (due to measurement problems etc) is social capital. According to Paldam and Svendsen (2000), social capital, defined as the density of trust within a group (potentially the whole of society), may be ”passively” enforced by a government by building a framework where people will enjoy the freedom to organize. If democracy is the form of polity guaranteeing these rights, then social capital will be a channel variable via which democracy tends to have a positive effect (given that social capital is of importance for growth). Using a sample of 29 market economies, Knack and Keefer (1997) find social capital to have a positive effect on economic performance when using indicators of trust and civic norms as measured by the World Value Surveys. While they argue that interpersonal trust may be an (imperfect) substitute for government-backed property rights, trust and civic norms tend to be stronger in countries with an efficient protection of property and contract rights.

2.2 Consolidation of regimes

So far, I have only discussed the absolute effect of a certain type of polity on economic growth, directly or via channel variables. One important aspect which is often disregarded is how consolidated these polities are. The literature on consolidation almost exclusively deals with conditions or policies for democracies to consolidate (Hadenius, 1994; Beetham, 1999; Przeworski et al., 2000). To my knowledge, it has not been used to differentiate the economic effects of differently consolidated systems, i.e. to assess the differing economic performance of new vs. established democracies as well as new vs. established autocracies. What is a consolidated regime? Beetham (1999) provides three definitions. The ”transfer of power test” defines a consolidated democracy as one where a freely and fairly elected government is defeated in a subsequent election and accepts the result. Second, the longevity of a regime mirrors the habituation to the electoral system, which tends to make alternative methods for appointing rulers unthinkable. Finally, the shock-persistence of the democratic system – whether it has survived substantial shocks or crises – provides an indication of how much confidence one may
have in the robustness of the system. In this paper, I will use the concept of longevity, partly because it is relatively easy to measure, but mainly because longevity applies to any type of political system - autocracies as well as democracies.\textsuperscript{7}

The longevity of regimes has previously been used. For example, one main argument in Putnam (1993) concerning local governance in Italy, is that practise and repeated interaction with other parties lead to less polarization, less extreme positions and more progressive legislation over time (denoted "institutional socialization" by Putnam (1993, pp. 26-38)). Clague et al. (1996) relate regimes and their duration to property and contract rights. The shorter is the ruler’s planning horizon, the more likely is an outcome of plundering and confiscatory policies. As an autocrat becomes more secure, he may gain support (and hence, increase his expectation of survival) e.g. by reducing taxes since he is no longer dependent on the loyalty bought from a military elite, for example. While there are different kinds of inefficiencies and lobbying groups in long-standing democracies, there are also an independent judiciary, courts, and a statutory evaluation of elected rulers in terms of inevitable and competitive elections. Transitory democracies can yield the same harmful effects as a short-sighted autocracy, however. Clague et al. (1996)’s analysis suggests that autocrats who have been in power longer and have reason to have a longer planning horizon are associated with better property and contract rights than short-lived autocracies. In general, democracies provide better security of these rights when they are longer-standing. Rodrik (1997, 1999b) shows that more democratic countries tend to have less volatile growth and that this volatility also tends to decrease with the longevity of democracies.

Periodical elections in democracies may lead incumbent politicians to overspend in election years to increase their probability of re-election. That

\textsuperscript{7}It might seem odd to speak about a consolidated autocracy. However, even though there exists a credibility problem in terms of property rights protection etc., as discussed in the previous section, there are states that have been autocratic for so long that it seems right to say that they are indeed firmly standing autocracies. Shock-persistence may also be a plausible definition. However, the type of shocks might be expected to differ between autocracies and democracies. In particular, more violent shocks would be expected in autocracies. Furthermore, while there is an implicit time-dimension in shock-persistence for democracies (more experienced systems will handle shocks better than less experienced ones), this is not evident for autocracies.
is, politicians may run a deficit that is politically instead of economically motivated, thereby creating a so-called political budget cycle. A contrary view is that voters understand the harmful effects of such a policy and instead punish pre-electoral manipulation by not re-electing those incumbents. In a recent paper, Brender and Drazen (2004) show the empirical finding of political budget cycles to be fully driven by newly established democracies. Their explanation is that, in new democracies, it is harder for the electorate to hold incumbents accountable for fiscal manipulation, due to voters’ inexperience with electoral politics and their lack of established information channels. Experience as well as information channels become more developed as the democracy consolidates.

A recent closely related article is Persson (2004), which finds that some forms of democracy – parliamentary democracies, and democracies with proportionality as the electoral rule – have a positive effect on economic development via what he calls "structural policy". This is measured by an index of institutional quality that considers the degree of openness to trade and property rights protection. Persson shows that also the age of (all forms of) democracy is positively correlated with the level of structural policy (and thus, economic performance). Hence, as democracies grow older, they adopt more growth-enhancing policies. These results come from a cross section. When moving to panel data analysis, Persson finds that being a "permanent democracy" (a dummy equal to one if a country turned democratic after 1960 and remained democratic until the year 2000) has a positive effect on trade openness. However, he does not find any direct effect of permanent democracies on economic performance. He conjectures that, if it takes a sufficiently long time for democracies to adopt growth-enhancing policies, and if the effect of structural policy on productivity occurs with a lag, the absence of an effect of permanent democracies on economic performance may be due to the fact that democracies established before 1960 belong to the control group (together with non-democracies).

There are a number of differences between Persson (2004) and this article. Persson does not consider outcomes under democracy vs. non-democracy, but focuses on the form of democracy. While using the same data on poli-

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8This is the same index used by Hall and Jones (1999), and called "social infrastructure" in their paper.
ties, he has a different classification of what constitutes a democracy. More importantly, this paper considers the duration of all forms of polities – autocracies, incoherent regimes, as well as democracies. However, the results in Persson (2004) altogether support the hypothesis explored in this paper.

2.3 Interaction between nature and stability of a political system

The main argument in this paper is that a growth enhancing environment may be problematic to establish if the political system as such is unstable. I also argue duration of regimes to be a good proxy for the consolidation of polities. Why should polity duration be expected to have an impact on growth?

First, there is a learning by doing effect for the state as such. In democracies as well as in autocracies, leaders, the bureaucracy, the legal system – every institutional and administrative part of the state – habituate to the system. Hence, over time, potentially more effective rules and laws are decided upon and existing rules and laws are more efficiently applied. Contract and property rights would stand out as particularly important. There are reasons to suspect that this effect would be more pronounced in democracies, since the interaction between groups is then more institutionalized (cf. Putnam, 1993, above). Rodrik (2000) argues that, due to increased cooperation and repeated interaction among political groups, countries with participatory institutions have better conflict management possibilities than other systems. Hence, over time, democracies would learn to handle shocks to the political system as well as to the economy. Likewise, there is also a learning by doing effect from the perspective of the electorate. As information channels

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9In terms of the polity index to be presented later, which ranges from -10 to 10, he considers a country to be democratic if it takes a value larger than zero (which is identical to the definition used by Brender and Drazen (2004)) while I use a value larger than five.

10In addition, this study will incorporate a spectrum of regimes between pure autocracies and pure democracies, controlling for the differences between these. Previous studies having dropped "non-pure" regimes (as in Clague et al., 1996) or used a dichotomous classification (as in Przeworski et al., 2000; Persson, 2004), may have lost valuable information.

11As pointed out by Beetham (1999), the inherited state structure would, to a large extent, determine the speed of consolidation in this sense.
develop and the form of political communication settles, voters learn to interpret political codes and are simply harder to fool (cf. Brender and Drazen, 2004, above). Assuming that people in general always try to adapt to the system to which they are subordinated, they would, even under autocracy, learn how to manage their lives as efficiently as possible over time.

It would also be expected that if agents believed in the viability of the system, they would trust existing rules and their application to a larger extent. This may have an additional beneficial effect on the working of the economy, whereas in a newborn political system, uncertainty about the future status of the regime may dampen the propensity for agents to undertake economically sound activities. But agents may not only increase their trust in the system as such. If trust-based inter-personal (and inter-entrepreneurial) relations are more marked in societies with consolidated polities (that is to say, if social capital is higher), and if inter-personal trust is not only a substitute for legal contract enforcement, this would add to the other effects. Conversely, changes in the political system may have a negative impact on the accumulation of social capital. Grootaert and van Bastelaer (2001) report evidence from Cambodia and Rwanda, concluding that "there is clear evidence that social capital can be destroyed (often rapidly) and rebuilt (often slowly)."

Longevity of democracy need not be unequivocally positive, however. An autocrat does have an advantage in the possibility of pursuing unpopular, but growth-friendly policies without the consent of a majority, and he may use coercive measures to command the economy to grow, e.g. via forced and low paid labour accumulation (Przeworski et al., 2000; Rodrik, 1999a). These possibilities would tend to erode over time. Furthermore, Olson (2000) argues that the emergence over time of special interest groups lobbying for distortionary redistribution makes older democracies inefficient. However, in a well working democracy, this could be expected to be understood as well as counteracted in due time, thereby corroborating the position that "[d]emocratization is (...) always and everywhere an unfinished process" (Beetham, 1999, p. 69, emphasis in the original). Not only may lobbying groups emerge over time, but political interest groups may also form which

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12This micro perspective has been taken by Offe (1997, p. 81): "The basic unit of the democratic political process is the citizen. The quality of policy decisions and outcomes generated by such regimes, as well as the durability of democratic regimes, will ultimately depend upon the quality of the citizens' thought and action."
articulate political goals reflecting changing preferences of society (e.g. the environmental movement). Since the distribution of preferences in the population is probably more easily revealed in a democracy as compared to other types of systems, consolidated democracies would be expected to be better at adjusting to changing demands in society. Still, consolidation is not defined as something inherently positive for the economy. Appendix 2 provides a rudimentary formalization of consolidation in different types of systems.

2.4 Hypothesis

My main hypothesis is that the economic effect of a specific type of political system should depend on how consolidated is the system, as proxied by the longevity of the polity. The second hypothesis is that the effect of consolidation should differ, depending on which type of regime is under consideration. Hence, in an empirical model including the level of democracy, I also include a measure of how consolidated is the system, as well as an interaction between the two variables. This paper does not focus on the indirect linkages via the enforcement of contract rights and similar issues, but whether there is a direct link from polities and their duration to economic growth. It is possible that a large part of this effect would be captured by channel variables, indeed probably the entire effect if all relevant variables are included, given that they are measured correctly. However, since the possible channels from democracy levels to growth are (1) numerous, (2) often small in sample in time and/or space, and may be subject to measurement error, and (3) potentially intercorrelated with the democracy level, I use a reduced-form approach. Hence, I do not focus on the details of institutional design, nor on the effects of specific government policies, but on the much broader question if consolidation is of importance by directly relating democracy and consolidation to economic growth.

Furthermore, it is possible that democracy and autocracy have different propagation mechanisms.

As stated in Marshall and Jaggers (2000, p. 12), defining three essential elements of democracy (the presence of institutions and procedures for citizens' influence, institutional constraints on the executive’s exercise of power, and the guarantee of civil liberties to all citizens): "Other aspects of plural democracy, such as the rule of law, systems of checks and balances, freedom of the press, and so on are means to, or specific manifestations of, these general principles."
3 Data and empirical setup

The sample consists of 129 countries over eight five-year periods from 1961 to 2000, yielding an unbalanced panel with altogether 754 observations. However, to control for potential systematic differences due to the entry and exit of countries, results are also presented using a balanced panel of 53 countries. The countries are listed in Appendix Table A1. Summary statistics and sources are presented in Table 1 and Table 2. Table 3 and Table 4 present correlation matrices for the full and the balanced sample, respectively.

3.1 Democracy measures

The measure of democracy used is the POLITY index from the Polity IV database. Polity IV is a project at the Center for International Development and Conflict Management (CIDCM) at University of Maryland. The POLITY index evaluates autocratic and democratic features in a country in a given year on a range from -10 (a totally autocratic polity) to 10 (a full democracy), and can therefore take on 21 discrete levels.\textsuperscript{15} The Polity Codebook defines a polity within the range $[6,10]$ as a coherent democracy, one in the range $[-10,-6]$ as a coherent autocracy, and one in the range $[-5,5]$ as an incoherent regime.\textsuperscript{16} In terms of moves in and out of these three classes of regimes, the full (balanced) sample has 135 (75) observations of regime change undertaken by 75 (38) different countries. 38 (15) of those countries only changed once during the period. These changes are described in more detail in Appendix A2. The POLITY index has been rescaled into a $[0,1]$ scale, referred to as $POL$ in the following, where 0 is the most autocratic level and 1 the most democratic one.

The POLITY index is, to some extent, outcome-based, i.e. when coding a country in a certain category, what is of importance is not intentions or legislation, but how policy has actually been conducted. It can be argued that this makes it hard to evaluate ”democracy” in terms of policy advice.

\textsuperscript{15}Formally, it is computed as the difference between a democracy index and an autocracy index, each ranging from 0 to 10. These two indices are weighted aggregates of five ”component variables”, measuring the competitiveness and the openness of executive recruitment, decision rules for the executive’s actions, and the regulation and competitiveness of political participation. For details, see Marshall and Jaggers (2000, pp. 17-25).

\textsuperscript{16}These intervals are quite arbitrary, however. In the sensitivity analysis, the limits for coherent regimes have been (symmetrically) changed in different steps.
Nevertheless, an identical constitution can clearly be interpreted or used in different ways in different countries, and what is really of importance for economic outcomes is the application rather than the rule.\textsuperscript{17} For example, after the military coup of January 1996 in Niger, a revised democratic constitution was passed in May. However, the following November election was boycotted by the opposition and Niger was coded as an autocracy between 1996 and 1998.

In my data, starting in 1961-1965, the variable $DUR$ reports the number of consecutive five-year periods when a country has had a particular regime since 1800 at most, or since the country enters the sample. Hence, regardless of the type of polity, it is the duration of a polity type that is considered here, as opposed to Clague et al. (1996) who use the duration of the incumbent ruler in autocracies. For example, Niger is first observed in 1960, and coded autocratic until 1990. After one year of "incoherence", four years of democracy followed before the new autocratic period 1996-1998. Thereafter, Niger has been coded as having an incoherent polity. In terms of duration, Niger then had its second period of autocracy between 1961-1965 ($DUR=2$), and its seventh one in 1986-1990 ($DUR=7$). This was followed by two periods involving regime changes (hence, $DUR=1$ for both 1991-1995 and 1996-2000).

\subsection{3.2 Control variables}

The dependent variable is the average five-year growth rate in GDP per capita. Different specifications are presented in the sensitivity analysis. In addition to the polity variables, I include a number of standard control variables. The log of GDP per capita ($LLGDP$) is introduced to capture conditional convergence. Gross domestic investments as a share of GDP ($INV$) are used to control for physical capital formation. Human capital is proxied by gross enrollment in secondary schooling as a share of the corresponding age group ($ENRS$) and (the log of) life expectancy ($LIFE$). Population growth ($POPGR$) may have a negative impact on growth, due to a lower

\textsuperscript{17}The normal critique against outcome-based measures is that the outcomes can be influenced by many things other than the policy output (cf. environmental policy and air quality). For the Polity measure, it is not evident that the discrimination between output and outcomes is that clear. If a country has elections under law but they are not undertaken, the country should clearly not be classified as a democracy.
per capita physical capital. Openness to trade (OP EN), defined as the sum of exports and imports over GDP, is used to capture the effect of trade on growth. To control for the size of government, I use general government consumption as a share of GDP (GOVC). As is more or less standard in the panel data growth literature, five-year averages are used in the estimation. This is intended to clean out high frequency business cycle fluctuations. Every regression presented uses time dummies.

3.3 Empirical model

In order to test the hypothesis outlined in section 2.4, I estimate the following regression equation:

\[ gr_{it} = x_{it}' \beta + \gamma_1 POL_{it} + \gamma_2 POL^2_{it} + \gamma_3 DUR_{it} + \gamma_4 POLDUR_{it} + u_i + \epsilon_{it}, \]  

(3.1)

where \( gr \) is average yearly growth, \( x \) is the vector of control variables, \( POL \) is the level of democracy, and \( POL^2 \) is included to capture potential nonlinearities. If there is only one main effect of consolidation, regardless of polity type, it would suffice to add the duration variable \( DUR \) to the equation, and the coefficient estimate would be positive or negative, depending on whether regimes perform better or worse as they endure. However, if the duration effect is related to the level of democracy, I would instead expect the coefficient for the interaction between democracy and duration, \( POLDUR \), enter significant. The marginal effect of duration on growth becomes \( \gamma_3 + \gamma_4 POL \), so if democracies have more to gain from consolidation than do autocracies (i.e. if \( \gamma_4 > 0 \)), the effect of duration on growth is larger the more democratic is the country. In particular, the marginal effect of duration for a full autocracy (\( POL = 0 \)) is \( \gamma_3 \), while for a full democracy (\( POL = 1 \)), it is \( \gamma_3 + \gamma_4 \). Hence, \( \gamma_4 \) directly measures the marginal growth differential of the effect of consolidation on growth for a fully democratic versus a fully autocratic country. Finally, \( u_i \) is an unobserved, time invariant, heterogeneity term.

If \( u_i \) is equal for each and every country (which is the same as saying that there are no country-specific effects), there is simply no country-specific component of variance, hence \( Var(u_i) = 0 \), and pooled OLS regression would be used. In the following tables, the Breusch-Pagan Lagrange multiplier test for \( Var(u_i) = 0 \) is presented. In every regression, the null hypothesis is rejected, suggesting that country effects should be taken into account. Given that the country effects, \( u_i \), are uncorrelated with the explanatory variables,
$X_{it}$, the effect may be controlled for by incorporating them in the error term (using random effects estimation). If, however, $u_i$ and $X_{it}$ are correlated, the random effect estimator is inconsistent. The effect may then be cancelled using within transformation (using fixed effects estimation) which removes any time-constant explanatory variables. If $u_i$ and $X_{it}$ are correlated, systematic differences in coefficient estimates between random and fixed effects estimation would be obtained. The tables below present the result from a Hausman test with the null hypothesis that the coefficients are the same. A non-rejection of the null suggests that individual effects can be controlled for by incorporating them in the error term, using random effects, whereas a rejection of the null would cast doubt on the use of random effects. In almost every regression, the use of fixed effects is strongly supported by the test. This makes sense, given the country specificness of institutional design. Democracy is presumably correlated with a number of country-specific features, crucial for growth but difficult to measure where a country’s ”democratic culture” is one example.\(^{18}\)

### 3.4 Reverse causation

While this paper focuses on the potential effects of democracy and its consolidation on economic growth, another stream of literature has studied whether economic development may influence the choice of regime. The hypothesis that there are certain necessary social conditions for democracy is often referred to as the Lipset/Aristotle hypothesis. The usual reference is Lipset (1959) who emphasizes the role of certain factors crucial for a stable (consolidated) democracy to survive. According to Lipset, the major factors are education, wealth, industrialization, urbanization, and ”historical elements” (the legitimacy and effectiveness of the democratic system).\(^{19}\) However, he emphasizes that ”the correlation [between democracy and the above-mentioned factors] never be so clear-cut that men cannot feel that they can change the direction of affairs by their actions” (p. 98).

\(^{18}\)Or, as argued by Putnam (1993, p. 182): ”Social context and history profoundly condition the effectiveness of institutions.”

\(^{19}\)By legitimacy is meant the capacity of the system to maintain the belief that the existing political institutions are the proper ones for society, (in particular for resolving tensions such as the conflict over income and wealth distribution). Effectiveness concerns the actual performance of the system, in particular that it is congruent with the expectations of powerful groups.
Barro (1999a) explores the Lipset hypothesis using a panel of around 100 countries between 1972 and 1995. He does find support for the hypothesis that improvements in the standard of living predict increases in democracy. His results suggest that the major determinants for a country’s propensity to experience democracy are the level of per capita GDP, the years of primary schooling, and the gender gap in average years of primary schooling. In addition, urbanization and a dummy for oil-exporting countries tend to have a negative impact on democracy. One conclusion is that “democracy that gets well ahead of economic development will not last” (p. 179). Vanhanen (1989) also finds a positive relationship between GNP per capita and a democracy index for 147 states between 1980 and 1985. However, he argues that the causal factor behind democratization is when politically relevant economic and intellectual resources are so widely distributed in a society that no group can suppress its competitors. Using data from 1950 to 1990 for 141 countries, Przeworski et al. (2000) find that “wealthy countries tend to be democratic not because democracies emerge as a consequence of economic development under dictatorships but because, however they emerge, democracies are much more likely to survive in affluent societies” (p. 137). A similar conclusion relating socioeconomic development and civicness in Italian regions has been made by Putnam (1993).

However, a found relation between levels of GDP and regimes does not necessarily imply any direct relation between growth and regimes, even though the growth record does determine the level of development. Durham (1999) finds that ”levels of development correlate with instances of democracy, a particular regime type. But no published evidence suggests that the rate of economic development affects regime type” (p. 94, emphasis in the original). He concludes that regimes may be treated as exogenous to economic growth. Przeworski et al. (2000, pp. 106-107) finds no evidence of an effect of growth experience on dictatorships. Poor democracies seem to be more likely to fall, however, when they face economic crises than when they grow.

The evidence summarized above suggests that my regressions may suffer from two problems. First, the correlation of GDP levels with my variables of interest, POL, and DUR, may lead to multicollinearity. Second, those variables may be simultaneously determined with growth; that is, the potential simultaneity bias does not only concern democracy levels, but also my dura-
tion variable. In the robustness section, I try to control for the possibility that collinearity affects the results. Then, I focus on the potential reverse causation in the growth-regime relation by proposing two instruments for $POL$. However, I have not been able to find any instruments for the second important variable, $DUR$. Thus, I try to address this problem using panel data GMM estimation in the robustness section.

4 Results

4.1 A linear or non-linear polity effect?

Before introducing duration, it is interesting to see whether my specification and data yield results in line with earlier empirical work. Table 5 presents the results for the full as well as the balanced sample using three different specifications. First, I only include my democracy variable, $POL$, in a linear specification (columns (1) and (4)). In columns (2) and (5), I instead use dummies for regime status. I split the democracy index so that a country with an index in the range $[0, .25)$ is coded 1 in the autocracy dummy, $AUT$. Regimes in the range $[.25, .75]$ get an incoherent coding, $INC = 1$, and those in the range $(.75, 1]$ are given the value of 1 in the democracy dummy, $DEM$. I include the dummies for autocracies and incoherent regimes, leaving democracy as the control group. Finally, I include $POL$ as well as its square in columns (3) and (6), in order to capture potential nonlinearities in the effect of democracy on growth.

In the linear specification, columns (1) and (4) of Table 5, I obtain negative estimated coefficients of $POL$, significant at the five-per cent level in both samples. However, in this specification, the Hausman test rejects the use of fixed effects, thereby suggesting random effects estimation to be more efficient. Appendix Table A3 reports the results using the random effects estimator for all six specifications from Table 5. The coefficient for $POL$ in column (1) falls by two thirds, and loses its significance, and the coefficient in the balanced sample, column (4), is halved and only significant at the ten-per cent level. The results are in line with those of Barro (1996, Table 1, column (2)), who found a negative, though insignificant, effect in a similar linear

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20 Since growth may be assumed to have a positive effect on $POL$ as well as on $DUR$, positive estimates of those variables on growth would most likely be upward biased.
The control variables enter with the expected signs and are similar to earlier findings (e.g. those presented in Barro, 1999b). The negative coefficient on initial GDP suggests conditional convergence. Physical and human capital formation, in terms of investments and schooling, have a positive impact on growth. Life expectancy also has a positive impact, but it seems that the within variation is not sufficiently large to make it significant. In the balanced sample, it even turns negative, though still not significant. Population growth enters with a negative, albeit not significant, sign. The trade share of GDP, openness, is positive and significant at the five-per cent level, thereby suggesting a positive effect of trade on growth. However, in the balanced sample, openness is estimated to have a zero effect on growth. Finally, government consumption enters as weakly significant and with a negative sign.

The dummy version in Table 5, columns (2) and (5), does not support the linear relation. The dummy for autocracy is positive and significant in both samples, suggesting a growth premium for autocracies. However, a linear relation would require the incoherent dummy to be around half the coefficient of the autocracy dummy, and it is much smaller than that in all my specifications. Furthermore, I changed the definition of what constitutes an autocracy and a democracy, letting the definition of an incoherent regime belong to the interval \([.35,.65]\) and \([.15,.85]\), respectively, instead of \([.25,.75]\). The results are reported in the lower panel of Table 5. In both definitions, autocracies still seem to perform better than democracies. Incoherent regimes enter negative, albeit not significant, and are thus suggested to be the worst performers, casting doubt on the linear specification. As in my first dummy version, Barro (1996) obtains positive coefficients on both dummies, although his middle group (which would correspond to my incoherent group) gives a higher estimate than that for autocracies. He also rejects linearity, however.

21 It should be emphasized that there are a number of differences in data as well as in the specification between my model and those of Barro. In particular, I use within estimation while Barro (1996) uses 3SLS estimation for a system containing two ten-year periods and one five-year period (1965-1975, 1975-1985, and 1985-1990). In Barro (1999b), the last period ends in 1995. Furthermore, Barro uses the Freedom House, or “Gastil” measure of democracy, not the Polity data.

22 In Appendix Table A3, the major differences concerning the control variables are that now the coefficient on initial GDP is reduced to half in absolute terms, the effect of life expectancy is significant at the one-per cent level in both samples, and its coefficient more than doubles in absolute value.
In columns (3) and (6), I find support for the inclusion of democracy squared. Both \( POL \) and \( POL^2 \) enter significant, at least at the five-per-cent level, and they are jointly significant (p-value .036 in the full and .010 in the balanced sample). The shape of the nonlinearity is suggested to be an ordinary U. This result differs from Barro (1996, Table 1, column (4)), who when introducing democracy and its square, found an inverse U-shape in the effect of democracy on growth. However, when extending the sample in time in Barro (1999b, Table 1, column (1)), the effect was no longer significant. In my estimates, the implied turning point is at .65 of the democracy measure,\(^{23}\) while the turning point in the balanced sample is at a democracy level of .62. This suggests that initial liberalization in a well defined autocracy would tend to retard growth while moving into the democracy region would enhance growth, as compared to being incoherent. Note, however, that the total effect of polity is never positive. Hence, for all possible democracy levels, none outperforms a full autocracy.

In sum, these results suggest the effect of democracy on growth to be nonlinear. Hence, in the following analysis, I include democracy as well as democracy squared.

4.2 The importance of consolidation

I now turn to the main focus of this paper: whether consolidation of political systems is of importance for growth, and if this influence differs with the type of political system. Table 6 contains the main results of this article. Since I found evidence of a nonlinear effect of democracy in Table 5, I use the specification including \( POL \) and \( POL^2 \).\(^{24}\) Then, I include my measure of consolidation in different ways.

As mentioned in section 3.3, if there is only a separate effect of consolidation, regardless of polity type, it would suffice to add the duration variable \( DUR \). This is done in columns (1) and (4) in Table 6 for the full and balanced sample, respectively. For both samples, \( DUR \) enters with a positive coefficient estimate (albeit only significant when using the full sample, at the five-per-cent level). If this were the only effect of regime stability, the average


\(^{24}\)In section 4.3, however, the robustness of this nonlinearity is questioned.
yearly growth would increase by .13 per cent for every additional five-year period a country keeps its current regime type. Since the effect of democracy on growth is suggested to be negative, this would imply an ever increasing growth gap between democracies and autocracies in favour of autocracies.

However, if the duration effect is related to the level of democracy, I need to include the interaction between democracy and consolidation, POLDUR. This is added in columns (2) and (5) in Table 6.\textsuperscript{25} In both samples, DUR now enters negatively (albeit not individually significant) and the interaction term is positive and significant at the five-per cent level. In both samples, the duration variables are jointly significant at the five-per cent level or better. This suggests that, as regimes persist, more democratic regimes tend to perform better than do less democratic regimes. In section 3.3, I noted that the marginal effect of duration on growth in equation (3.1) is $\gamma_3 + \gamma_4 \text{POL}$. Using the coefficient estimates from Table 6, column (2), $\gamma_3 = -.08$ and $\gamma_4 = .37$. The marginal growth differential from consolidation between a totally autocratic and a fully democratic country is then around .37 percentage points of yearly growth.

In the preceding regressions, for a given level of democracy, I have assumed a linear effect of consolidation on growth. However, it is plausible that the effect of consolidation is transitional, i.e. that its effect on growth tapers off as the polity becomes "sufficiently" consolidated (i.e. old "enough"). In columns (3) and (6) of Table 6, this is allowed for by instead using the log of duration and the log of duration interacted with POL.\textsuperscript{26} Coefficient values for the democracy variables now become somewhat smaller and the nonlinearity is no longer statistically significant. Compared to the previous results, the threshold level of democracy for a regime in its first period of existence is now .80 in the full and .66 in the balanced sample, as compared

\textsuperscript{25}An F-test for the inclusion of the interaction yields $F_{(2,607)} = 6.03$ for the full sample, and $F_{(2,353)} = 3.15$ in the balanced sample. I also included an interaction between $\text{POL}^2$ and duration (not shown), but it never entered near any conventional level of significance and hence, was dropped.\textsuperscript{26}To also allow for a reversal in the duration effect (which would be the case if consolidation in the long run tended to have a negative effect on growth, e.g. due to the emergence of lobbying groups in democracies as suggested in Olson (2000)), I included the square of the duration variable in the estimation instead of the log. This variable never entered significantly, however.
to .67 in column (2) and .63 in column (5). Moreover, the estimates for duration lose in significance, and although they are still jointly significant in the full sample, this is no longer the case in the balanced sample. Hence, the evidence for this non-linearity is at best weak.

To better understand the implications of my results, I use the estimates to plot the relation between growth and my variables of interest in Figure 1 to 3. Holding the control variables constant, and using the coefficient values from column (2) in Table 6, the effect of these four variables is:

$$growth = -5.778POL + 4.024POL^2 - 0.078DUR + 0.374POLDUR$$ (4.1)

In Figure 1, I use these estimates to illustrate the relation in the growth-democracy dimension for three different levels of duration. "New polity" (solid line) corresponds to a country in its first period of a certain polity type, i.e. I set $DUR = 1$ in Equation (4.1). "Avg duration" (dashed line) uses the sample mean of 4.9 periods ($DUR = 4.9$), and "Old polity" (short-dashed line) uses the sample maximum, $DUR = 38$. First, the plot shows the non-linear effect of democracy on growth. For a newly established polity (the solid line), the estimated turning point is at a democracy level of around .67. Hence, an autocracy moving towards democracy would tend to have a negative impact on growth, but this effect is reversed during the segment defined as incoherent regimes (the interval $[0.25,0.75]$). Still, no democracy level outperforms a full autocracy in its first period of existence. However, the more consolidated are the regimes (illustrated by the dashed and the short-dashed lines), the more favourable is the growth-outcome for more democratic systems, given that they are more democratic than a critical level. The opposite holds for less democratic systems. Quantitatively, the critical level of democracy, that is the level above which longevity tends to be positive instead of negative for growth, is approximately .21; that is a level in the upper part of what is defined as an autocratic polity. For sufficiently consolidated regimes, democracies outgrow autocracies.

A maybe clearer illustration of the growth-impact of longevity for different types of polity is given in Figure 2, which illustrates the relation in the

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27 In terms of Equation (3.1), for $DUR = 1$, the turning point is given by $-(\gamma_1 + \gamma_4)/(2\gamma_2)$ when using duration and by $-\gamma_1/(2\gamma_2)$ when using log duration.

28 Formally, this threshold level of democracy is calculated as $-(\gamma_3/\gamma_4)$ from Equation (3.1), hence $0.078/0.374=0.21$. 

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growth-duration dimension for three different levels of democracy ($POL$). Using Equation (4.1), I consider the hypothetical cases that a country of democracy level $POL = 0$, $POL = 0.5$, and $POL = 1$, respectively, keeps that level for 38 periods (i.e. 190 years). As seen in Figure 2, and as suggested by the estimates, more autocratic regimes (the solid line) tend to worsen their performance over time, and a full democracy (the short-dashed line) outperforms the growth rate of the fully autocratic regime during its fifth period of existence.\(^{29}\)

Analogous to Figure 2, Figure 3 illustrates the relation in the growth-duration dimension for three different levels of democracy, but instead uses the specification with log duration. The coefficient values from column (3) in Table 6 now suggest that democracies perform as well as autocracies in terms of growth during their seventh period of existence, i.e. a later surpass of democracies over autocracies. Thereafter, the advantage of being a democracy increases, albeit at a decelerating rate as opposed to the linear specification in Figure 2.

Equation (4.1) gives an estimate of to what extent growth can be attributed to my variables of interest, ceteris paribus. Then, the following thought experiment can be performed. What would the implied growth rate have been if a country had had another democracy level or duration history than its actual one? That is, I compute the effect in Equation (4.1) using hypothetical values and subtract the effect using actual values. Then, this effect may be added or subtracted from the actual growth rates. For example, during 1996-2000, Indonesia changed into the incoherent class, $POL = .56$.\(^{30}\)

For this period, Indonesia had an average growth rate of around zero. Using my variables of interest only, the estimates suggest the effect of democracy and duration to amount to -1.84 per cent per year (plugging in the actual values into Equation (4.1)). Now, had Indonesia instead been democratic

\(^{29}\)In terms of Equation (3.1), the critical number of periods is: $-(\gamma_1 + \gamma_2)/\gamma_4$, hence $-(−5.778 + 4.024)/0.374 = 4.7$, or about 24 years. The corresponding number of periods for an incoherent regime to grow at the same rate as a total autocracy is 10.1. If I instead use the sample average levels for each of the three types of polity (i.e. $POL = 0.132$, 0.473, and 0.939 respectively), I get a catch-up time for democracies to autocracies of around 3.9 periods (8.9 for incoherent regimes).

\(^{30}\)In reality, it went from an autocracy to a democracy during this period, giving the average coding as incoherent. Moreover, note that this period includes the Asian crisis in 1997-1998.
during 1996-2000, say at a democracy level of .85, my coefficients would instead suggest that the influence of these variables on growth would have been -1.76. That is, had Indonesia been more democratic (by .29 index points), its growth rate should have been .08 percentage points higher, ceteris paribus. However, this is not the only alternative. Had Indonesia instead chosen to remain autocratic, keeping its democracy level at .15, it would have started its seventh period of autocracy.\footnote{Prior to 1965, Indonesia was coded as incoherent.} This would have implied an effect on the growth rate of -.80, that is 1.04 percentage points higher than the actual one. Hence, the model suggests that the best Indonesia could have done in terms of the growth rate of that period would have been to remain autocratic. Indeed, incoherent regimes are the ones suggested to have the worst growth effects and, as noted before, countries do not tend to spend many periods being coded in this category.

The same counterfactual reasoning may be used to obtain the impact of growth over a longer period to project the accumulated effect on GDP per capita levels. That is, I compute the hypothetical difference using Equation (4.1), add this difference to actual growth, and then calculate the compounded effect. For example, from 1960 to 1995, autocratic Cote d’Ivoire improved its GDP per capita level by a factor of around 1.2 (from 1,606 to 1,929 U.S. dollars). Instead, assuming that it had been incoherent with $POL = .5$ for the whole period, the factor would have been around .9, which implies a GDP level of 1,445 U.S dollars in 1995. Assuming a democratic history for Cote d’Ivoire, a democracy level of around .9 would instead have led to the same GDP level as the actual one, and a democracy level of one would have given a per capita GDP level of 2,200 in 1995.

Costa Rica is coded as fully democratic in every period, starting with a duration value of 18 in the period 1961-1965. Between 1960 and 2000, Costa Rica improved its GDP per capita with a factor of 1.7. Instead assuming that Costa Rica had turned autocratic in the period 1961-1965 ($POL = 0$, $DUR = 1$), the factor would have been below .3, yielding a per capita GDP level in the year 2000 of around 1,000 instead of the actual 5,900. The same experiment for India, had it turned fully autocratic in 1960, gives a GDP level of 2,300 instead of around 2,500 in the year 2000 (factor 2.7 vs. 3).

Two countries repeatedly shifting democracy status over the sample pe-
period are Pakistan and Peru. Pakistan is coded as incoherent in 1961-1965 \((POL = .47)\) and increased its GDP per capita level by a factor of around 3.1 to the year 2000 (around 2,000 U.S. dollar). Coding Pakistan as fully democratic for every period yields a projected GDP level of around 3,000 (factor 4.7). Coding it as autocratic instead leads to 3,100 (factor 4.8); that is, the cumulative effect of an investment in democracy in the early 1960’s would not have been fully sufficient to outgrow Pakistan, had it been autocratic. In fact, even if Pakistan had kept the incoherent status of .47 throughout the period, it would have been better off than with its actual performance (GDP level 2,100, factor 3.3). For Peru, coded as incoherent between 1966-1970 \((POL = .39)\) and with a GDP per capita in 2000 of just below 4,600, the full democracy experiment gives a GDP level of 6,300 in 2000. The autocracy experiment instead leads to a GDP level of around 6,900, that is, Peru would have been better off either as a full democracy or a full autocracy during the whole period. As for Pakistan, the compounded effect of democratic consolidation would not have been sufficiently large in the year 2000 for a democracy experiment to outperform an autocratic history.

Naturally, these examples are only back-of-the-envelope calculations and should not be taken literally. In particular, I have only taken into account the definition of the regime as well as its duration, and not the actual policies conducted. However, they do suggest that it takes a long time for an investment in democracy to pay, and that repeated changes of political system are bad for growth. The short-run effect of democratization seems to be negative, which is in accordance with the results in a number of previous studies referred to in section 2.1. Controlling for consolidation, by including duration, suggests this to only be true in the short run. Over time, the effect of keeping the political system democratic is positive. On the other hand, keeping a system autocratic is bad for economic growth. The main conclusion is that consolidation seems to be a necessary and important parameter when evaluating the influence of democracy on growth performance.

### 4.3 Robustness of results

In this section, a number of alternative estimations are undertaken to test the sensitivity of the above results. When referring to ”the benchmark model”, the reference is column (2) in Table 6. I start by adding channel variables that would, potentially, make my consolidation effect insignificant. Then, I
define my democracy variables differently than in the benchmark model, and control for the influence of "very" established as well as fledgeling regimes. Endogeneity is addressed by instrumental variable techniques (two-step least squares and panel GMM). Finally, I control for sample stability in terms of income levels, outliers, and regional influence.

4.3.1 Alternative specifications

Channel variables. In section 2, I mentioned twelve potential channel variables via which democracy as well as consolidation may influence growth, and I stated that if I were able to control for all these channels, no additional effect of democracy and duration on growth would be expected. In the previous analysis, however, I only included five channels, namely human and physical capital formation (ENRS, INV), government spending (GOVC), population growth (POPGR), and openness to trade (OPEN). Data for the seven other channels are either more limited in time and/or space (economic freedom, or a subset of economic freedoms - property and contract rights; income inequality; social capital) or, to my knowledge, non-existent (a measure of the trust, or the belief in the viability of the political system; a measure of the efficiency of the bureaucracy and in voting behaviour; a measure of the possible negative effect of the extent of lobbying for inefficient redistribution).

A number of studies referred to in section 2.1 found an impact of democracy on economic freedom as well as a correlation between economic freedom and economic growth. To see if my results are sensitive to the inclusion of economic freedom, Table 7 controls for one such measure. The "economic freedom of the world"-index (EFW) from the Fraser Institute is available for some countries from 1970 (see Gwartney and Lawson, 2004). It is constructed from a total of 38 components under five area headings: size of government; legal structure and security of property rights; access to sound money; freedom to trade internationally; and regulation of credit, labour,

\footnote{For readers familiar with this index, it was previously named $I_c$. However, the index used in the regressions is the "chain-linked" index and not the index for different years. Since some components are missing for earlier years (e.g. the ICRG data on property rights begin in 1982), this index is based on the year 2000, and changes in the index are only based on changes in components present in adjacent years. Moreover, the index was rescaled from a $[0,10]$ index into $[0,1]$, where 0 means least economic freedom.}
and business. Using this index, my sample is now reduced from 754 observations (129 countries) to 481 observations (108 countries). When I simply include the initial level of economic freedom in the base regression in Table 7, column (1), it enters with a positive sign, albeit not significant. Since the index as such uses government consumption and openness to trade, I exclude $GOVC$ and $OPEN$ from the regression in column (2). Economic freedom still fails to have a significant effect. This is in line with the results in e.g. de Haan and Sturm (2000), referred to in section 2.1, who only find changes in this index, not levels, to be of importance for growth. In column (3), I instead use the per period change of economic freedom. Economic reforms are suggested to have a positive and significant (at the five-per cent level) impact on economic growth.\footnote{Results differ somewhat if I use the growth of economic freedom, rather than the change. However, since those results are slightly "better" for my variables of interest, I choose to present the "worst" alternative. Moreover, excluding government consumption and openness in those two specifications did not alter the results in any important way.} For the four variables of interest, $POL$, $POL^2$, $DUR$, and $POLDUR$, the point estimates largely remain unchanged. However, the standard errors are larger, thereby rendering the estimates insignificant. This does not imply that economic freedom accounts as a channel for most of the effect of democracy cum consolidation. Column (4) presents the benchmark specification for the smaller sample for which data on economic freedom are available. The estimates for all four variables are now very similar to those obtained in columns (1) to (3), in size as well as in terms of standard errors. Hence, it appears that the change in the results of the democracy-related variables is mainly an effect of the reduction in sample size, and not of economic freedom per se. I draw the same conclusion when including a subset of the economic freedom index in column (5). $ICRG$ is a property rights index, originally constructed by Knack and Keefer (1995), here rescaled to $[0,1]$, where 0 means the lowest protection of property rights.\footnote{Originally, the index used five components: quality of the bureaucracy, corruption in government, rule of law, risk of expropriation of private investment, and repudiation of contracts by the government. From 1998, however, the expropriation and repudiation components are no longer constructed. Hence, I constructed the index based on three components only.} While $ICRG$ enters with a positive sign, it is nowhere near significant, thereby indicating that the within variation of property rights is too low for it to have any effect. Moreover, my democracy and consolidation variables do not seem to change greatly
when ICGRG is included (cf. column (6)), suggesting that the insignificance of the estimates is once more due to a sample effect. To conclude, changes in economic freedom (which include ICGRG) as presented in column (3) seem to have a growth effect, but I cannot infer from the results that the effect of economic freedom is responsible for the insignificance of the duration effect. My interpretation of this is that there may still be a potential role to play for other channels, such as income inequality, social capital, and agents’ trust in the political system.

**Defining democracy differently.** To check whether the results are due to an arbitrary choice of limits for autocracies, incoherent regimes, and democracies, the specification of columns (2) (and (5)) in Table 6 was re-estimated for two alternative limits of POL, letting the incoherent group first be defined as a polity belonging in [.15,.85] and then in [.35,.65]. These are the same levels that were used in the lower panel of Table 5. Extending the incoherent group increases the number of incoherent polities to 384 (as compared to 185 in the original definition as reported in Table 2), and the number of occurrences of democracy decreases to 280, leaving 90 observations of autocracy. The longest duration for an autocracy is now eight periods. The narrower measure of incoherence, i.e. [.35,.65], consists of 103 incoherent polities with a duration of eight periods at most, 360 observations of democracy, and 291 of autocracy.

The results are displayed in columns (2) and (3) of Table 8. The relation between growth and polity and its duration does not seem to be sensitive to the exact definition of what constitutes the respective type of polity. The time for a full democracy to surpass a full autocracy only marginally changes from 4.7 periods in the original specification, redisplayed in column (1), to 4.5 periods in the broader definition of incoherent polities, and 4.3 periods in the narrower one.

**Less consolidated regimes.** As described in section 3.1, my duration data measure the regime history since 1800 at the latest. While my previous results do not support a nonlinear duration effect (using log duration or

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35In terms of the original index, this corresponds to values of [-7,7] and [-3,3], respectively.

36The results using the balanced sample were similar.
duration squared), there might be some concern that the effect is either
driven by very consolidated polities or by newborn regimes.

To control for the effect of countries with a much longer history of du-
ration, I gradually excluded countries with a high measure of duration from
the sample, starting with the exclusion of $DUR = 38$. The results are pre-
sented in column (4) of Table 8, when I only include countries with at most
eight periods of consecutive duration in my sample. For all duration values
greater than eight periods, the results are similar. When excluding the eighth
period of duration from the sample however, the duration effect disappears.
In column (5) of Table 8, I exclude newly established polities, that is, every
observation of $DUR = 1$. The nonlinearity of $POL$ is no longer supported.
If anything, the effect is suggested to be inverse U-shaped. The change is not
sufficiently large to outweigh the effect of democratic consolidation, however.
The threshold level of democracy is now .38 (cf. .21 in the benchmark). More
democratic countries than this level improve their growth performance over
time, while less democratic countries deteriorate. In column (6), I obtain
results similar to those in column (5), when jointly excluding new as well as
longer standing regimes from the sample. The threshold level of democracy
is now .39.

**Control variables**  A serious problem encountered in growth regressions
is the non robustness of variables to the specification. Levine and Renelt
(1992) show that only a few variables found to be significant in earlier pa-
pers were robust to specification, namely investments, initial income, and
secondary school enrollment rates. However, the extreme bounds analysis
employed by Levine and Renelt is interpreted by Sala-I-Martín et al. (2004)
as too strong a test for any variable to pass. They employ a technique called
Bayesian Averaging of Classical Estimates to determine the significance of
variables in cross-country growth regressions. They test the significance of
67 explanatory variables on GDP per capita growth between 1960 to 1996,
and find 18 of these to be significantly correlated with long-term growth.
They find strongest evidence for the primary school enrollment rate, initial
GDP per capita, and the relative price of investment, but also for government
consumption and life expectancy, as well as the public investment ratio (for
larger model sizes).\(^{37}\)

\(^{37}\)At least nine of those 18 variables are time invariant, however.
Table 9 redisplay the original results together with the results when dropping selected control variables. When investment is excluded in column (2), the interaction of duration and polity now turns insignificant; hence the inclusion of investment is decisive for my results. Column (3) drops all variables with a simple correlation with POL or DUR of 0.3 or higher as reported in Table 3 to assess whether multicollinearity is a problem for the precision of the coefficient estimates. The standard errors of my variables of interest would then be expected to become smaller. Compared to column (1), the absolute value of the democracy related parameters is now lower, the largest change being the parameter on POLDUR, which falls by one third (from 0.374 to 0.259). The standard errors are only marginally smaller and hence, my parameters lose their significance. When adding initial GDP to the regression, in column (4), the original results are more or less fully restored. In column (5), I exclude variables that are not found to be robustly partially correlated with growth by either Sala-I-Martin et al. (2004) or Levine and Renelt (1992). The results are once more disappointing, even though the duration variables are jointly significant (p-value .003). Finally, in column (6), I exclude life expectancy and population growth which did not enter significantly in the benchmark model. The results do not seem to be affected by these two regressors.

4.3.2 Simultaneity bias?

The potential effect of growth on polity was discussed in section 3.4. To assess the endogeneity of the polity variable, instruments for a country’s democracy level are needed. I propose two instruments that I believe measure the political pressure on a country to adopt a specific polity. For these instruments be ”good”, they need to be relevant as well as valid. Relevance means that the instruments must have predictive power for the endogenous variables. For the instruments to be valid, they should not have a partial effect on growth, once democracy is controlled for (that is, they are correctly excluded from equation (3.1)). If the instruments are instead ”weak”, the instrumental variable estimator will be inconsistent and its bias will be the same as the OLS estimator.

My first instrument, SHDEM, is the share of countries defined as coherent democracies in a specific region during the preceding time period. The idea is that there is a correlation between a specific country’s democ-
racy level and the regional level of democracy in neighbouring countries, but that the regional level of democracy is uncorrelated with the growth rate in a specific country.\textsuperscript{38} The second instrument, \textit{POLDIST} is aimed at measuring a country’s ”polity distance” in its region and is constructed as the difference between a country’s polity level from the regional mean. While \textit{SHDEM} only measures how democratic is the region, \textit{POLDIST} instead measures how different is the country in relation to its neighbours. The more a country differs, the more pressure for a change in polity status is expected. In theory, the measure may go from \textit{POLDIST} = $-1$ for a full autocracy in an otherwise fully democratic region, to \textit{POLDIST} = 1 for the reverse case.\textsuperscript{39} However, both instruments may be correlated with the error term in equation (3.1) if, for example, likes trade with likes so that a short polity distance would imply higher regional trade and hence, growth. However, I have not found any better instruments.

The instruments are summarized in Table 10. The share of regional democracies varies from a low five-per cent (North Africa, Middle East, and Central Asia, 1971-1975 and 1981-1985) to .82 (South America 1991-1995). The polity distance goes from -.63 (Cuba 1991-1995) to .77 (Israel 1981-1985 and 1986-1990). The simple correlation with my instruments and growth seems promising. From the correlation matrix, the instruments are correlated with \textit{POL} (.61 and .70, respectively) though not with themselves (.09), thereby suggesting that both of them may be used. As our full set of excluded instruments I use \textit{SHDEM} and \textit{POLDIST}, as well as the two instruments interacted with \textit{DUR}. To test the endogeneity of the variables of interest, I performed a regression based Hausman test.\textsuperscript{40} Using my set of instruments, the F-test for the joint significance for the residuals is $F_{(3,582)} = 1.84$ (p-value:

\textsuperscript{38}Durham (1999) uses the contemporaneous version of this instrument. However, I believe lagged shares to be more likely to affect current polity levels than contemporary shares.

\textsuperscript{39}I used six different regions: Sub-Saharan Africa; North Africa, Middle East, and Central Asia; North America and the Caribbean; South America; Asia and Oceania; and Europe. In constructing the instruments, I use all countries available in the Polity IV data set, not only those in my sample. The number of countries used for each period is: 1961-1965: 121 (58 in sample); 1966-1970: 130 (73); 1971-1975: 139 (87); 1976-1980: 140 (90); 1981-1985: 138 (98); 1986-1990: 142 (105); 1991-1995: 160 (115); and for 1996-2000: 158 (128).

\textsuperscript{40}That is, I first ran my three first-stage regressions, \textit{POL}, \textit{POL}$^2$, and \textit{POLDUR} on the full set of regressors and the excluded instruments. Then, I included the residuals in the main equation and tested for their joint significance.
that is, from a mere statistical viewpoint, I fail to reject exogeneity of the polity variables. However, the p-value is not very high, and together with the fairly strong arguments for democracy to be endogenous, I choose to instrument for polity, notwithstanding the test result.

First-stage regression results are presented in Appendix Table A4. The excluded instruments are jointly significant in each first-stage regression, and the result from the overidentification test in Table 11 column (2) suggests that instruments are not correlated with the error term. Since my instruments are based on lags, column (1) in Table 11 redispers the original regression for the smaller sample of 732 observations. The results for the control variables are, in principle, unchanged between the two columns. However, the coefficient on \( POL \) and \( POL^2 \) (as well as their standard errors) almost triples in absolute value, and they are no longer significant. \( POLDUR \) retains its significance, however, and the coefficient value increases by around twenty per cent. In sum, while my instrumentation for the democracy variables casts doubt on the direct effect of democracy on growth, there still seems to be an effect via democratic consolidation.

Above, I only controlled for the potential endogeneity of democracy. Admittedly, many of the regressors in the benchmark model are potentially endogenous. As noted by Caselli et al. (1996, pp. 367-368), ”we wonder whether the very notion of exogenous variables is at all useful in a growth framework”. Moreover, if some of the variables at time \( t \) are correlated with shocks at some earlier point in time, then the fixed effects estimator is inconsistent. Since the growth equation includes the initial level of GDP, this lagged dependent variable is, by construction, correlated with the mean of the individual errors.

To address this problem, I now consider two panel data GMM estimators. First, the growth equation (3.1) is first differenced to eliminate the country-specific effects. Given that the errors are not second-order autocorrelated, the lagged levels of the regressors may be used as instruments. For endogenous regressors (i.e. correlated with earlier and contemporary shocks), two-period lags are valid instruments, and for predetermined variables (i.e. correlated with earlier but not contemporary shocks), one-period lags are valid instruments. Hence, for \( T \) periods, I get a system of \( T - 2 \) cross-country regressions where each equation has its individual instrument set.
This system thus handles both country-specific effects and the endogeneity of explanatory variables. This estimator is called the first-difference GMM panel data estimator (also known as the Arellano and Bond (1991) estimator where it was derived). This estimator was first introduced in a growth context by Caselli et al. (1996) in their analysis of conditional convergence in the augmented Solow growth model. Bond et al. (2001) argues that the first-difference estimator is likely to be inappropriate for growth models, especially if time series are persistent (since lagged levels are then weak instruments for the first differences). They instead suggest the use of the system GMM estimator as specified in Arellano and Bover (1995). In principle, the above difference specification is complemented with the original regression specified in levels, and lags of first differences of the predetermined and endogenous variables are used as instruments.

Column (3) of Table 11 reports the result using the first-difference estimator, and column (4) the system estimator when treating all explanatory variables as potentially endogenous. Since the sample size is now 502 observations (105 countries), the benchmark results for this smaller sample are included in column (5). In both specifications, the signs of the four variables of interest are the same as in previous specifications. In the difference specification in column (3), parameter values are very similar to those obtained in the benchmark model in Table 6, column (2). Standard errors are larger, however, so the interaction term is now only significant at the ten-per cent level. When instead using the system estimator in column (4), the interaction effect falls by half in absolute value, and the duration variables are no longer jointly significant. These results are, however, in line with those in the "original" specification in column (5), so it is not evident that the change is due to the estimator and not to the reduction in the sample size.⁴¹ In sum, it seems that we may have some confidence in the original results.

⁴¹The sizes as well as the change in the coefficient of log GDP are similar to those obtained in Bond et al. (2001), Table 2. The results presented in Table 6 are first-step estimates because two-step estimates have downward biased standard errors. However, when running a two-step estimation, and using the Windmeijer small sample correction, the interaction term is significant at the five-per cent level in both specifications. I also tried alternative specifications, treating some control variables as exogenous or predetermined, instead of endogenous. The results do not seem sensitive to such alterations, however.
4.3.3 Sample stability

In the discussions related to the results in Table 7 and 11, it was noted that reductions in sample size influence the estimated effect of the four variables of interest. In this section, I address three concerns about the sample stability: (i) Whether the results depend on differences in income levels; (ii) if outliers are responsible for the observed relation; and (iii) if some economic or geographic subgroup of the sample is driving the results.

An effect of income level? We have seen that the durational effect of a certain polity cannot be attributed to its exact definition, nor to some very old polities. What if the effect instead depends on differences in income levels? The process of consolidation might be considered as being more important as a precondition for starting a development process in poorer economies, alternatively that, by being richer, richer economies have more to gain from consolidation. Table 12 presents the results when running the base regression on different income segments. The last rows of the table report the sample means for democracy level and duration. As noted by Przeworski et al. (2000), richer countries tend to be more democratic on average, and they also tend to have longer standing regimes. While POL and POL$^2$ have the same signs as the original ones in every group but the richest, the coefficient estimates are never significant. Hence, the non linear effect of democracy is not supported for any single income group. In fact, the only ones of the variables of interest entering significant are the coefficients for DUR and POLDUR in the poorest income group. These results indicate that no income group alone seems to be responsible for the non linear effect of democracy. However, the duration effect may be more pronounced for poorer income levels, thereby suggesting that it might be relatively more important for economic growth to sustain democracy in low income countries.

Influential observations To identify outliers and assess whether their existence has an undue influence on parameter estimates, I used two tests, and re-ran the main regression without those observations found to be outliers. The results are presented in Table 13 together with the original results re-displayed in column (1). Column (2) presents the results when outliers are excluded, based on the DFITS test, choosing $2\sqrt{k/n}$ as the upper limit for inclusion in the regression (where $k$ is the number of parameters in the re-
gression and \( n \) the number of observations). 25 observations are excluded.\(^{42}\) In general, every coefficient is reduced in absolute size (except life expectancy and population growth). While the effect of \( POLDUR \) is reduced, it is still significant (at the ten-per cent level), and the duration variables are jointly significant. The catch-up time for a democracy is now expected to be 4.2 periods (cf. 4.7 in the benchmark).

Since the main variable of interest is the interaction between polity and duration, I then specifically focus on \( POLDUR \). Figure 4 presents a partial scatter plot of growth and \( POLDUR \). Applying the Hadi (1992) procedure for identifying outliers to the partial relationship of growth with \( POLDUR \), and using .05 as the cut-off significance value, led me to exclude three countries: Chad 1981-1985, Gabon 1971-1975, and Mauritania 1961-1965.\(^ {43}\) Since these are all observations on the north-east of the scatter plot, the coefficient should be expected to be affected. Column (3) presents the results with those observations excluded. While the original results hold, it now takes 5.7 periods for a full democracy to surpass a full autocracy. Column (4) instead uses DFBETAs to identify influential observations from \( POLDUR \).\(^ {44}\) 44 observations were excluded. The results are in favour of my hypothesis. The nonlinearity of democracy enters significantly, and the impact of democratic consolidation is assumed to have a large and significant impact on growth. The time it takes for a full democracy to reach an equal growth rate as a full autocracy is now 3.1 periods. In sum, I find no evidence for some influential observations to be driving the results on the importance of consolidation.

**Regional regressions** Another dimension where I test the sample stability is the role of regional effects. The concern would be that a well defined economic or geographic subgroup of the sample may feature such strong polity-duration relations that it alone drives the results. To control for the


\(^{43}\)Some recent papers using the Hadi procedure to identify outliers are Easterly et al. (2004), Clemens et al. (2004), and Roodman (2003).

\(^{44}\)\(|DFBET_A| > 2/\sqrt{n}\) was used as the critical value.
effect of developed countries, I interacted my variables of interest with a dummy for initial membership in OECD, OECD20 (i.e. the twenty countries signing the convention on 14 December 1960). Table 13 column (5) presents the results. Coefficient estimates on the polity and duration variables largely remain unchanged, and while the regional interactions on the duration variables ($DUR \times OECD20$ and $POLDUR \times OECD20$) have the same signs as the original results, they are not significant. Note, however, that the nonlinearity of $POL$ is suggested to be an inverse U-shape for the OECD countries (albeit not significant). Hence, my results mainly seem to come from non-OECD countries.

To assess the geographical influence, I interacted the four variables with six regions (Sub-Saharan Africa; North Africa, Middle East, and Central Asia; North America and the Caribbean; South America; Asia and Oceania; and Europe), hence 24 interaction effects. Only for Europe and Sub-Saharan Africa were the regional interactions jointly significant, so I only included those two. This regression is shown in Table 13, column (6). The inclusion of these two regions fully removes the significance of my four non-interacted variables of interest. While the nonlinearity of democracy is still present, it is no longer significant, and the interaction of democracy with duration, $POLDUR$, even changes sign. The regional interactions suggest that both regions exhibit the duration effect of democracy (even though the significance levels are lower for Europe). Hence, my original results do not seem to be supported for regions outside Europe and Sub-Saharan Africa.

5 Conclusion

This paper has analysed the relationship between different types of political systems, their consolidation, and growth. If people adapt to the institutions to which they are subordinated over time, and/or if interactions among people become more efficient (due to trust or information) as the system becomes more consolidated, then the longevity of regimes, both democracies and autocracies, should be of importance. This paper suggests that, from an empirical perspective, this is especially true for democracies. The results

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45In fact, eighteen countries in my regressions, since Iceland and Luxembourg are not in the sample. The results were similar, if I instead used OECD30 (today’s thirty member countries).
indicate that, over time, as regimes grow older, democratic regimes outperform autocracies. On the other hand, young democracies do not perform better than do young autocracies. Thus, democracies bear their fruits, but only after some time. These results may explain the ambiguous findings of the previous literature on growth and democracy.

In terms of policy advice, time is not a very neat policy tool. But to understand specific factors, I believe one must resort to episodical studies as suggested by Pritchett (2000). What is interesting here is that, at the aggregate level, the consolidation of polities seems to have a role to play in understanding growth. In particular, this suggests that temporary lapses from democracy in order to "set things right" may not be a good strategy for development. Instead, one should stick to democracy, and work for its consolidation. Does this also suggest that new democracies are bound to a slower initial growth, as compared to other types of polities? If the results are to be taken very literally, yes, but the problem is rather one of finding substitutes for time to overcome the initial problems, i.e. to speed up the process of consolidation.

In particular, this points at a role for international organizations, such as the World Bank, in supporting the functioning of the institutions in fledgeling democracies. For example, any new regime is likely to inherit a stock of sovereign debt. While much of this debt may be considered to be legitimate, some of it may not. If such "odious debt" is transferred to successors, this would effectively punish rather than help the new polity. Kremer and Jayachandran (2003) present a model where an international institution truthfully announces whether regimes are odious, so that a new regime may renege on such debt without any reputational loss. However, Kremer and Jayachandran (2003) report that successor governments typically do not re-pudiate debt, even when it is likely to have been incurred under illegitimate circumstances.

Likewise, legitimate debt may also lead to debt crises. Kraay and Nehru (2004) find the incidence of debt distress to be robustly related to the debt burden, shocks, and the quality of policies and institutions, as measured by the World Bank’s Country Policy and Institutional Assessment (CPIA) index. In a joint attempt at arriving at a coherent view when deciding on future lending as well as the level of grant financing, IMF and the World
Bank recommend the use of the CPIA as the primary measure of policy and institutional performance (IMF/IDA, 2004). The CPIA data are not publicly available but, for some years, countries’ performance in terms of quintiles of the CPIA is published. Appendix Table A5 lists the quintile score as well as the polity level for 2002 for 49 available countries. Of 14 countries defined as democracies in the Polity data, all but Guyana and Papua New Guinea belong to the top two quintiles. Of the seven autocracies, however, four belong to the bottom quintile (Uzbekistan, Laos, Zimbabwe, and Sudan), while three belong to the top performers (Bhutan, Vietnam, and Mauritania), so there is no apparent relation between policy and democracy level. If lending decisions are based on the CPIA, this implies that at least some autocracies may (legitimately) be allowed to accumulate debt. If autocracies perform worse over time, as is found in this paper, then these countries will face an increased debt burden, which will be transferred to successor democracies. While it seems important not to reward bad policies, it seems equally important not to punish new polities for old policies.

An interesting attempt at increasing the stability and credibility of institutions may be found in Chad. To manage the prospected revenue inflow from the petroleum project from 2004 onwards, the ”Oil Revenues Management Act” was adopted in December 1998. The act states that the vast majority of incomes shall be used in five priority areas, namely public health, education, infrastructure, rural development, and water resources. Moreover, disbursements shall, by law, be monitored by an oversight committee consisting of members from the government, NGOs, trade unions, the judiciary, and the parliament (IBRD/IDA, 1999). During 2003, oil production was started, one year ahead of schedule, with the first revenues appearing in the sequestered account at the end of the year. The project’s International Advisory Group states that 2004 will be a crucial test for the credibility of the Monitoring Group (IAG, 2004).

In sum, even if there exists an initial price to pay for democratization, it seems that the effect of being a democracy, as compared to existing alternatives, becomes positive in due time. If a poor country enters this piecemeal process of consolidation, there is certainly a role to play for aid donors, especially if democratization is the result of donor conditionality.

46 The data on CPIA are from IDA (2003).
References


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### Table 1: Summary Statistics, full sample

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a WDI: World Development Indicators online database; PWT: Penn World Tables, Mark 6.1; P4: Polity IV. Definitions described in Section 3.
Table 2: Tabulation of polity type and duration

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Balanced sample:

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Table 3: Correlation matrix, full sample

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Table 5: Within growth regressions, using Polity index

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Other cut-off levels for polity type-dummies:

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Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. AUTDUM and INCDUM are dummies indicating that a regime belongs in the [0,.25) or the [.25,75] interval of POL, respectively. All regressions include period dummies (not shown). BP(p) reports the p-value from the Breusch-Pagan test for random effects. Hausman(p) reports the p-value from the Hausman test of equality of coefficients in the random effects and fixed effects estimations. Joint(p) is the joint significance (p-value) for the democracy variables.
Table 6: Within growth regressions, using Polity index and duration

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Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include period dummies (not shown). Columns (3) and (6) use the log of duration, and the log of duration interacted with polity as opposed to the other regressions that are using duration unlogged. BP(p) reports the p-value from the Breusch-Pagan test for random effects. Hausman(p) reports the p-value from the Hausman test of equality of coefficients in the random effects and fixed effects estimations. Joint(p) is the joint significance (p-value) for the democracy variables. Jointdur(p) is the joint significance (p-value) for the duration variables.
Table 7: Within growth regressions, incorporating economic freedom and property rights protection.

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Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. Column (1) to column (3) include a measure of economic freedoms, and column (5) includes a subset of this variable, a measure of institutional quality. "Orig" in column (4) and (6) is the original specification but on the now smaller number of observations. All regressions include period dummies (not shown). Joint(p) is the joint significance (p-value) for the democracy variables. Jointdur(p) is the joint significance (p-value) for the duration variables.
Table 8: Changing the definition of a regime

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<td>0.025**</td>
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<td>(0.049)</td>
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<td>Jointdur(p)</td>
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<td>0.005</td>
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</table>

Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include a constant term and period dummies (not shown). Column (1) redisplays the original results, using duration based on the regime definition of the Polity index as [.0, .25], [.25, .75], and (.75, 1] for autocracies, incoherent regimes, and democracies, respectively. In column (2), duration is based on a more narrow definition of autocracies and democracies, letting “incoherent regime” span [.15, .85], while column (3) instead defines an incoherent regime narrowly as belonging to [.35, .65]. Column (4) removes all country-observations with a duration value higher than 8, and column (5) removes all country-observations with a duration value equal to one. Column (6) excludes DUR < 2 and DUR > 8.
Table 9: Within growth regressions, dropping selected control variables

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Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include period dummies (not shown). Joint(p) is the joint significance (p-value) for the democracy variables. Jointdur(p) is the joint significance (p-value) for the duration variables.
Table 10: Instruments for polity level (732 obs)

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Correlations

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Table 11: Within growth regressions, instrumenting for polity variables and GMM

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<td>(0.039)</td>
<td>(0.031)</td>
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First-stage regression results in Appendix Table A4.

Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. "Orig" in columns (1) and (5) is the original specification but on the now smaller number of observations. All regressions include period dummies (not shown). Joint(p) is the joint significance (p-value) for the democracy variables. Jointdur(p) is the joint significance (p-value) for the duration variables. Ovid(p) is the p-value from the Hansen J overidentification test, robust to unknown form of heteroscedasticity and autocorrelation. AR2(p) is the p-value for the test of second-order auto correlation.
## Table 12: Growth regressions, by income group

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Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include a constant term and period dummies (not shown). Column (1) redisplay the original results. Columns (2) to (5) present the same regression run on different income groups, ordered by quartiles. Joint(p) is the joint significance (p-value) for the democracy variables. Jointdur(p) is the joint significance (p-value) for the duration variables. Mean(dur) is the mean duration for the respective sample, and Mean(pol) gives the mean of the democracy level for each sample.
Table 13: Growth regressions, dropping outliers, and controlling for regions.

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<td>0.001</td>
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Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include a constant term and period dummies (not shown). Column (1) redisplays the original results. Column (2) excludes outliers using the DFITS test. Column (3) excludes outliers based on the Hadi procedure for the relation between growth and POLDUR, and column (4) uses DFBETA. Excluded observations are listed in section 4.3.3. Column (5) interacts a dummy for OECD20 (initial members of the organization) with the variables of interest, and column (6) interacts dummies for Europe and Sub-Saharan Africa. Joint(p) is the joint significance (p-value) for the democracy variables. Jointdur(p) is the joint significance (p-value) for the duration variables.

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Figures

Figure 1: Illustration: Growth and Polity for different duration.

Figure 2: Illustration: Growth and duration for different polity.
Figure 3: Illustration: Growth and log duration for different polity.

Figure 4: Partial scatter of growth and POLDUR.
### Appendix 1. Tables

Table A1: Country list

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<th>End Year</th>
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<th>No of changes</th>
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Table A2: Changes between classes (autocracies, incoherent polities, and democracies)

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*Note: Number of countries in parenthesis.*
Table A3: Growth regressions, using random effects

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<td>-0.197</td>
<td>(0.323)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.145</td>
<td>(0.399)</td>
<td></td>
</tr>
<tr>
<td>AUT[0,.15)</td>
<td>-0.086</td>
<td>(0.434)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.607</td>
<td>(0.531)</td>
<td></td>
</tr>
<tr>
<td>INC[.15,.85]</td>
<td>-0.359</td>
<td>(0.306)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.230</td>
<td>(0.404)</td>
<td></td>
</tr>
</tbody>
</table>

This table uses the same information as Table 5, but the regressions use the Random Effects estimator instead of the Fixed Effects estimator. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. AUT DUM and INC DUM are dummies indicating that a regime belongs in the [0,.25) or the [.25,75] interval of POL, respectively. All regressions include period dummies (not shown). BP(p) reports the p-value from the Breusch-Pagan test for random effects. Hausman(p) reports the p-value from the Hausman test of equality of coefficients in the random effects and fixed effects estimations. Joint(p) is the joint significance (p-value) for the democracy variables.
Table A4: First-stage results when instrumenting for polity variables

<table>
<thead>
<tr>
<th>Instrumented:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>POL</td>
<td>POL$^2$</td>
<td>POLDUR</td>
</tr>
<tr>
<td><strong>SHREG</strong></td>
<td>0.429***</td>
<td>0.655***</td>
<td>-0.974***</td>
</tr>
<tr>
<td></td>
<td>(0.130)</td>
<td>(0.149)</td>
<td>(0.272)</td>
</tr>
<tr>
<td><strong>SHREGDUR</strong></td>
<td>-0.003</td>
<td>-0.020**</td>
<td>0.698***</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.009)</td>
<td>(0.028)</td>
</tr>
<tr>
<td><strong>POLDISTREG</strong></td>
<td>0.384***</td>
<td>0.461***</td>
<td>-0.590***</td>
</tr>
<tr>
<td></td>
<td>(.045)</td>
<td>(.055)</td>
<td>(0.086)</td>
</tr>
<tr>
<td><strong>POLDISTREGDUR</strong></td>
<td>0.036***</td>
<td>0.016</td>
<td>0.955***</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.013)</td>
<td>(0.031)</td>
</tr>
<tr>
<td>Test, excluded IV</td>
<td>42.47***</td>
<td>35.38***</td>
<td>302.03***</td>
</tr>
<tr>
<td>Observations</td>
<td>732</td>
<td>732</td>
<td>732</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses (clustered by country). * significant at 10%; ** significant at 5%; *** significant at 1%. 'Test, excluded IV' reports the F-statistic of the hypothesis that the instruments jointly do not belong to the first-stage regression.
Table A5: Country list, CPIA-quintiles and Polity in 2002

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>CPIA</th>
<th>Polity</th>
<th>Country</th>
<th>Year</th>
<th>CPIA</th>
<th>Polity</th>
</tr>
</thead>
<tbody>
<tr>
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<td>5</td>
<td>-9</td>
<td>Djibouti</td>
<td>2002</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Bhutan</td>
<td>2002</td>
<td>1</td>
<td>-8</td>
<td>Tanzania</td>
<td>2002</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Laos</td>
<td>2002</td>
<td>5</td>
<td>-7</td>
<td>Comoros</td>
<td>2002</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2002</td>
<td>1</td>
<td>-7</td>
<td>Niger</td>
<td>2002</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>2002</td>
<td>5</td>
<td>-7</td>
<td>Nigeria</td>
<td>2002</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Mauritania</td>
<td>2002</td>
<td>1</td>
<td>-6</td>
<td>Armenia</td>
<td>2002</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Gambia</td>
<td>2002</td>
<td>4</td>
<td>-5</td>
<td>Georgia</td>
<td>2002</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2002</td>
<td>2</td>
<td>-5</td>
<td>Guinea-Bissau</td>
<td>2002</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Cameroon</td>
<td>2002</td>
<td>4</td>
<td>-4</td>
<td>Sierra Leone</td>
<td>2002</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Congo, Rep.</td>
<td>2002</td>
<td>4</td>
<td>-4</td>
<td>Bangladesh</td>
<td>2002</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Nepal</td>
<td>2002</td>
<td>2</td>
<td>-4</td>
<td>Benin</td>
<td>2002</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Rwanda</td>
<td>2002</td>
<td>2</td>
<td>-4</td>
<td>Ghana</td>
<td>2002</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Uganda</td>
<td>2002</td>
<td>1</td>
<td>-4</td>
<td>Guyana</td>
<td>2002</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Angola</td>
<td>2002</td>
<td>5</td>
<td>-3</td>
<td>Mali</td>
<td>2002</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Chad</td>
<td>2002</td>
<td>4</td>
<td>-2</td>
<td>Sri Lanka</td>
<td>2002</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Haiti</td>
<td>2002</td>
<td>5</td>
<td>-2</td>
<td>Albania</td>
<td>2002</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Togo</td>
<td>2002</td>
<td>5</td>
<td>-2</td>
<td>Honduras</td>
<td>2002</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Guinea</td>
<td>2002</td>
<td>4</td>
<td>-1</td>
<td>Indonesia</td>
<td>2002</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>2002</td>
<td>5</td>
<td>-1</td>
<td>Nicaragua</td>
<td>2002</td>
<td>2</td>
<td>8</td>
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<tr>
<td>Burkina Faso</td>
<td>2002</td>
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<td>0</td>
<td>Senegal</td>
<td>2002</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Burundi</td>
<td>2002</td>
<td>4</td>
<td>0</td>
<td>Bolivia</td>
<td>2002</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Congo, Dem. Rep.</td>
<td>2002</td>
<td>5</td>
<td>0</td>
<td>India</td>
<td>2002</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Zambia</td>
<td>2002</td>
<td>2</td>
<td>1</td>
<td>Papua N. G.</td>
<td>2002</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Cambodia</td>
<td>2002</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2

In order to fix ideas, consider the following illustration of the mechanisms described in Section 2.3. Make the assumption that a change in the political system has two effects; one direct effect (a shock), and one long-run effect from consolidation (both dependent on the type of system implemented):

**Mechanism 1:** The adoption of a new system has a direct effect on contemporary growth. This shock may have a different effect on growth for different types of polity. It could introduce uncertainty about the viability and the working of the new regime, but it could also carry with it a "confidence boom", as well as a direct positive effect as a result of coercive power. Moreover, this effect is transitional as people adapt to the new set of rules in the economy. Denote the shock $\beta_j$ where $j$ indexes the type of the new regime.

**Mechanism 2:** The underlying stability of the regime, i.e. the long-run steady state rate of consolidation in the economy, may depend on the type of polity. Denote this underlying growth enhancing potential $z_j$.

These two effects may be captured in a "consolidation production function", $S_{jd} = H(z_j, \beta_j, d)$, where $S_{jd}$ denotes the level of consolidation for a country with regime type $j$ in place for $d$ periods. $z_j$ is the long-run rate of consolidation for polity type $j$, and $\beta$ is the size of the shock induced by the change of system. As a specific example, let the consolidation function be:

$$S_{jd} = d^{\beta_j}e^{z_jd}. \quad (5.1)$$

The rate of consolidation, or the "system transmission function" is then given by:

$$\frac{\dot{S}}{S} \equiv \gamma_{S_{jd}} = \beta_j d^{-1} + z_j, \quad (5.2)$$

hence in the limit as $d \to \infty$, $\gamma_{S_j} = z_j$.

Now, consider two types of polity, $j \in (A, B)$. Suppose that a shift to $A$ entails a positive shock on growth (a "confidence boom", "trust of force", or simply forced labour accumulation), so that $\beta_A > 0$. However, as people adapt to the new regime, there is less social cohesion, increased distrust in the system, and growth promoting actions from the regime are less viable; hence
the underlying potential is non-positive, $z_A \leq 0$. On the contrary, suppose a shift to $B$ to be associated with a negative shock, $\beta_B < 0$ (say that a new autocracy is not believed to prevail, or that the start of a participatory process with many political groups/parties forming and pushing forward their agendas leads to increased uncertainty, so that the "trust of promise" is low). However, as polity $B$ lives on, the deliberative process of democracy increases the belief in the viability of the system, leading to more economic space to maneuver and solid social cohesion, or the autocracy may be proven "better" than first believed, so that $z_B \geq 0$. An illustration of the rate of consolidation is provided in Figure A1. This effect of consolidation may be incorporated in a Solow-Swan growth model à la exogenous labour augmenting technology. In steady state, the effect of consolidation on growth is then equal to $z_j$.

Figure A1: Rate of consolidation for two different regimes.