Democracy, regime duration, and growth

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Findings of regularities in statistical relationships between regime type and economic growth are debatable, because specifications are variable. We argue that the effect of regime type on growth is contingent on the duration of the regime. Further, the effect of duration depends on regime type: older autocracies grow at a different rate than older democracies. The reason is that the causes for decelerating growth are fundamentally different in democracies and autocracies. Our estimations are run on a large (unbalanced) annual panel of 155 countries from 1950 – 2006. In this sample, autocracies grew around 0.75 percentage points more slowly than non-autocracies, holding constant the regime-specific effect of regime duration. Autocratic growth rises for the first 30 years, after which growth rates fall rapidly. Non-autocracies always grow faster than equally old autocracies, but the differences are especially pronounced when young and old regimes are compared. Some implications of this result for the political system of Brazil are discussed.

Keywords: economic development, autocracy

DOI: https://doi.org/10.21874/rsp.v72.ia.5696 ISSN: 0034-9240 | E-ISSN: 2357-8017
Submitted: May 27, 2021. Accepted: June 10, 2021.
[Original version]

Democracia, duração do regime, e crescimento

Os achados de regularidades nas relações estatísticas entre o tipo de regime e o crescimento econômico são discutíveis, porque as especificações são variáveis. Argumentamos que o efeito do tipo de regime sobre o crescimento depende da duração do regime. Além disso, o efeito da duração depende do tipo de regime: as autocracias mais antigas crescem a uma taxa diferente das democracias mais antigas. A razão é que as causas da desaceleração do crescimento são fundamentalmente diferentes nas democracias e autocracias. Nossas estimativas são feitas com um painel anual (desbalanceado) de 155 países de 1950 a 2006. Nesta amostra, as autocracias cresceram cerca de 0,75 pontos percentuais mais lentamente do que as não-autocracias, mantendo constante o efeito específico do regime da duração do regime. O crescimento nas autocracias aumenta nos primeiros 30 anos, após os quais as taxas de crescimento caem rapidamente. As não-autocracias sempre crescem mais rápido do que as autocracias igualmente antigas, mas as diferenças são especialmente pronunciadas quando os regimes jovens e velhos são comparados. Algumas implicações desse resultado para o sistema político do Brasil são discutidas.

Palavras-chave: desenvolvimento econômico, autocracia

Democracia, duración del régimen, y recimiento

Los hallazgos de regularidades en las relaciones estadísticas entre el tipo de régimen y el crecimiento económico son discutibles, porque las especificaciones son variables. Argumentamos que el efecto del tipo de régimen sobre el crecimiento depende de la duración del régimen. Además, el efecto de la duración depende del tipo de régimen: las autocracias más antiguas crecen a un ritmo diferente al de las democracias más antiguas. La razón es que las causas de la desaceleración del crecimiento son fundamentalmente diferentes en las democracias y las autocracias. Nuestras estimaciones se ejecutan en un panel anual grande (no equilibrado) de 155 países entre 1950 y 2006. En esta muestra, las autocracias crecieron alrededor de 0,75 puntos porcentuales más lentamente que las no autocracias, manteniendo constante el efecto específico del régimen de la duración del régimen. El crecimiento autocrático aumenta durante los primeros 30 años, después de lo cual las tasas de crecimiento caen rápidamente. Las no autocracias siempre crecen más rápido que las autocracias igualmente antiguas, pero las diferencias son especialmente pronunciadas cuando regímenes jóvenes y viejos son comparados. Se discuten algunas implicaciones de este resultado para el sistema político de Brasil.

Palabras clave: desarrollo económico, autocracia

Introduction

> During the past two decades economic policy in Brazil has been the final product of a game of unstable rules when even constitutional rules—supposedly the most durable set of institutions in a representative democracy—have been changing with high frequency and variable range…The fact is that Brazilian political leaders do not seem to understand that the credibility of public choices demands respect for the constitution. The temptation to change constitutional rules so frequently is especially salient in election years, and also as a component of a solution to some political scandal. (Monteiro, 2009).

One of the key insights Jorge Monteiro took from Public Choice was the importance of rules, and the consistency of rules. As he demonstrated in the paper quoted from above, the set of commitments to rule of law that allow nations to flourish depend on "respect for the constitution." But often developing nations, particularly those with immature or hastily constructed constitutions, face a dilemma: democratic processes can be frustratingly slow, and reforms in response to problems of corruption or economic collapse can be disjointed. It is tempting, especially in a crisis, to resort to extraordinary "emergency" measures to hasten the response.

But a state of constant emergency and changes of the constitution driven by central leadership make credible commitments—to property rights, to sustained attention to lower taxes and reduced regulatory burden, or even just to reduced meddling in labor markets for political gain—harder to sustain. As North and Weingast (1989) showed, the ability to make credible commitments and to prevent constant change is paradoxically one of the hallmarks of the ability to adapt to changing circumstance.

This raises one of the key questions in development economics: Do democracies grow at different rates than autocracies? The empirical evidence is mixed. Perhaps because it is an article of faith for Western elites and media that democracy is better, many scholars have labored to show that democracies grow faster. In fact, the United Nations International Covenant on Civil and Political Rights[1] claims that democracy

1 There are three key articles regarding democracy, Articles 21, 22, and 25. Articles 21 and 22 guarantee "freedom of peaceful assembly." Article 25 asserts "Every citizen shall have the right and the opportunity…without unreasonable restrictions: 1. To take part in the conduct of public affairs, directly or through freely chosen representatives; 2. To vote

is a fundamental human right. But is it plausible for a developing nation in desperate economic straits to write down "transition to democracy" first on its "to-do" list, not because democracy is a right but because democracy causes greater growth?

Anecdotal evidence can be (and is!) marshaled in support of either position. Fast-growing Singapore is a dictatorship, but then so is medieval North Korea. Democracy advocates might point to Estonia or South Korea, but gloss over Costa Rica, France, or Venezuela.[2] Statistical analysis is inconclusive and confusing enough that some important scholars (e.g., Brunetti, 1997; Przeworski, *et al*, 2000; Ross, 2006) have concluded that growth is largely unaffected by regime type. More recent surveys (Doucouliagos and Ulubaşoğlu, 2008; Gwartney and Lawson, 2003; Rodrik, 2000) have concluded that there is no clear relationship between regime type and growth, and that the most that can be said about democracy is that it is a "meta-institution" standing in for a suite of policies that actually cause growth.

Siegle, et al. (2004) argue that democracies are more responsive, and are much more able to deliver the benefits of aid to their citizens, where autocracies simply steal the aid for elites. Rodrik (2004) attributes the positive difference he sees as being the result of good governance and the ability of democracies to commit. For Rodrik in particular, little matters except institutions. Ross (2006), on the other hand, doubts both of these conclusions, since a focus on actual outcomes (in this case, health outcomes) allows not measurable distinction between democracies and autocracies.

In this paper we argue that the lack of convergence in empirical estimates is more a product of different specifications and theoretical approaches than of genuine contradictions in the data. The goal of this paper is to select a general, but parsimonious, specification that allows for several kinds of variation other scholars[3] have argued might be important. This will allow us to capture the possibility that the answer to the

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and to be elected at genuine periodic elections which shall be by universal and equal suffrage and shall be held by secret ballot, guaranteeing the free expression of the will of the electors; 3. To have access, on general terms of equality, to public service in his country." The United Nations International Covenant on Civil and Political Rights, 1976. http://www.hrweb.org/legal/cpr.html

2 While France was a post war miracle economy, per capita income relative to the US peaked there at 80% at the beginning of the 1980s and fell to 66% by 2000 according to the Penn World Tables. Venezuela fell from 44% of US income per capita in 1957 to 20.3% in 2000 and was classified as a democracy for every year from 1958-2000. Another example of an under-performing democracy is Costa Rica whose relative income peaked at 28% of the US in 1960 and fell to 16.5% by 2000.

3 See, for example, Olson (1992)

question, "what form of government is better for growth?" is contingent. There are two possibilities that any statistical treatment must take into account.

- The relation between any government type and growth depends on the duration, or age, of the regime. Organized interests create permanent diversions of resources, and limit the capacity of the economy and the political system to respond to shocks.
- The relation between regime duration and growth is itself mediated by regime type. That is, institutional sclerosis operates very differently in democracies compared to autocracies. The formation and influence of interest groups have very different dynamic properties.

But this means that accounting for duration, contingent on regime type, is crucial to any realistic prospect of obtaining accurate measures of the effect of regime type on growth. Further, two different growth trajectories as functions of duration have to be calculated: one for democracies, and the other for autocracies.

Building on this theoretical foundation, our estimates depend on two other claims about empirical specification. First, using an index measure of democracy as if it were a continuous linear regressor to explain growth obscures the (possibly complicated) true relationships between regime type and economic performance. Consequently, in this paper we transform the democracy index into a dichotomous dependent variable. To those who might object that we are throwing away useful variance to be explained, we would respond that the variance is an artifact of the measure, not of the phenomenon being measured, so that using the index creates far more problems than it solves.

Second, pervasive sample selection problems have plagued previous work. The variability in results is not surprising, because no reliable inference about growth can be drawn in the face of such selection problems. The desire of previous authors to use variables whose importance was implied by complex theories is understandable, of course. But the cost in terms of bias and reliable on such a non-randomly selected sample was much too high. The expanded sample used here means that we cannot use complete sets of values of conditioning variables. But this loss is more than compensated for by including a much greater range of variation in the variables of key interest. Reliable estimates of the key theoretical relationships between government type and growth are better than biased estimates incorporating complex mediating effects. The parsimony of

our model may or not be an advantage, of course, depending on one's view of statistical modeling.[4] But the fact that we are able to include more cases, with more statistically independent variation in growth and regime type, is unambiguously a benefit.

To summarize: We analyze the growth patterns of 155 countries, using an unbalanced annual panel over the period 1951 – 2006. The main question is whether growth is contingent on dictatorship, and if so how. Dictatorship and democracy are defined using a single dummy variable, which takes the value "1" for autocracies. In our sample, then, Brazil is classified as a "democracy" for the periods 1951-1964, and since the "New Republic" period of 1985; it was an autocracy during the period of the military dictatorship, 1964-1985.

Using this design, we find that dictatorships pay a significant penalty in terms of growth: on average non-democracies grow approximately 0.75 percentage points per year more slowly, holding regime duration constant. We also show that regime length has a significant impact on growth that is both non-linear and regime type specific. These results buttress (with some caveats) the policy prescription that new nations seeking growth should adopt democratic institutions as soon as possible.

The paper is organized as follows. Section I reviews the theoretical and empirical literature. Section II describes our modeling strategy and data, while section III presents our basic results and some robustness tests. Section IV discusses how our results relate to the literature and section V concludes.

I. The existing literature

The empirical literature on regime type and economic performance is enormous and equivocal. Brunetti (1997) concludes, "Considering the evidence of this survey, it can be safely stated that there is no clear relationship between democracy, at least as measured in these studies, and economic growth." Other reviews (see, e.g., Aron 2000) highlight dozens of papers, but some of the most important for our purposes can be summarized briefly.

Levine & Renelt (1992), Barro (1996), Przeworski *et al.* (2000), Tavares & Wacziarg (2001) all conclude that democracy is either unrelated to growth, or has a mild

4 That is, the parsimony of our model is a necessity, but it might also be a virtue. One claim on the side of "virtue" is Achen, 2005.

to moderate negative effect. Gerring, Bond, Barndt, & Moreno (hereafter GBBM, 2005) and Persson & Tabellini (hereafter PT, 2009) both argue that the "stock" democratic institutions matter more than small changes, and that either democracies or autocracies at risk of transition grow more slowly.

The survey, or "meta-analysis," by Doucouliagos and Ulubaşoğlu (2008) suggests that there are important of categories of literature that help organize existing theories and evidence. The three main categories they suggest are (1) conflict (democracy hampers growth); (2) compatibility (democracy either directly causes growth, or doesn't hinder it); and (3) skepticism (the democracy-autocracy classification is nearly irrelevant to growth. We will consider each of these briefly.

Conflict: Democracies allow, and perhaps even promote, conflict (Huntington, 1968; Kurzmann, et al., 2002). Political institutions are both weak, in the sense of being unable to resolve conflicts, and fragile, in the sense of being unable to make commitments even about their own survival. Short term bias, because of elections, means that profitable social investments will be foregone in favor of popular demands. Demands for redistribution will prove irresistible, and competition for greater levels of redistribution or other favorable treatment will engender unrestricted rent-seeking competitions. As a result interest groups will organize to "invest" in non-productive but potentially highly profitable activities to influence government and attract subsidies and protection from competition. In this view, autocracy is necessary, but certainly not sufficient, to achieve growth. Autocratic governments can restrict the scope of conflict, cut off rent-seeking, and pursue medium to long-run social investment goals.

The problems with this approach, as have been pointed out by many authors, include the fact that the relation between a strong state and authoritarian state is at best weak (de Haan and Siermann, 1995a). More generally, the problems with a pure conflict approach as a theory of the relation between democracy and growth are many, and most the of the theoretical claims are questionable (for a review, see Sirowy and Inkeles, 1990). That is not to deny the problems that democracies face, particularly when they are young. Instead, the difficulty is that autocracies can be expected to face many of the same problems, or worse, so that the theoretical claims about institutional differences are not dispositive.

Compatibility: Those who have argued that democracy is compatible with, or even aids,

growth have noted that rule of law can play the role of the autocrat, except that rule of law may actually be sufficient to ensure growth. The variety of compatibility arguments is wide (for a sampling, see Nelson, 1987, North 1990, Olson 1993, Bhagwati,1995, and Nelson and Singh 1998), but rule of law generally lies at the center of the argument. By rule of law scholars have meant a variety of things, but the core elements are protections of both political and economic rights, an independent judiciary, and a professional and honest system of police enforcement. In fact, the weakness of democracy compared to autocracy, in terms of centralized control, has been argued to be a benefit in at least three ways.

First, it is more difficult for democratic leaders to confiscate assets, precisely because in a democracy there are means for property owners to defend themselves. At least two scholars, Olson (1993) and Bhagwati (1995) note that this effect is likely to depend on duration, though Olson thought the problem worse for new dictatorships and Bhagwati for older dictatorships. Second, democracies can borrow at cheaper rates—even from lenders in their home countries—because confiscation and reneging on commitments will result in loss of power for the ruling elite. Thus democracies are able to attract loans and repay them more easily. Finally, democratic states may have significant powers of regulation and control of corruption without necessarily being authoritarian.

Skepticism: The difficulty, as several authors (most famously Rodrik, 2000, and Gwartney and Lawson, 2003) have pointed out, is that the key institutional comparison may not be autocratic v. democratic at all. To be fair, the same point had also been made, though generally more equivocally, a decade earlier (Alesina and Perotti, 1994; Bhagwati, 1995; Barro, 1996; Kaufmann, et al., 1999; Kaufmann and Kraay, 2003; Knack and Keefer, 1995). Instead, the key may be the extent to which there is a reliably independent judiciary and a police force that rejects corruption. If policies that allow citizens, industry, and organized interests to solve collective action problems through reliable and cheaply enforced agreements are in place, than either democracy or autocracy can produce steady growth. And without these kinds of policies, neither system can produce growth. Thus, the problem is not a choice of institutional form, a problem that could be solved simply by adopting a new constitution, but an entirely separate set of equilibria and political culture, with no obvious path for moving from one to another. Successful institutions, in what Doucouliagos and Ulubaşoğlu call the "skeptical view," must exhibit

the following traits:

- Controlled corruption, with professional norms that actually make corruption shameful.
- Allow citizens to obtain licenses, permits, and to specify and enforce contracts, all low transactions costs.
- Make available an infrastructure that allows the recognition of, and adjustment to, changing market and technological conditions.

The argument of the "skeptics" is that the choice of institutions with three of these features is the key to growth. Consequently, the autocracy / democracy dichotomy is very nearly an empty comparison. Autocracies or democracies with these features will likely have rapid and sustained growth; autocracies or democracies that lack one or more of these features, or even just cannot credibly commit to maintaining these features over time, will have slow growth or stagnation.

Some of these theories would divorce the problem of growth from the selection of political institutions entirely, claiming that economic freedoms alone are sufficient to explain growth. In large measure this claim requires only that investors are assured that they can capture the fruits of their efforts through contracts, that their accumulated wealth will not be confiscated, and that the disputes that inevitably arise in complex market transactions will be resolved by legal arguments rather than bribes and rent-seeking contests. In the "economic freedom only" view, democracy might be associated with such institutions, but there is no necessary reason to expect that it will be.

These observations have merit empirically. The examples of Singapore, Hong Kong, and Taiwan illustrate that political freedoms are not necessary for growth, and the examples of Argentina and Italy illustrate that democracy is surely not sufficient for growth. But our object is to investigate the central tendency of institutional choices, over time and across as many nations as we can gather data for. If the suite of policies that is alleged to cause growth (rule of law, government accountability, bureaucratic efficiency, stability, absence of corruption, and regulatory policies driven by expertise rather than rent-seeking) are more likely in democratic systems than in autocratic systems, then the original distinction still has explanatory merit.

Rodrik (2000), in particular, argued forcefully that democracy is the form of governance that gives this suite of "growth policies" a stable equilibrium character, so that

democracy is the "meta-institution" that creates and sustains the entire suite of policies consistent with growth, rather than arbitrarily choosing some parts of the suite, as an autocracy might. Put simply, if this claim is correct, the statistical results of a properly specified set of regressions will identify democracy as the key differentiating feature, because though other systems might select "correct" policies their ability to commit to such policies over extended periods is limited.

Democratic policies are more predictable, and stable, because regime change is effected through elections that leave the essential constitutional and legal framework of the nation unchanged. Democracies are less likely to go to war, particularly against other democracies, and democracies are better able to respond to severe external shocks without collapsing into chaos or desperate policy measures to sustain the regime.

Finally, and no less important, a number of scholars have argued that there is a variety of indirect channels of growth and investment promotion that democracy stands in for, in a regression analysis. These channels include increased investment in human capital, guarantees of levels of income distribution that will forestall revolution or riots, and economic freedom. Democracy is not just "majority rule with organized party systems," in this view, but rather a meta-institution that encourages individual achievement and investment.

Consequently, it is our claim that both the regime type, and the duration of the regime within a type, are important causal variables in determining the growth path of different systems. Of course, if we are to sustain this claim we must offer a persuasive explanation for the empirical (near) consensus that democracy either has no measurable effect on, or else actually retards, growth rates unless democracy is measured as a cumulative process.

There are three separate difficulties with previous work. Each of these could affect, and distort, the size, direction, and significance of findings on the relation between regime type, regime duration, and growth path. Taken together, an analysis that can offer improvements in all three categories should provide new insights into the central empirical question: does democracy cause growth, or retard growth? Here are the three problems.

1. A more comprehensive sample is required to capture a range of variation sufficient to make valid inference. In particular, if many of the "worst" autocracies have been excluded from previous samples, and those nations have had relatively low growth, the

"democracy retards growth" thesis may simply be an artifact of sample selection.

2. The use of the Freedom House index (or the Polity IV measure, or any normalization or other variant of such indices) as a linear regressor requires that the measure is scaled in cardinally constant increments, even if the specification itself is non-linear. However, there is no reason to believe that the difference between (for example) a -8 and a -6 on the scale is the same as the difference between a 1 and a 3. Our claim is simpler, and easier to test. Autocracies and democracies are different in a fundamental way.

3. In addition to considering regime type, it is also necessary to evaluate the duration or persistence of the regime. A dictator in his sixth year of power is different from a dictator in his first year. We do not consider the explicit processes that cause or explain these differences, but we demonstrate their empirical significance. Any analysis that ignores these effects will produce biased and inconsistent results. While the democratic capital papers cited above do something like this for democracies, they either ignore autocratic persistence or force it to be the inverse of democratic persistence.

II. Modeling strategy and data

The cornerstone of our approach is allowing for regime specific duration effects on growth as described above. However, we also believe that it is important to address the other issues (measurement of autocracy/democracy, sample size, structural vs. reduced form modeling) we noted in the introduction.

In that regard, rather than use a qualitative index of regime type as a linear regressor as much of this literature does, we split the sample into autocracies and non-autocracies and report a sensitivity analysis on the splitting criterion.[5] It would be surprising if the intervals between points on a democracy scale had similar meanings, regardless of where on the scale the starting point was. Our claim is that inconstancy of interval meanings is a likely culprit as an explanation for the wide variability in findings that try to use the indices in this way.

5 While Przeworski *et al.* also use a 0 / 1 classification, using a multiple category index as a linear regressor is otherwise the standard practice in the empirical literature. An interesting examination of some of the issues can be found in Gleditsch and Ward (1997), who question whether the components of the underlying autocracy and democracy scores actually measure what they purport to in the first place.

We also have worked to achieve the largest sample size possible. We are using a dataset built on work originally done by Angus Maddison that contains a wider array of non-democratic country-years than does the usual source (the Penn World Tables) used in the literature. Of course this increase in coverage comes at the price of not having many conditioning variables in the regressions, but we consider this potential bug to actually be a feature in our analysis.

In effect, there are two basic modeling options: (a) specify and test a set of structural equations that capture the underlying channels by which effects are transmitted across sectors. (b) Specify a parsimonious reduced form model that controls for the key relationships between growth and institutions. Our sample size puts us into camp (b) by default, but we argue here that (b) is also the best approach on the merits, at least for this problem. There are three reasons. First, structural modeling greatly reduces the sample size and eliminates many cases that may be quite relevant (repressive and secretive dictatorships, for example). The most comprehensive structural investigation is that of Tavares & Wacziarg (2001) which can only study 65 countries once all the data requirements are met. Second, there is no agreed-upon, fully-specified theory of all the channels by which regime type can influence growth. If we specify the structure incorrectly, we will almost certainly miss the effect even if it is there. [6] Third, just as we have seen an argument that regime duration may affect growth differently for democracies and autocracies, it is likely that many other channels whereby regime type can affect growth vary by country group or other conditioning variables. In other words, even if we knew in theory all the structural channels, finding the correct functional form would remain a formidable challenge. Our strategy is to treat the specific structural channels through which regimes might affect growth as a black box, and instead look directly at the regime – growth relationship in a reduced form model.[7]

The data come from the Growth & Development Center at the University of

6 Clearly, our claim echoes Friedman (1953), who favored simple reduced form models over structural models in cases where the correct structure is not known or agreed upon: "Complete 'realism' is clearly unattainable, and the question whether a theory is realistic 'enough' can be settled only by seeing whether it yields predictions that are good enough for the purpose in hand or that are better than predictions from alternative theories."

7 This is not as strange as it may seem. Growth theory tells us that in the short run, growth can come from changes in the rate of accumulation of inputs, and in the long run from technological progress and a country's ability to use such progress. Any policy variables in growth regressions really must be seen as factors that influence input accumulation, technology progress or the ability to utilize new technology.

Groningen.[8] The income data are adjusted for inflation and deviations from PPP much in the same manner as the Penn World Tables data. The regime data come from the Polity IV database that is widely used in political science. We use the 0 – 10 autocracy ranking from Polity IV to form our regime type variable, coding as dictatorships any country years with an autocracy ranking of 5 or above which captures about 45% of the observations in the sample.[9] We use the Polity IV "durable" variable as our measure of regime length. This variable gives the age in years of the current regime.

The Polity database does not code an autocracy number during regime transition periods but rather codes the variable as -66, -77, or -88 depending on the type of transition. In this study, we simply drop these transition years from our analysis, leaving us with 6538 country-years in our regressions (around 210 country years are dropped as transitional). While there is economic data for many countries before their date of independence, there is no Polity data and we thus exclude these nations from the analysis. We also exclude countries that do not have more than 10 years of coverage. All other nations are included, giving us a larger and more diverse sample than has been used in most previous work. The Appendix lists the specific countries included in our sample.[10]

We include fixed annual effects to allow for common shocks over time. We do not include country specific fixed effects, for the simple reason that including them would not allow the experiences of countries whose regime type is unchanged over the sample to influence the variable of interest. In other words, employing country specific fixed effects would force the dictatorship coefficient to be determined only by within group variation in the sample (countries whose status shifts at least once during the sample period) and there are a lot of countries in our sample whose regime type is constant throughout the period.[11] Since we believe that differences in average performance between the USA and North Korea (as well as between France and China) are relevant for determining the effect of regime type on growth, we do not use country fixed effects in our preferred

8 We will provide our exact data upon request.'

9 We consider alternative definitions in our robustness section below.

10 Note that our sample includes both divided Germanies before the fall of the wall and United Germany afterward. We treat the former USSR, Yugoslavia, and Czechoslovakia in the same way. As discussed in footnote 20, dropping all the countries from Eastern Europe from the sample actually strengthens our results.

11 There are other issues in using fixed effects, particularly their effect on the estimates of the standard errors of the variables of interest, that can be severe, as Pritchett (2000) illustrates.

specifications. However, we will show that two of our three main results are robust to the inclusion of country fixed effects.

III. Results

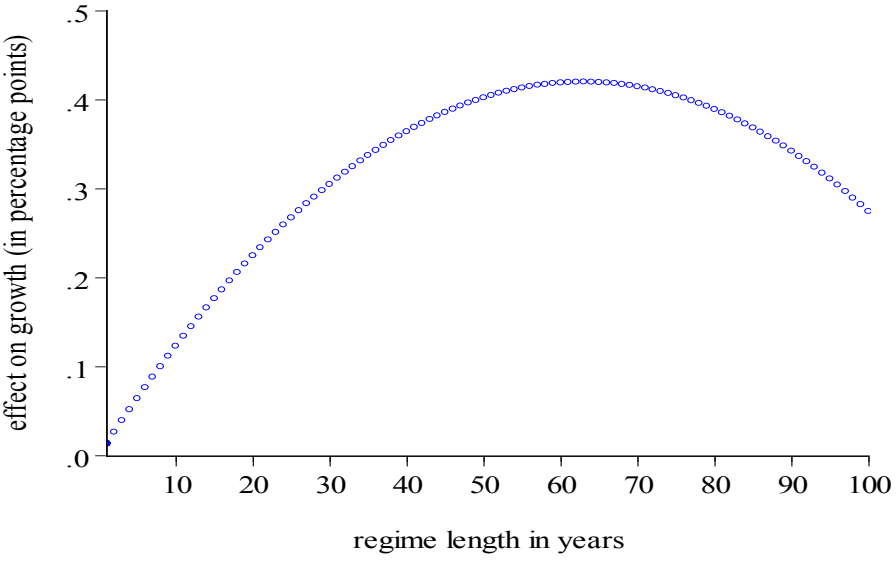
A. Basic Findings

We begin in equation 1 of Table 1 with the simplest possible test. We regress per capita growth on a constant, a set of time dummies, and our dictatorship dummy, finding that dictatorships grow significantly slower (by almost 1/2 of a percentage point) than non-dictatorships (allowing for common temporal shocks). Equation 2 adds lagged growth to the model, which improves the fit but does not change the result.

Equation 3 adds the regime length variable (called durable), and its square. All variables are significant at the 0.01 level and regime durability first raises, but then lowers growth. Dictatorship lowers growth by almost four tenths of a percentage point. We present a picture of the estimated relationship between durability and growth in Figure 1.[12] Initially, regime survival provides an increasing growth dividend that rises quickly over the first 40 years. Then after 70 years or so, regime survival begins to slow down growth.

12 GBBM report that the polity IV durability variable is insignificant in their tests, but they do not consider any possible non-linear effects of regime durability.

Figure 1 – The Rise and Decline of Nations?



Source: authors.

So far, we have shown that with a more comprehensive data set than has been used previously, dictatorships grow significantly slower than non-dictatorships. Further, we find that regime duration has a significant, but non-linear effect on growth. However, we argued above that the effect of regime length on growth may well be regime-type dependent. We investigate this possibility in equation 4 of Table 1.

There are two aspects to the claim, each of which has received some attention in the literature. First, some authors (famously, Siegle, *et al.*, 2004) have claimed that growth rates are higher for "young" democracies than for otherwise similarly situated autocracies. To the extent that the intercepts in our estimates can be interpreted as the growth rates for low duration regimes, this claim appears to be borne out for our results. In every estimate, regardless of specification, the initial growth rate for a zero-duration democracy is higher than for a zero-duration autocracy.

Further, the other predictions of the theory section are by and large borne out as well. All variables in Table 1 are significant at the 0.01 level. Most importantly for the purposes of this paper, we see that the effect of regime length on growth is indeed dependent on the type of regime. Allowing for this interdependence almost doubles the coefficient on the dictatorship dummy from .38 to .76 indicating that holding constant the effects of durability, dictatorships grow about three quarters of a percentage point

slower than non-dictatorships in per-capita terms. Figure 2 shows the two different estimated regime length – growth relationships that we uncover. These functions are significantly different from each other at the 0.01 level. Here we can see that, from a growth perspective, non-dictatorship dominates dictatorship. Dictatorship starts with almost a one percentage point disadvantage, almost catches up within 30 years but then falls further and further behind beyond that point. These results represent the first clear achievement of a long sought after goal, namely a convincing empirical case for the growth benefits of non-dictatorship.

Table 1 - Regime Type, Regime Length, and Economic Growth in 155 Countries, 1950 - 2006

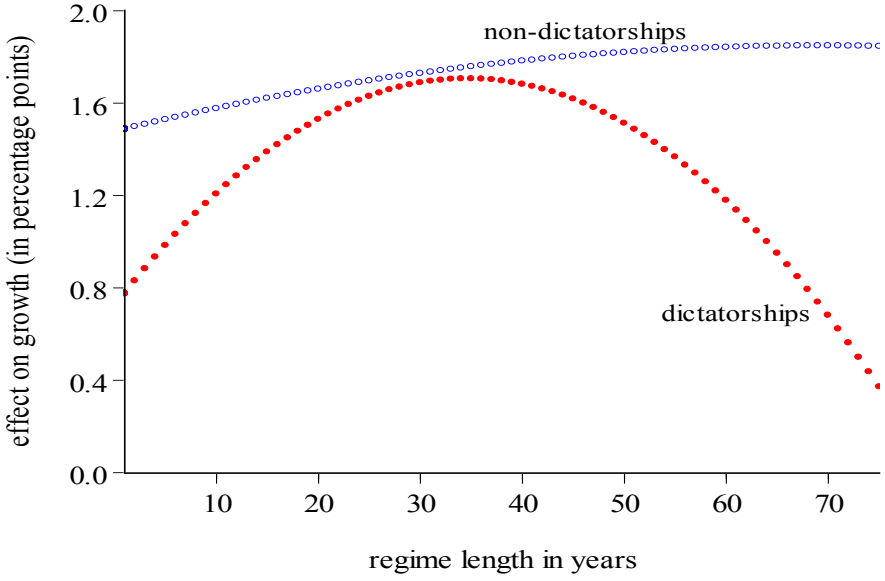
Variable	Eq1	Eq2	Eq3	Eq4	Eq5
Intercept	2.087	1.60	1.45	1.46	1.31
	(27.3)	(19.9)	(11.9)	(12.2)	(9.43)
$Growth_{-1}$	---	0.267	0.265	0.262	0.259
		(14.3)	(14.5)	(13.9)	(13.8)
Dictator	-0.452	-0.359	-0.387	-0.756	-0.838
	(2.98)	(2.52)	(2.48)	(3.14)	(2.92)
Durable	---	---	0.013	0.011	0.035
			(2.63)	(2.49)	(3.73)
$Durable^2$	---	---	-0.00011	-0.00007	-0.00054
			(3.27)	(2.80)	(3.74)
$Durable^3$	---	---	---	---	0.000002
					(3.50)
Durable*	---	---	---	0.0461	0.072
Dictator				(2.84)	(1.99)
(Durable*	---	---	---	-0.00074	-0.002
$Dictator)^2$				(3.61)	(1.76)
(Durable*	---	---	---	-0.00074	0.000011
$Dictator)^3$				(3.61)	(1.47)
$\bar{R}^2$	0.066	0.131	0.134	0.136	0.138

Source: authors.
Dictator is a dummy variable indicating that a country's Polity IV autocracy score is >=5.
Durable is the age of the current regime in years from Polity IV.
Time dummies are also estimated but not reported.
Numbers in parentheses are the absolute values of t-statistics computed using PCSEs.
N=6538 in all regressions.

As Figure 2 reveals, Olson's claims are really only borne out for dictatorships. In dictatorships, stability brings a quickly rising growth premium over the first 20 years. Then the effect flattens out, and after 35 years further stability begins to reduce growth. In the non-dictatorship case, the effect of regime durability on growth rises quite slowly, but for almost an indefinite period of time, with the peak occurring at around 100 years of life. We see little evidence of institutional sclerosis in these data. It is worthwhile to note that there are many observations (over 900 country / years) in the sample

with dictatorships older than 30 years, so the downward portion of that curve is both estimated with some statistical power and is substantively relevant.

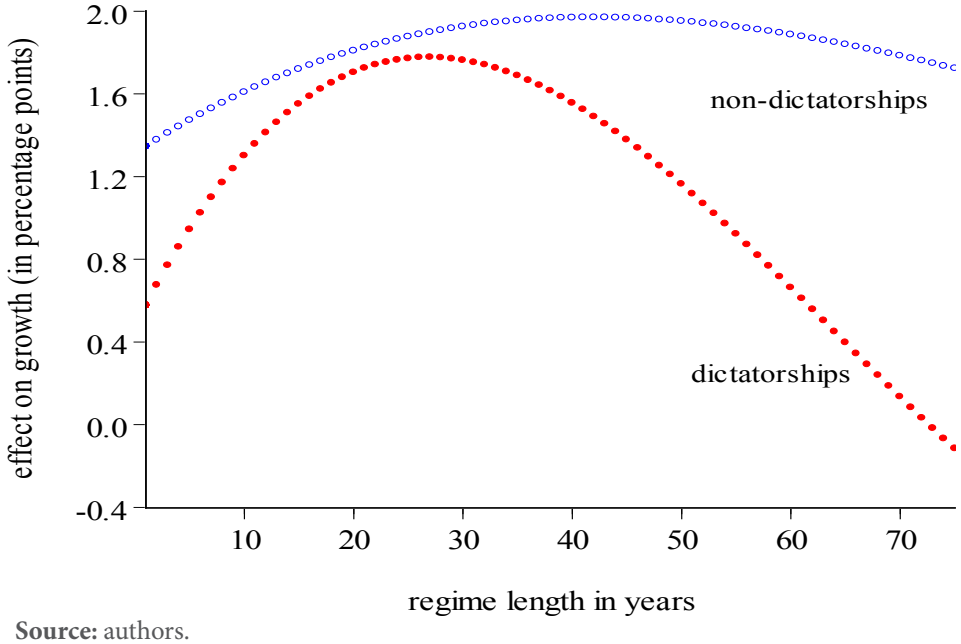
Figure 2 – The Combined Growth Effects of Regime Type and Regime Durability



Source: authors.

Of course our choice of a second order polynomial to model the potential nonlinearity in the effect of duration on growth is traditional, but arbitrary. In equation 5 of Table 2, we relax this restriction by employing a third order polynomial. This functional form is associated with an even larger negative coefficient on the dictator dummy, and the cubic terms are jointly significant at the 0.01 level. Figure 3 presents the graph of our key findings using this third order polynomial specification. The results are fairly similar to those shown in Figure 2. However, the growth duration curve for dictatorships peaks sooner than in the quadratic specification and the gap between the two functions is generally larger in Figure 3 than in Figure 2. Increasing the order of the polynomial further does not produce any additional significant coefficients (at least increasing to a 4^{th} or 5^{th} order model), nor does it change the general shape of the functions or the message of this section.

Figure 3 – The combined Growth Effects of Regime Type and Regime Durability using a 3rd Degree Polynomial



Source: authors.

Table 2. Regime Type, Regime Length, and Economic Growth in 155 Countries, 1900 - 2006

Variable	Eq1	Eq2	Eq3	Eq4	Eq5
Intercept	2.044	1.67	1.59	1.64	1.56
	(26.8)	21.1)	(13.5)	(13.5)	(11.1)
$Growth_{-1}$	---	0.213	0.212	0.209	0.208
		(14.1)	(14.0)	(13.9)	(13.8)
Dictator	-0.406	-0.362	-0.379	-0.787	-0.937
	(2.81)	(2.61)	(2.67)	(3.40)	(3.43)
Durable	---	---	0.008	0.004	0.015
			(1.48)	(0.71)	(1.37)
$Durable^2$	---	---	-0.00007	-0.00003	-0.0002
			(1.74)	(0.81)	(1.33)
$Durable^3$	---	---	---	---	0.0000009
					(1.16)
Durable*	---	---	---	0.0491	0.087
Dictator				(3.07)	(2.53)
(Durable*	---	---	---	-0.0007	-0.002
$Dictator)^2$				(3.77)	(2.09)
(Durable*	---	---	---	---	0.00001
$Dictator)^3$					(1.59)
$\bar{R}^2$	0.085	0.129	0.129	0.131	0.132

Source: authors.
Dictator is a dummy variable indicating that a country's Polity IV autocracy score is >=5.
Durable is the age of the current regime in years from Polity IV.
Time dummies are also estimated but not reported.
Numbers in parentheses are the absolute values of t-statistics computed using PCSEs.

B. Starting in 1900

Given the strength of the above results, we push the beginning of our sample backward in time to investigate whether that would change our results. PT (2009) provide a precedent for so doing. Table 2 thus repeats the sequence of regressions in Table 1 on the expanded 1900 – 2006 sample of 8059 observations. As can be seen, two of our three main results are robust to this expansion. First, the Dictator dummy is always negative and significant, with a coefficient that approaches -1.0 in equation 5. Second, regime length in dictatorships has a significant nonlinear relationship with growth. However, we no longer find any significant effects of regime length on growth in non-dictatorships.

C. Country Fixed Effects

In this sub-section we investigate what effect adding country fixed effects has on our results. Again, this addition changes what information is used to determine the coefficients on our variables of interest. In panel A of Table 3, we add country fixed effects to the model and sample given in equation 5 of Table 1. As can be seen, two of our three main results are robust to the inclusion of these fixed effects. The Dictator dummy is still negative and significant (though smaller in absolute value) and regime length in dictatorships is still significantly and non-linearly related to growth. However, we no longer observe any significant effects of regime lengths on growth in non-dictatorships.

Panel B of Table 3 repeats this experiment for the expanded 1900-2006 sample and finds essentially the same results. In both cases, the set of country fixed effects are statistically significant as a group, but they do not dramatically increase the explanatory power of the regressions. In the remaining analysis in the paper, we will return to excluding these country fixed effects from the estimated models.

Table 3. Adding Country Fixed Effects

A: 1951 – 2006, N=6538

$$Growth_{it} = \underset{(9.71)}{1.58} - \underset{(0.90)}{0.0126*Durable_{it}} + \underset{(0.44)}{0.00009*(Durable_{it})^2} - \underset{(0.20)}{0.0000002*(Durable_{it})3}$$

$$+ \underset{(3.76)}{0.1551*(Durable_{it}*DICTATOR_{it})} - \underset{(3.21)}{0.00410*(Durable_{it}*DICTATOR_{it})^2}$$

$$+ \underset{(2.86)}{0.00003*(Durable_{it}*DICTATOR_{it})^3} - \underset{(2.27)}{0.708*DICTATOR_{it}} + \underset{(10.2)}{0.200*Growth_{it-1}}$$

$\bar{R}^2 = 0.167$

B: 1900 – 2006, N=8059

$$Growth_{it} = \underset{(11.2)}{1.73} - \underset{(1.51)}{0.0193*Durable_{it}} + \underset{(1.24)}{0.00026*(Durable_{it})^2} - \underset{(1.01)}{0.00001*(Durable_{it})3}$$

$$+ \underset{(4.39)}{0.1631*(Durable_{it}*DICTATOR_{it})} - \underset{(4.13)}{0.00450*(Durable_{it}*DICTATOR_{it})^2}$$

$$+ \underset{(3.74)}{0.00003*(Durable_{it}*DICTATOR_{it})^3} - \underset{(2.77)}{0.790*DICTATOR_{it}} + \underset{(10.5)}{0.162*Growth_{it-1}}$$

$\bar{R}^2 = 0.155$

Source: authors.
Dictator is a dummy variable indicating that a country's Polity IV autocracy score is >=5.
Durable is the age of the current regime in years from Polity IV.
Country and Time fixed effects are also estimated but not reported.
Numbers in parentheses are the absolute values of t-statistics computed using PCSEs.

D. Changing the Definition of Dictatorship

So far, we have defined a country year as belonging to a dictatorship if that country's autocracy score in that year was greater than or equal to 5. In this section we investigate whether our result are robust to tightening or loosening that definition.

In panel A of Table 4, we loosen the criterion for being a dictatorship to having an autocracy score of 4 or above and find that all three of our results are robust to this change in definition. Dictatorships grow significantly slower and regime length has a significant non-linear relationship with growth that is distinctly different between the two regime types. In panel B, we tighten the dictatorship criterion to having an autocracy score of 6 or above and observe exactly the same pattern of results that obtained in equation 4 of

Table 1 (that used the 5 or above cutoff) and in Panel A of this table. In sum, our results are quite robust to changing the definition of what constitutes a dictatorship, at least in the neighborhood of our preferred definition.

Table 4 – Using Alternative Measures of Regime Type

A: Dictator = 1 if Autocracy >= 4
$Growth_{it}$ = 1.44 + 0.0114*$Durable_{it}$ - 0.00008* ($Durable_{it}$)^2 (11.5) (2.43) (2.71) + 0.0421*(Durable*DICTATOR) - 0.00070*(Durable*DICTATOR)^2 (2.71) (3.57) – 0.599*$DICTATOR_{it}$ + 0.262*$Growth_{it-1}$ (2.61) (13.9) R2 = 0.137
B. Dictator = 1 if Autocracy >= 6
$Growth_{it}$ = 1.473 + 0.0133*$Durable_{it}$ - 0.00010* ($Durable_{it}$)^2 (12.8) (2.89) (3.18) + 0.0381*(Durable*DICTATOR) - 0.00071*(Durable*DICTATOR)^2 (2.34) (3.20) – 0.753*$DICTATOR_{it}$ + 0.262*$Growth_{it-1}$ (2.99) (13.9) R2 = 0.137

Source: authors.
Dictator is a dummy variable defined as indicated in each sub-heading.
Durable is the age of the current regime in years from Polity IV.
Time dummies are also estimated but not reported.
Numbers in parentheses are the absolute values of t-statistics computed using PCSEs.
N=6538 in all regressions.

E. A Country-by-Country Jackknife

Here we further consider how dependent the results are on the exact sample employed by performing a country-by-country jackknife on the data.[13] That is, we re-

13 That is, rather than excluding a single observation, we exclude all observations for each nation, one at a time.

estimate the model in equation 5 of Table 1 154 times; each time with a different country excluded from the regression. We then consider the properties of the 154 separate coefficients we estimate for each variable in the model. This information is contained in Table 5 and is notable mainly for the tremendous degree of coefficient stability shown. In no case does excluding a country cause a coefficient sign change and for all 9 variables, the distribution of their coefficients is very tightly packed around the means. For example, the average estimated value of the dictator dummy is -.84 with a minimum of -.96, a maximum of -.71 and a standard deviation of 0.03. These results show that our findings are not very sensitive to the exact sample employed.[14]

Table 5 – Jack-knife coefficient distributions

Variable	Mean	Std. Dev.	Minimum	Maximum
Intercept	1.309077	0.017400	1.262579	1.353323
$Growth_{-1}$	0.259826	0.003390	0.248692	0.284348
Dictator	-0.837363	0.030810	-0.963375	-0.708311
Durable	0.035000	0.001036	0.032496	0.040752
$Durable^2$	-0.000542	0.000018	-0.000691	-0.000508
$Durable^3$	0.000002	0.000000	0.000002	0.000003
(Dictator* Durable)	0.071575	0.003748	0.044826	0.081419
$(Dictator* Durable)^2$	-0.001971	0.000119	-0.002371	-0.001022
$(Dictator* Durable)^3$	0.000011	0.000001	0.000004	0.000015

Source: authors.
Each coefficient was estimated 154 times using data for N-1 of the countries in the sample and the resulting summary statistics are reported above. Period fixed effects were also estimated in each individual regression.

Rather than testing for influential observations, then, we are testing for influential nations in the sample. 14 As another robustness test we drop the Eastern European countries from our sample, due to expressed concerns of data quality coming from the USSR and its satellites during the Communist era. In this treatment, the coefficient on Dictator is -1.03 (and significant at the 0.01 level) and both sets of polynomials on duration are jointly significant at the 0.05 level or better. Thus, beyond no single nation driving our results, this group of nations is not driving them either.

F. Shouldn't There be Three Groups of Countries?

In what we have presented so far, we have been comparing dictatorships to non-dictatorships. This assumes that there are no relevant differences between strong democracies and "near" dictatorships. In this subsection, we investigate this issue.

Here we split our sample into democracies, dictatorships and intermediate regimes. Rather than using the autocracy score to define dictatorships and the democracy score to define democracies (which in theory could produce double counting), we use a country's Polity2 score (the sum of their democracy and autocracy scores) to split the sample. Democracies are those with a Polity2 score of 5 or higher, dictatorships are those with Polity2 scores of -5 or lower and intermediate regimes have scores in between -5 and 5.

The first thing we noticed doing this split is that intermediate regimes are fairly rare. Out of our sample of 6538 observations, there are only about 900 observations in the intermediate category. And, of these 900, almost all of them occur in regimes with less than 20 years of longevity. The number of observations for intermediate regimes with durations of longer than 20 years is 84, and these observations come from only 4 countries: Honduras, Malaysia, Singapore, and South Africa.

Given this paucity of data, we decided to simply drop intermediate regimes from the data and compare democracies with autocracies, rather than trying to estimate a non-linear relationship between regime age and growth that would be determined largely by only 4 countries. Thus, Table 6 presents our results comparing democracies and dictatorships on a sample of 5634 observations (i.e. with the 904 country years labeled as intermediate excluded from the sample). Again, our three main results continue to obtain, but now can be given a different interpretation. The coefficient on the Dictator dummy is negative and significant and indicates that, holding constant regime length effects, lagged growth, and global shocks, dictatorships grow almost 1 full percentage point slower in per capita terms than do democracies. The findings of significant but distinct non-linear relations between regime length and growth are also obtained in this subsample, which directly compares democracies and dictatorships.

Table 6: Comparing Democracies and Autocracies 1950-2006 (intermediate regimes excluded)

$$Growth_{it} = \underset{(8.84)}{1.46} + \underset{(2.51)}{0.0256*Durable_{it}} - \underset{(2.61)}{0.00040*(Durable_{it})^2} + \underset{(2.43)}{.0000014*(Durable_{it})3}$$

$$+ \underset{(2.24)}{0.0826*(Durable_{it}*DICTATOR_{it})} - \underset{(1.93)}{0.00220*(Durable_{it}*DICTATOR_{it})^2}$$

$$+ \underset{(1.62)}{0.00001*(Durable_{it}*DICTATOR_{it})^3} - \underset{(3.00)}{0.930*DICTATOR_{it}} + \underset{(11.1)}{0.237*Growth_{it-1}}$$

Source: authors.
The sample includes all country years where the -5>= Polity2 score or Polity2 score >= 5.
Dictator = 1 if Polity2 score is <= -5.
Durable is the age of the current regime in years from Polity IV.
Time dummies are also estimated but not reported.
Numbers in parentheses are the absolute values of t-statistics computed using PCSEs.
$\bar{R}^2 = 0.126$, N=5634.

IV. Discussion

In this paper, we have shown strong evidence that, holding constant the effect of regime duration, dictatorships face a large growth penalty. We have also shown that regime duration has a significant non-linear effect on growth that is distinct between dictatorships and non-dictatorships. Our findings on effects of regime type are clearly relevant for the traditional democracy and growth literature: we show a reduced form result that implies regime type matters.

Our results also have implications for the stock of democracy papers by GBBM and PT. Those papers calculate a stock of accumulated experience with democracy and use it to explain growth. Consider the case of GBBM. They add up a country's annual polity2 score year by year and apply a 1% depreciation rate. This approach implicitly defines experience with autocracy as an inverse experience with democracy, which our less constrained approach shows is clearly not the case. In fact, we find that with a regime type dummy in place, the effect of accumulated experience with dictatorship has a more robust (and positive) impact on growth than does accumulated experience with democracy.

V. Conclusion

The significant relation between political regimes and economic performance has proven hard to uncover. No one doubts that there are important effects, but almost no one agrees on how to gauge the differences, or even to model the pathways through which such different effects might be transmitted.

In this paper, we have investigated the relationship among regime type, regime duration and growth rate. The innovation of this paper is three-fold:

(a) We used a larger sample, with more variability in the measures of interest, than in most previous studies. This has the cost of limiting the number of control variables available, but gives us a simple reduced form way to ask how much regime type affects growth, though we are necessarily silent on the exact ways in which this effect occurs.

(b) We abandoned the use of any kind of democracy/autocracy index as a single dependent variable. It is quite plausible theoretically to build a model on the claim that autocracies and democracies are simply qualitatively different, rather than points near the respective extremes of a single theoretical construct. A further advantage of this approach is that it does assume that an ordinal index can be used as if it had the properties of a ratio scale.

(c) Our focus on regime type is nuanced and conditioned on regime persistence, or duration. That is, even though all autocracies are different from all democracies, it is not true that all autocracies are alike. The key difference in the ability of an autocratic regime to make commitments may well depend on the expectation citizens have that the regime will survive.

Using data from 155 countries, over the period 1951 – 2006, we estimate a reduced form model that allows the effect of duration to be both non-additive and non-linear, and find that this functional form produces estimates consistent with two important claims. First, in sharp contrast to existing work, we find that democracies clearly and persistently enjoy a growth premium.

Second, we find that new dictatorships pay a steep penalty in growth, but close much of the gap over time. However, these gains are subsequently eroded as the regime

ages.

The simple model estimated here is intended only as a preliminary estimate; a challenge to the prevailing wisdom on the insignificance, or actual damage, of democratic institutions to economic growth and a spur to consider regime duration as an additional important institutional variable. With the reduced form result established, future work can focus gathering additional data to specify more clearly the exact channels by which institutions affect growth, and how the pattern of growth over time promotes institutional change.

Finally, our results have particular resonance for the current political struggles of Brazil. The temptation for a show of strength, and a resort to authoritarian means to solve problems rapidly, is shown by our results to be a trap. The ability to make a credible, constitutional commitment to a set of tax and regulatory policies that can be relied, and the guarantee of property rights against nationalization, is a key aspect of development. Brazil faces a wide variety of problems of economics, inflation, and the environment. But we echo the concern of Monteiro (2007), who recognized that for all its problems only constitutional democracy, with constraints on majorities but with control of centralized authoritarian power, can solve the problem:

> The complexity of government involvement in the economy and society requires an understanding of the institutional environment in which public choices are formed. These choices are not limited to the autonomous decision of politicians and their agents. There is an interaction with the citizen, who, in turn, can act individually, as a voter, and in formal groups, articulating preferential interests. (Monteiro, 2007).

Democracy is inconvenient, and frustrating. But the solutions that emerge constitutionally are the best hope for the continued development and prosperity of Brazil.

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