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Democracy and Policy Stability

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Abstract

The strong negative link between democracy and output volatility documented by Rodrik (2000) and others stands in sharp contrast to the lack of consensus on the democracy-growth relationship. To explain stable growth performance in democracies we characterize political systems in terms of the distribution of political power across groups, and show that in a world where the qualities of available policy alternatives are uncertain, greater democracy (i.e. decentralization of decision-making authority) leads to more stable policy choices. We design an empirical test of this mechanism by creating measures of the inter-temporal variability in fiscal and trade policies for a panel dataset of 92 countries. In an array of specifications (cross-sectional and panel OLS, fixed effects, random effects, instrumental variables), under 5 different measures of democracy and using sharp episodes of democratizations in a difference in difference, we show that policy choices are significantly more stable over time in democracies. This mechanism explains a large part of the negative link between democracy and output volatility.

1. Introduction

An enduring debate in political economy concerns the relative economic merits of different forms of political organization. With the liberalization of formerly planned economies, it is tempting to conclude that the issue has been resolved in favor of democracy and laissez-faire. However, "miraculous" growth rates in East Asia through decades of careful government planning, contrasted with the faltering economic performance of many democracies makes such a conclusion seem premature. The empirical literature on the democracy-growth relationship has also failed to uncover a clear answer - studies find frail positive, negative or no association, as well as evidence of nonlinearities (Brunetti 1997).[1] In the absence of a definitive answer, Amartya Sen circumvents the democracy-growth question by arguing that political rights is intrinsically good and irrespective of its impact on economic performance, is a desirable outcome. While Sen's argument is sound, it reflects the profession's unease with the lack of consensus on the democracy-development link, and it has led the New York Times to question whether economists need to be this "apologetic" about democracy.[2] Independent of its intrinsically desirable qualities, it is important to determine whether democracy can be defended on economic grounds alone.

Examining democracy's impact on the second moment properties of growth rates has proved to be a more promising approach towards understanding the economic implications of political organization. This emerging literature finds that democracies

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[1] Others have questioned the robustness of any observed statistical relationship between democracy and growth. See De Haan and Siermann (1995, 1998) and Levine and Renelt (1992). In their review article, Przeworski and Limongi (1993) conclude that social scientists seem to know surprisingly little about the democracy-growth question – that there is no conclusive evidence either in favor of or against democracy.
[2] New York Times, *Economic Scene*, April 13, 2000

exhibit lower growth volatility (Rodrik 2000, Quinn and Woolley 2001, Almeida and Ferreira 2002, Nooruddin 2003, Mobarak 2005, Yang 2007, Chatterjee and Shukayev 2006), and that democracies have a moderating effect on the growth process (Rodrik 1999, Jerzmanowski 2006, Armijo and Gervasoni 2006). This apparently robust link between democracy and stability, which has been verified by several independent authors and papers, stands in sharp contrast to the lack of consensus on the democracy-average growth relationship.

While this observed empirical correlation between democracy and volatility is very strong (see figure 6), the theoretical counterpart to this literature to explain the mechanisms underlying the negative correlation is less well developed. To explain the link, some empirical papers either make informal arguments about voters' innate risk aversion (Quinn and Woolley 2001) or constraints on an executive's ability to change policy autonomously (Nooruddin 2003), while others cite theoretical papers on democracy as a conflict management tool (Rodrik 1999), or the variability in performance arising from human fallibility in the leader's decision-making ability (Sah and Stiglitz 1991) as motivation for running the democracy-volatility regression. However, the negative link between democracy and volatility is at best a reduced form secondary outcome of these proposed theoretical mechanisms, and is therefore not a direct test of any mechanism. Various authors citing these alternative mechanisms all run virtually the same regression (the standard deviation of growth rates as a function of some democracy index such as the POLITY score), which prevents us from distinguishing between the variety of mechanisms. This renders the link between the theory and the regression tenuous at best.

This paper proposes a simple theoretical link between the nature of political systems and the stability of policies chosen by the system (which in turn may affect growth volatility), and then designs an empirical test of that particular mechanism by creating measures of the variability of fiscal and trade policies employed by countries. The theory section investigates policy choices in a world where the quality of available policy alternatives is uncertain. It demonstrates that the variance of the quality of chosen policies is decreasing in the extent of dispersion of decision-making authority. When an autocrat unilaterally choosing policies is replaced by a committee of policy-makers who vote over available alternatives, the larger number signals used in the latter decision process allows the committee to choose good policies with greater precision and regularity. Our logic is related to the Tsebelis (1995, 1999) veto players theory to explain countries' abilities to enact policy changes and produce significant laws, but our model delivers the policy stability result under more general conditions even without having to assume the existence of politicians with veto power over changes to the status quo. The formal results we derive conforms to Amartya Sen's intuition, who notes that although China has consistently surpassed India in terms of average food production and output growth, India, unlike China, has not suffered from any major famines since 1949 (Sen 1983 and Sen and Dreze 1989). They stress the role of democratic institutions and the media - institutions that are lacking China - in mobilizing a swift response to the threat of famines in India.[3] In the China-India comparison, and as predicted by our theory, democracy appears to guard against extreme outcomes even when its average

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[3] Besley and Burgess (2002) provide supporting evidence of a positive impact of greater political competition on famine and drought relief expenditures across a panel of Indian states.

performance is sub-par.[4] The triumph of democracy and recent democratization trends may therefore have less to do with high growth rates – the focus of the current literature – than with the fact that the democratic form of government is a safer alternative where abrupt changes in policies are less likely.

The measures of fiscal and trade policy volatility we construct are based on the notion that changes in economic policy unrelated to economic conditions is the "discretionary" component of policy that fluctuates along with the policy-maker's preferences. Following Fatas and Mihov (2003) and Dutt and Mitra (forthcoming), we isolate movements in government consumption and in trade volumes in each country that are not due to their respective systematic economic determinants (i.e. macroeconomic conditions, oil prices, trading costs etc.), and then use the inter-temporal variance in the unexplained components.

The regression results indicate that the discretionary components of fiscal and trade policies are significantly more stable over time in democracies.[5] A unit increase in a country's polity score is associated with about a 3-5% decrease in the volatility of its fiscal and trade policies. The results are qualitatively robust to using any one of five different measures of democracy, and hold up in both cross-sectional samples and panel (country-year) samples, where we can include either country fixed effects or random effects. We address endogeneity concerns (e.g. democracy and policy volatility both

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[4] A vivid example of our theoretical construct of democratic decision-making that guards against unilateral decisions made by individuals with extreme viewpoints is the case of Mao Tse Tung and sparrows in China. Mao decreed that all sparrows in China should be killed since they ate grain, which then upset ecological balance and other pests once killed by sparrows began to attack crops. The subsequent famine is thought to have lasted four years and claimed millions of lives. One wonders whether other failed Mao experiments, such as smelting pots and pans to make steel in every home would have passed muster under more democratic decision-making where other reasonable voices and ideas carried some weight.

correlated with some omitted variable, or that volatility encourages democratization) by instrumenting for democracy using the mortality rates faced by European settlers in former colonies (Acemoglu, Johnson and Robinson 2001), and using countries with Muslim majority populations (Mobarak 2005). Variations in democracy only attributable to variations across countries' colonial and religious histories also have a strong negative effect on fiscal policies. Our results are generally stronger for fiscal policies because the instruments are weaker and within-country variation less informative statistically for trade policies. Under high standards for statistical evidence, the empirical link between democracy and trade policy stability can be considered tentative. Finally, we define major episodes of democratization in the sample, and show using a difference-in-difference estimator (with a control group of countries that never democratized), that periods of democratization are followed by diminished policy volatility. In summary, since inference with cross-country data has some well-known identification problems, we try to follow the best practice in econometric estimation under these data limitations to cover all bases, and the consistency of this negative effect of democracy on policy volatility across samples, across definitions of democracy, and across the nature of variation in the data used to identify the effect, is quite striking. The uncertainties with empirical identification using cross-country data notwithstanding, there does appear to be something to the theoretical proposition that having a larger number of decision-makers makes policy choices more stable. Our regression results also show that this mechanism can explain up to two-thirds of the negative correlation between democracy and output volatility that a number of other researchers have noticed.

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[5] The regression results are most closely related to Treisman (2000), Franzese (2002), and Henisz (2004), who find that government deficits, inflation, and several categories of government expenditure and

We focus on stability as an alternative development indicator because it is an important macroeconomic goal. "Development" definitionally requires *steady* growth (Betancourt 1996). Lack of volatility in growth, along with growth itself are manifestations of the development process, as evidenced by the comparatively more volatile growth rates observed in less developed countries (Pritchett 2000). The costs of volatility are disproportionately borne by the poor, and the welfare costs of consumption volatility are large in poor countries (Pallage and Robe, 2003). Stability enhances growth (Ramey and Ramey 1995) and is therefore a crucial means to economic success even if it is not deemed a worthy end.

2. Modeling Democracy

Democracy is difficult to model, since political systems are comprised of many economically relevant dimensions. A popular approach assumes the median voter is the crucial decision-maker in democracies, whereas in autocracies the rich elite have greater control over policy choices and outcomes (e.g. Acemoglu and Robinson 2001, Benabou 1996, Wacziarg 2001, Bourguignon and Verdier 2000). This approach generally treats the world of political organization as binary, and the discrete move from autocracy to democracy in these models is associated with a profound change in the rules of the policy-making game. In reality, the extent of democracy and associated variations in decision-making authority is much more continuous. Differences between countries are not adequately characterized in terms of the presence or absence of elections in which the role of a median voter becomes crucial. Elections in many developing countries have

revenues are more stable when policy-makers are more constrained by independent veto players,

been used to legitimize military dictatorships long after power was seized in a non-democratic manner.[6] Even when elections are fairly conducted, they do not necessarily equate the balance of power between competing political groups, as in Singapore.

Our model adopts a minimalist notion of democracy. We characterize political systems solely in terms of the distribution of authority across policy-makers. Democracy is defined as an even distribution of policy-making authority, whereas the degree of concentration of authority in the hands of one group (or few groups) measures the extent of autocracy. "Authority" is manifested in a group's ability to set policies unilaterally (or with minimum approval from others). The more continuous variation in concentration of authority accords better with extant empirical measures of democracy than do binary notions of political structure.

The definition of democracy adopted here is partly inspired by the classic political science literature that formalizes this concept. The liberal strand of this literature - whose roots lie in the works of Hobbes, Locke and Mill – interprets politics as conflict and compromise between different interests (Laakso 1995). Power, in this context, refers to the ability to promote one's own interests and democracy becomes identified with the fair play of all interests. Since voting and interest group activity serve as primary vehicles for the representation of diverse interests, Dahl (1971) identifies "political participation" and "political competition" as two important components of functioning democracy. Most theoretical models exploit the "participation" or "voting" component to formalize the concept of democracy. In contrast, we concentrate on the "competition" component, and show that one consequence of devolving power from one group to many in a setting

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[6] For example, two South Asian military dictators, Zia-Ul-Haque in Pakistan and Hussein Ershad in Bangladesh, held popular referendums in the 1980s to justify remaining in power after seizing control

where politicians have limited capacity to identify good policies is to reduce the variance in the quality of chosen policies.

3. A Model of Dispersion of Decision-Making Authority

One of the primary functions of the political authority is to choose economic policies. There is an emerging consensus among many prominent economists that inappropriate policy choice, rather than a lack of human capital or technology, is the primary cause of under-development (Sachs and Warner 1995). Moreover, policy failures are not limited to a particular type of regime, it has plagued both democracies and dictatorships (Robinson 1998). While bad policies are sometimes chosen intentionally, most often they are a result of fundamental uncertainties about their likely effects. For example, many countries in Latin America and South Asia have tried to imitate successful East Asian economic policies without a clear prior understanding of how these may interact with their own domestic institutional structures. In some cases, these policies backfired (Robinson 1998).

This section studies the impact of decentralizing decision-making authority on how often and with what precision good policies are chosen in an uncertain environment. For clarity and tractability, the model narrowly equates democracy with greater dispersion of decision-making authority.[7] Our theoretical construct is therefore closely related to existing empirical measures of democracy. The country-level measures of

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through military coups.

[7] Although a high degree of correlation probably exists between "democracy" and "dispersion of authority", it is not always a one-to-one correspondence. In Malaysia for example, although one party has enjoyed unbroken control of power for forty years, this party is a coalition of Chinese, Malay and Indian political groups that represents a broad range of the population.

democracy we use in the empirical section capture, in turn, the extent of institutionalized constraints on the decision-making powers of chief executives (based on a component of the Polity dataset), the voice that elected representatives have in policy-making (based on the Freedom House measure of Political Rights), the diversity in the representation of interests within the political system (from Vanhanen 2000), and a coarse classification of political regimes that increases in the dispersion of decision-making authority (from Cheibub and Gandhi 2004).

Consider an economy with n politicians whose responsibility is to choose between proposed policies. One of these n policy-makers is an "oligarch" who, depending on the political structure, may have greater decision-making authority than the rest. These n policy-makers vote to choose one of two proposed policies. The oligarch gets $T \geq 1$ votes, while each of the other (n-1) policy-makers gets 1 vote. A policy is accepted if it receives more than half the votes (i.e. more than $\dfrac{(n-1)+T}{2}$ votes).

The parameter T represents concentration of power in the hands of the oligarch. *Autocracy* is the situation where the oligarch can unilaterally accept or reject policies. This is the case if $T > (n\text{-}1)$, so that the oligarch's vote is the only one that ultimately matters for policy decisions.[8] In a complete *Democracy*, all political groups have equal power, defined by $T = 1$. In between these two extremes, there are political systems that we will term *Oligarchies* whose extent of democratization varies inversely with T. Democracy is therefore synonymous with greater diffusion of decision-making authority. This formulation is meant to capture the variation in the number and relative strengths of decision-makers across alternative political systems. Even within the set of countries

with electoral systems, the number of independent decision-makers can vary depending on election outcomes and on the rules that govern the relationships between the executive, judiciary and legislature. For example, in the United States there are more independent branches of government than in Saudi Arabia, but Senate, House and Presidential elections determine the extent of political alignment between these different branches at any given point in time.

Of the two competing policies the politicians are voting over, one is "good" and the other is "bad". For the purposes of the present analysis, policies need not be defined further except to note that the good policy is better for economic performance than the bad one. The politicians only have imperfect information about which policy is the 'good' one. To be specific, each politician identifies and votes for the good policy with probability q ($0 < q < 1$).[9] While we refer to this imperfect identification of good policies as the effect of uncertainty, this could also be a result of incompetence, dishonesty or narrow political interests. For example, the "bad" policy might just be the preferred policy the set of lobbies or interest groups that a particular politician represents.

Let Y denote the Bernoulli random variable associated with good policy choice:

$$Y = \left|\begin{array}{ll} 1 & \text{if good policy is chosen} \\ 0 & \text{if bad policy is chosen} \end{array}\right.$$

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[8] This is also the special case that corresponds most closely to Tsebelis' (1995, 1999) construction of "veto players", since we are effectively giving our "autocrat" veto authority over all policy choices.

[9] For the moment we will assume that all politicians have the same ability to identify the good policy, and will consider the case of a relatively more skilled oligarch later. The competence of politicians can be the single-most important factor that determines economic performance of a region. Coal-producing Bihar, which is a mineral-rich state in India, is among its poorest. The media and contemporary scholars frequently attribute its dismal performance to former chief minister Lalu Prasad, considered an incompetent leader. In contrast, Indonesia strived economically under Suharto, who is generally viewed as a competent leader, although his regime is universally considered extremely corrupt.

If $p(q)$ is the probability that the good policy is chosen, the discrete pdf of Y is given by

$f(y) = p^y (1-p)^y$ $(y = 0,1)$.[10] By the properties of the Bernoulli random variable,

$E(Y)=p(q)$ and $Var(Y)=p(q)[1-p(q)]$. Our task now is to investigate the properties of the

function $p(q)$ under alternative political structures, in order to compare $E(Y)$ and $Var(Y)$

across political systems.

To ensure that voting does not result in a tie, we will assume n and T are both

odd.[11] The minimum number of votes required for a win is then $\dfrac{n+T}{2}$. There are two

ways in which the good policy could be chosen: (a) If the oligarch and at least $\dfrac{n-T}{2}$ of

the other politicians vote for it, or (b) if the oligarch does not, but at least $\dfrac{n+T}{2}$ of the

other politicians do. In an oligarchy we thus have:

$$Pr(Y=1) = Pr(\text{Oligarch votes "good"})* Pr(\text{at least } \frac{n-T}{2} \text{ others vote "good"})$$

$$+ Pr(\text{Oligarch votes "bad"})* Pr(\text{at least } \frac{n+T}{2} \text{ others vote "good"}).$$

Define $b(j,n-1,q) = \dbinom{n-1}{j} q^j (1-q)^{n-1-j}$ to be the density of the binomial random

variable with parameters $(n\text{-}1,q)$, which gives the probability that exactly j out of $(n\text{-}1)$

votes are for the good policy.   Define the corresponding cumulative density

$B(k,n-1,q) = \sum_{j=0}^{k} b(j,n-1,q)$, which is the probability that at most k votes (out of the

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[10] Note that each politician's vote is itself a binomial random variable, but $f(y)$ is the random variable for the policy choice that occurs after all votes are aggregated.
[11] This is an innocuous assumption adopted only for simplicity. Results are unchanged if a coin toss determines the outcome in case of a tie.

possible *n-1*) are cast for the good policy. Using this notation, the probability that the good policy is chosen when the oligarch has T votes (P_T) can be re-written:

$$P_T \equiv \Pr(Y=1) = q\left[1 - B\left(\frac{n-T}{2} - 1, n-1, q\right)\right] + (1-q)\left[1 - B\left(\frac{n+T}{2} - 1, n-1, q\right)\right] \qquad (1)$$

Note that *Democracy* is a special case in this formulation where $T = 1$. $\Pr(Y=1)$ in a democracy is given by $P_1 = \left[1 - B\left(\frac{n-1}{2}, n, q\right)\right]$. *Autocracy* is another special case where

$T \geq n$, and $\Pr(Y=1)$ in this case is given by $P_n = q$.

3.1 Effect of Political System on the Average Quality of Policies Chosen:

First we study the impact of changes in the concentration of power (T) on $E(Y) = P_T$.

> *Proposition 1:* The more democratic the system, the greater the probability of choosing the good policy (i.e. *E(Y)*) when 0.5<*q*<1. When 0<*q*<0.5, the opposite is true.

The proof of this proposition is in the appendix. This provides a complete ordering of all systems – from democracy to oligarchies with increasing concentration of authority to autocracy – in terms of the probability of good policy choice for each value of *q*. This proposition states that the quality of policy choices increases with decentralization of decision-making as long as each policy-maker is better at identifying good policies than a person who guesses randomly. This result is best understood in terms of the law of large numbers. As long as politicans have some ability to discriminate between good and bad policies (i.e. *q*>0.5), and each politician receives an equally useful signal as to which is the good policy, it is most efficient to make use of all available signals. With *q>0.5*, more than half the politicians will receive the "correct" signal on average, and

decentralization ensures that individual mistakes do not dominate the decision-making process. On the other hand, if random coin tosses are used to determine the outcome, the number of coin tosses does not change the probability of the good outcome. Decentralization therefore has no impact on *E(Y)* when *q=0.5*. Figure 1 compares policy choices under *T=1* (Democracy), *T=3* (Oligarchy), and *T=5* (Autocracy) for the case n=5.

[Figure 1 here]

3.2 The Case where the Oligarch has Superior Ability

Note that these results do not necessarily hold if the oligarch has better discriminating ability than the other politicians. Depending on the relative abilities of the oligarch and the rest, we may want to rely solely on the oligarch's choice in that case. As Sah (1991) notes, a classic argument in favor of centralized political systems is that since more hinges on the ability of fewer individuals in these systems, greater effort is made to ensure that these individuals are of higher ability. This is the basis for the merit-based selection of decision-makers in all bureaucracies of developing countries fashioned after the British civil service.

Denote the oligarch's probability of identifying the good policy by *r*. We let *r >* *q*, which implies the oligarch has superior ability relative to the others. In this situation, it is possible to show that $P_T - P_{T+2} > 0$ [i.e. a more democratic system has higher *E(Y)*] if and only if $\frac{r}{1-r} < \left(\frac{q}{1-q}\right)^{T+1}$ (see appendix under proof of proposition 1). In other words, a more autocratic system can now have higher *E(Y)* even when *q>0.5*, as long as the oligarch's discriminating ability is sufficiently high relative to the other politicians'. Decentralizing decision-making authority now involves a trade-off. While the system

gains from use of the additional signals that decentralization entails, it loses due to a decreased reliance on the oligarch's superior ability. The inequality above defines a region in r, q, T space in which greater democracy leads to increases in the expected quality of chosen policy. Figure 2 maps the relevant region defined by $0.5 \leq q < r \leq 1$ and $1 \leq T \leq n$, and decentralization increases *E(Y)* in the shaded portions.[12]

[Figure 2 here]

3.3 Stability of Policy Choices

We now turn to the central result of the paper concerning the impact of decentralization of decision-making authority on the variability in policy choices:

Proposition 2: *Var*(Y), the variability in the quality of chosen policies is non-increasing in the extent of decentralization of decision-making authority.

The proof given in the appendix shows that *Var(Y)* increases with T for almost all values of q (except $q = 0, 1$, or 0.5 – where all political systems are equivalent). Figure 3 below is again drawn for $n=5$, $T=1,3$, and 5. *Var*(Y) is low when q is close to 1 or 0, since either good or bad policies are chosen with high probability in those cases. More democratic systems always dominate less democratic ones, since the use of additional signals in the more democratic system ensures that one particular type of policy is chosen with greater precision. When $q>0.5$ (the more realistic scenario), this particular policy is the "good" one. The intuition for this result is that while in an autocracy we rely on just

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[12] The range of values of r/q for which greater democracy leads to higher *E*(Y) expands as T increases. This occurs because when T is low, the system is already very democratic, and the gains from additional democratization are low compared to the gains from using the high-ability oligarch.

one signal, all signals are "averaged out" throught the voting mechanism in a democracy. The variance of the averaged variable is always lower than the variance of any one signal. When $q>0.5$, the good policy ought to be chosen more frequently than the bad, but the autocrat's reliance on a single signal allows for a greater possibility of mistakes being made, which in turn leads to higher policy variance.

[Figure 3 here]

If good policies are better for growth than bad policies, the complete ordering of political systems in terms of $Var(Y)$ provided by Proposition 2 implies that we can order political systems in terms of variability in growth rates. This implies that variability in policy choices can possibly help explain the larger inter-temporal variance in growth rates in non-democracies that Rodrik (2000) and several other authors have noticed. The empirical part of this paper will attempt to test this particular mechanism directly by constructing indicators of inter-temporal variability in economic policy choices for 92 countries. We test the model's predictions on $var(Y)$ rather than $E(Y)$, since average quality of chosen policies is very difficult to define. The quality or appropriateness of a chosen policy (such as the extent of trade) depends on the countries' underlying economic, historical and geographic fundamentals. However, to the extent that such fundamentals are a fixed factor for each country, observing greater inter-temporal variability in policy choice within a country can proxy for $var(Y)$. Our measures of inter-temporal variance can fall short as proxies if the appropriateness of a particular policy varies greatly across years within each country. This is partly why we study volatility in trade and fiscal policy (rather than monetary policy), since the appropriateness of a particular monetary policy instrument is more time and business cycle dependent.

4. Data Description

Our objective is to show that democratic countries exhibit lower policy volatility, that this relationship is robust to reverse causality and endogeneity concerns, and that the relationship holds both across countries and within countries over time. We also examine whether the documented relationship between democratic institutions and output volatility is mediated by policy volatility. To examine these issues we collected data on democracy, fiscal and trade policies and a variety of controls over the period 1960-2000.

4.1. Democracy

There is no consensus on how to measure democracy, definitions of democracy are contested, and there is an ongoing lively debate on the subject (see Przeworski et al 2000). For this reason, we use multiple measures of democracy and political rights indices collected from a variety of sources in order to check the robustness of our results to changes in the measure of democracy used. While none of these measures correspond exactly to our notion of democracy used in the theory section, they each capture, to different extents, the degree of dispersion of decision making authority.

Our primary measure is the Polity measure of democracy from the Polity IV project, which is the measure most commonly used in the cross-country political economy literature. The POLITY score recognizes that there is no necessary condition for characterizing a political system as democratic vs. autocratic. It therefore treats democracy as variable and takes into account the presence of institutions through which citizens can participate in the political process, the competitiveness and openness in

executive recruitment, as well as the constraints on the exercise of power by the executive. More importantly, in its construction, the POLITY data ignores the influence of an autocratic regime in the social and economic sphere.[13] This has an important advantage for us because the relationship between political institutions and economic outcomes is not confounded in the coding process. We report our results with both the Polity measure and with the sub-component Constraints on the Executive that has been used in a number of influential papers (e.g., Acemoglu et al, 2003; Acemoglu, Johnson, and Robinson, 2001). 'Constraints on the executive' takes values between 1 and 7 and measures the extent of institutionalized constraints on the decision-making of chief executives. It comes close to capturing our theoretical notion of democracy. As an example, it takes the value 5 when a legislature or a party council often modifies or defeats executive proposals for action. In contrast, it takes the value 1 when rule by decree is used and the legislature either does not exist, or is ignored by the chief executive. Both Polity-based measures are averaged over 1960-2000.

The third measure we use is the political rights index from Gastil (available from 1972 onwards), measured on a seven point scale that captures the rights to participate meaningfully in the political process, the right of all adults to vote and compete for public office, and for elected representatives to have a decisive vote on public policies. This last aspect (elected representatives have a say in public policies) corresponds to our theoretical notion of democracy. We recoded this measure as (8 – the original measure) so that it increases with the degree of political rights. A fourth measure is from

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[13] Note that we used the POLITY2 measure, which transforms the Polity standardized authority codes (i.e., -66, -77, and -88) to scaled POLITY scores so the POLITY scores may be used consistently in time-series analyses without losing crucial information by treating the standardized authority scores as missing values.

Vanhanen (2000) who draws on Dahl's (1971) two theoretical dimensions of democratization - degree of political competition and degree of participation in the political process. He constructs an index of democratization which is the product of two variables - *Competition* defined as the percentage share of votes for the smaller parties and *Participation* defined as the percentage of population who voted in elections. A larger vote share for smaller parties should correspond to greater dispersion in decision making authority. Our final measure is from Cheibub and Gandhi (2004) who create a six-fold classification of political regimes, coded as 0 if a parliamentary democracy, 1 if a mixed democracy, 2 if a presidential democracy, 3 if a civilian dictatorship, 4 if a military dictatorship, and 5 if a monarchic dictatorship. We altered the coding such that the six-fold classification is 5 for a mixed democracy, 4 for a parliamentary democracy, 3 for a presidential democracy, 2 for a civilian dictatorship, 1 for a military dictatorship, and 0 for a monarchic dictatorship. Note with this coding, the measure is also increasing in the extent of dispersion of decision-making authority. All these measures were averaged over their years of availability.[14] Table 1.1 shows the summary statistics and correlations between the various measures of democracy.

4.2. Policy Volatility

We will focus on two key components of governmental policy: fiscal and trade policy. We believe both to have profound implications for growth and distribution, and are subject to manipulation by political groups, lobbies and sundry interest groups.[15] In

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[14] In one table we also use the Henisz (2000) measure of the number of independent veto points and the distribution of preferences within veto points to see how well the democracy measures explain policy volatility compared to the veto points measure. We also use a Legislature Diversification Index defined is (1 - the total Herfindahl index for the legislature) from Database of Political Institutions (2000).

[15] Fiscal and trade policies are almost universally decided by politicians and rulers. While in many countries monetary policies are at the discretion of politicians/rulers, there seems to be an emerging

measuring fiscal policy volatility, we follow Fatas and Mihov (2003) who study the effects of volatility in *discretionary* fiscal policy on economic growth. The goal is to isolate a measure of policy stance that captures the portion of discretionary fiscal policy that is not explained by the state of the business cycle. They define discretionary fiscal policy as changes in fiscal policy that are not in response to current macroeconomic conditions. We estimate the following regression for each of 92 countries to explain *G,* government final consumption expenditure as a percentage of GDP, which is our chosen proxy for fiscal policies:

$$G_{it} = \alpha_i + \beta_i G_{it-1} + \gamma_i Y_{it} + \delta_i \mathbf{X}_{it} + u_{it} \tag{1}$$

where *Y* is the logarithm of real GDP, and *X* is a vector of control variables that include inflation, inflation squared, and an index of oil prices. The country-by-country IV regressions instrument GDP with two lags of GDP growth variables because of the possible reverse causality from government spending to output. Following Fatas and Mihov, we calculate the volatility of discretionary fiscal policy (as measured by government spending) as $\sqrt{\mathrm{var}_i(u_{it})}$ which we will denote as σ^G_i.[16]

To construct a measure of trade policy volatility, we should ideally use direct measures of trade policy that are comparable across countries and over time. Unfortunately, few such measures especially over a long enough time-horizon exist. Moreover, countries have recourse to a wide variety of direct and indirect trade policies (tariffs, quotas, VERs, subsidies to name a few). Our trade policy measure is $\left(\frac{X+M}{GDP}\right)$ and

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consensus that monetary policy should be in the hands of an independent central bank. In fact, many countries moved or have been moving towards such a model.

[16] Two other approaches to measuring policy volatility include calculating the raw standard deviations of policy variables (before or after detrending) and using GARCH models to construct smooth (time-varying)

we follow Pritchett (1996) who recommended that this indirect measure of trade policy be adjusted for country size, population and transport costs to provide a more accurate picture of trade protection. We adjust this measure for the country's level of development, an index of oil prices, and for lagged dependence since changes in trade policies are relatively infrequent. We also add a remoteness index (a weighted average of a country's trading partners' GDP where the weights are distance to the trading partners) to capture trading costs.[17] We run the regression

$$TP_{it} = \alpha_i + \beta_i TP_{it-1} + \gamma_i Y_{it} + \delta_i \mathbf{X}_{it} + v_{it} \tag{2}$$

country-by-country using OLS where TP is the logarithm of $\left(\dfrac{X+M}{GDP}\right)$. Trade policy volatility is measured as $\sqrt{\mathrm{var}_i(v_{it})}$ which we will denote as σ^{TP}_i [18]

Table 1.2 provides summary statistics for the (logged) policy volatility measures and Table 1.3 shows the constructed values of policy volatility across the sample. Examples of policy volatile countries are Congo and Chad, while fiscal and trade policies are generally more stable in OECD economies.

4.3. Controls

The first control we add is a measure of political instability. Acemoglu and Robinson's (2001) theoretical work shows that political instability in terms of the movement in and out of democracy will lead to volatility in redistributive policies. To

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measures of volatility (Henisz, 2004). As Fatas and Mihov (2005) argue these two methods do not extract the exogenous component of policy changes (unless policy is itself exogenous).

[17] We acknowledge that extracting trade policy volatility based on $\left(\dfrac{X+M}{GDP}\right)$ confounds policies with outcomes. However, our country-by-country OLS specification will rid us many country-specific time invariant terms such as colonial and linguistic ties that affect trade volumes.

capture this effect, our regressions use the Dutt and Mitra (forthcoming) political instability measure, which captures movements from dictatorship to democracy, but not government changes that preserve the democratic or dictatorial structure of the country.

We add various other controls used in the literature as determinants of policy volatility: For fiscal policy volatility we include a dummy variable for the political system (1 = presidential 0 = parliamentary), the number of executive and legislative elections (summed over 1960-2000), ethno-linguistic fractionalization (as of 1960) and trade exposure $\left(\frac{X+M}{GDP}\right)$, since open economies are more prone to external shocks, governments may have to resort to discretionary fiscal policy to smooth these shocks (see Rodrik 1998); and (4) domestic distortions, since these distortions may necessitate more frequent changes in discretionary fiscal policy. Domestic distortions are measured by calculating for each country the PPP value of the investment deflator in 1960 (relative to the US) and then calculating the deviation from the sample mean of this deflator. We also control for regional effects by adding a set of regional dummies.[19] For trade policy volatility we include the same set of controls apart from substituting trade exposure with the year the country joined the GATT/WTO.[20] According to the WTO website, one of the ways for countries to demonstrate their commitment to trade policy stability is via membership in the WTO. Rose (2004) examines this hypothesis in a recent paper but finds very little support for it.

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[18] We have experimented with various permutations in measuring policy volatility. These include: an Anderson-Hsiao estimator, a fixed effects estimator, and the Arellano-Bond system GMM estimators. In all cases the volatility measures are highly correlated with the country-by-country OLS based measure.

[19] In addition, we tried the following set of controls: majoritarian vs. proportional systems of democracy; percentage of years when left-wing governments were in power over the time period of the study; fractionalization of opposition parties. None of these political determinants seem to play a significant role in affecting policy volatility.

[20] For countries who are not members of the GATT/WTO we set the year of accession to 2006.

5. Democracy and Policy Volatility: Results

Figures 4 and 5 show the correlation between the Polity measure of democracy and logged fiscal and trade policy volatility measures over the period 1960-2000. There is a clear negative relationship between democracy and each of the two volatility measures. The unconditional raw correlation is negative and a regression of fiscal (trade) policy volatility on Polity -- reported in figure 4 (5) -- yields a coefficient of -0.06 (-0.07), with p-values <0.01..

5.1 OLS Estimates and Comparisons

Tables 2 and 3 check the robustness of this basic relationship to alternative measures of democracy and to the inclusion of controls. Columns 1-5 in table 2 show that the degree of democracy significantly reduces fiscal policy volatility. Political instability is strongly significant as well and positively impacts fiscal policy volatility in line with Acemoglu and Robinson (2001). Columns 6-10 add the rest of the controls and the coefficient on each of the democracy measures increases marginally Taken together, our variables account for 32-48% of the cross-country variation in fiscal policy volatility. Table 3 shows that democratic countries also exhibit significantly less trade policy volatility. Countries that are politically stable, that joined the GATT/WTO earlier and who have a Presidential form of government exhibit lower trade policy volatility. Finally, Latin American and sub-Saharan African countries on average exhibit higher levels of both fiscal and trade policy volatility. The numbers in table 2 and table 3 imply that a country that moves from being extremely autocratic (Polity score = -10) to a full democracy (Polity score =10) will experience a 74% decline in fiscal policy volatility and

an 82% decline in trade policy volatility. Of the democracy measures, political rights has the strongest effect – a one standard deviation improvement in political rights leads to a 40% decline in fiscal policy volatility. The corresponding numbers for Polity, Constraints on the Executive, Vanhanen and Cheibub measures are 24%, 25%, 31% and 22%. The magnitudes of effects are similar in the trade policy volatility regressions.[21]

Table 4 compares the relative explanatory powers of our measures of democracy to veto points based measures (Henisz 2000, 2004) as determinants of policy volatility. Column 1 confirms the Henisz (2004) result that veto points reduce the volatility of fiscal policies. When we add the Polity measure of democracy in the second column, neither Polity nor veto points is individually significant, which may be due to the high level of multicollinearity between the two measures. The Vanhanen democracy measure added in column 3 is statistically significant and leads to an improvement in model fit. The Polity component 'constraints on the executive' is also statistically significant in column 4. Finally, in column 5, the Vanhanen measure, constraints on the executive and a measure of diversification of the legislature, all of which correspond to our theoretical construct of diversification of decision-making authority, significantly reduce fiscal policy volatility even in the presence of a veto-points based measure. Columns 6-10 repeats this exercise for trade policy volatility. While the Henisz veto points measure is a significant determinant of trade policy volatility, so are the Vanhanen measure and the legislature diversification index even in the presence of the control for veto points. Thus there is strong evidence that the variables capturing diversification in decision-making authority have significant explanatory power over and above the veto points construct.

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[21] Our results are robust to the inclusion of per capita GDP as an additional control. Per capita GDP has no significant effect on fiscal policy volatility but does reduce trade policy volatility.

5.2 Instrumental Variable Estimates

Two potential problems with the results reported in tables 2 and 3 are omitted variables bias and endogeneity of policy volatility. An omitted variable may affect both democracy and policy volatility, or countries that exhibit more policy volatility face populist pressures (domestically and internationally) to democratize if both consumers and investors are averse to policy volatility (reverse causality). We try to address these concerns by using an instrumental variables (IV) estimator for democracy. Incidentally, the IV strategy will also help deal with measurement error problems in the subjective coding of the democracy measures. Since measurement error leads to attenuation bias, the IV estimator may increase the absolute value of the democracy coefficients.

Following the literature, we use the following variables as instruments for democracy: a dummy for countries with Muslim majority populations, a dummy for countries that became independent after 1945 and the historical European settler mortality estimate from Acemoglu et al. (2001). Between the eighteenth and twentieth centuries, Europeans pursued different colonization policies depending on the mortality rate the settlers faced in those colonies. When faced with high mortality, Europeans were more likely to set up extractive institutions, and it is possible that those differences in institutions have persisted to create differences in the extent of democracy across countries in the late twentieth century.[22] Mobarak (2005) argues that the Middle East (where most Muslim countries are located) has historically been populated by tribal cultures where forms of hereditary rule have dominated, and until today, countries in this region remain more monarchic than the rest of the world. And unlike the two other major

world religions, Islam through its codebook of law---the Sharia---provides guidance for not just spiritual life, but also political life, and as such, if the divine word governs politics, automatically less is left for the people to decide, which could explain why Muslim countries would score lower on indices of democracy.[23]. Finally, if democracy is the end product of years or centuries of political evolution, newer countries on average are likely to be less democratic, which explains the post-1945 independence instrument.

In table 5 the coefficients on democracy measures for both types of policy volatility remain negative and significant even after they are instrumented. In the first-stage of the IV regressions, the F-statistic on the excluded instruments is jointly significant and the Partial R^2 ranges from 0.14 to 0.39 in the fiscal policy volatility regressions.[24] The explanatory power of the instruments is weak in the trade regressions, and these results should therefore be interpreted with care. The increase in the magnitude of the democracy coefficients in second stage of the IV regressions (compared to table 2 and 3) suggests the presence of measurement error in democracy.

5.3 Panel Estimation

We next use panel data to examine how shifts in the degree of democracy within a country affect the volatility of trade and fiscal policies over time. This necessitates the construction of multiple policy volatility measures per country over shorter time

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[22] The settler mortality instrument is only available for the subset of countries that were colonized, and this reduces our sample by over 30%.

[23] The concentration of Muslim countries in the Middle East region makes this instrument vulnerable to the criticism that many of these countries are oil exporters and the volatility in oil prices may have a direct connection to policy volatility. We therefore include a dummy for oil exporters to account for this.

[24] All three instruments should be related to democracy and not directly related to policy volatility (other than through its effect on democracy). We test this assumption by using a Hansen-Sargan test of overidentifying restrictions. If our instruments determine policy volatility directly, then the test would have rejected the orthogonality of the errors and the instruments. The test fails to reject the null hypothesis of overidentifying restrictions and valid instruments, and the *p*-value of the test is reported in table 5.

horizons. We create a panel of decade averaged data which results in four non-overlapping periods starting in 1960. Since each volatility data point is now based on only 10 years of data, constructing the volatility estimates using country-by-country OLS specifications is no longer feasible. Instead we follow the approach pioneered by Anderson and Hsiao (1982) and first difference all variables in equations 1 and 2 (to remove country fixed effects) and use second-lag differences as instruments for the lagged dependent variable. As before, we also instrument for per-capita GDP with lagged GDP growth.

Table 6 presents pooled OLS results using this panel where we use the Polity measure of democracy. As columns 1 and 5 show, more democratic countries exhibit significantly lower fiscal and trade policy volatility. Columns 2 and 6 show that this is robust to the inclusion of controls. Again, countries that are political unstable, exhibit higher policy volatility. To address the endogeneity concern, that countries with higher levels of policy volatility are more likely to be democratic, columns 3 and 7 use the Polity measure from the previous decade. Our results show that countries that were less democratic in the past exhibit higher levels of policy volatility in subsequent years. Next, columns 4 and 8 check the robustness of our results when we include lagged policy volatility as regressors. We do this since it may be argued that our results are biased if there is reverse causality within a particular decade and at the same time shocks to policy volatility are highly persistent over time. While lagged volatility enters with a positive sign and is significant, the coefficient on democracy is marginally lower (relative to columns 2 and 6) but continues to be negative and significant. Finally, these pooled OLS

results hold up in exactly the same fashion when we use our other measures of democracy (not reported here due to space constraints).

Next, in tables 7 and 8 we look for direct evidence that the relationship between policy volatility and democracy is not driven by country-fixed factos. Table 7 shows that four out of the five measures of democracy significantly reduce fiscal policy volatility in a fixed effects specification (the Gastil measure also reduced volatility, but has a p-value of 0.2). In the random-effects specifications (which allows us to include time-invariant controls) all five measures of democracy negatively and significantly affect fiscal policy volatility. In the trade policy volatility regressions (table 8), the democracy coefficients remain uniformly negative under the fixed effects specification, but we do not have enough statistical power using only within-country variation in the data to conclude that these effects are statistically different from zero. Under the random-effects specifications, the effect of democracy on trade policy is uniformly negative and significant.

5.4 Difference in difference estimation

As an additional check on the relationship between democracy and policy volatility, we define major episodes of democratization within countries in our sample, and use a difference-in-difference strategy. We interpret major episodes of "democratization" as a treatment administered to some countries, and use as controls countries that remained either autocratic or democratic during the entire sample period. (Persson 2004, Giavazzi and Tabellini 2004). We then compare the change in policy volatility in the treated countries following treatment, and difference out with the change in policy volatility in the control group over the same time period.

Following Papaioannou and Siourounis (2004), we infer that a country "democratizes" if either (a) 21 point Polity measure (ranging from -10 to +10) suddenly changes from a negative to a positive value or (b) the trichotomous Gastil political rights measure jumps from "not free" to either "partly free" or "free". We also require that both indicators remain at the higher democracy score for at least five years. We therefore exclude brief democratic transitions that did not succeed in consolidating representative institutions. This leads to 51 countries being coded as "treatment" countries and the balance 98 countries were coded as "control" countries. Since democratization episodes do not take place in all countries at the same time, to implement the difference-in-difference approach, we calculated policy volatility in a ten year window before and after the democratization episode. For control countries we calculated policy volatility over two non-overlapping time periods 1960-1984 and 1985-2000. We estimate the following equation

$$(Volatility_1^i - Volatility_0^i) = \alpha + \beta D_1^i + \mathbf{X}^i + \in_i$$

where $(Volatility_1^i - Volatility_0^i)$ is the difference between policy volatility from before to after treatment, D_1^i is the treatment indicator (coded 1 if the observation is in the treatment group and in second time period, 0 otherwise), β is the treatment effect, and $\in_i$ is the difference between errors at time 1 and time 0.

The identifying assumptions in our difference in difference strategy can be violated if either (a) democratic reforms are not random and whatever triggers democratization is also correlated with policy volatility, or (b) some unobserved variable correlated with policy volatility is systematically different across treatment and control

observations (Besley and Case 2000). We try to minimize the likelihood of violation of the identifying assumptions by using a couple of strategies. First, we include in the control group both countries that are always democratic and those that are always autocratic. This ensures that the "average" control country is not very different from the "average" treated country in its propensity to democratize. Second, the vector **X** of additional controls in the difference-in-difference regression includes the interaction between treatment indicator and region dummies for sub-Saharan Africa, Latin America and Caribbean, South Asia, East Asia and Pacific, Australia and New Zealand, a dummy for oil exporters, and a dummy for socialist legal origin. **X** also includes a time-variant measure of political instability (in a 10 year interval before and after the democratization episode for treatment countries and for time periods 1960-1984 and 1985-2000 for control countries).

Our estimate shows that for fiscal policy volatility $\beta = -1.142$ with a *p-value* of 0.004 and for trade policy volatility, $\beta = -0.923$ with a *p-value* of 0.007. Thus it appears that countries experience significantly larger declines in policy volatility following democratization relative to any "natural" change in policy volatility over time in other countries that remain always democratic or always autocratic.

6. Policy Volatility and Output Volatility

We next turn to the adverse consequences of policy volatility, and examine whether the robust link between democracy and policy volatility outlined above can explain cross-country variation in the volatility of output. The severity of such output volatility has accelerated in recent years as many developing countries in Latin America,

East Asia and Eastern Europe experienced significant economic crises. While some of these crises were sparked off by profligate governments adopting inappropriate and distortionary policies (closed economies, fixed and overvalued exchange rates, runaway budget deficits, uncontrolled monetary policies to name a few) an emerging view is that it is not sufficient to set policies at the `right' levels. Policy volatility can lead to output volatility which deters investment and growth (Ramey and Ramey, 1995; Fatas and Mihov 2003).

In this section we examine both the direct and indirect effect (operating through fiscal and trade policy volatility) of democratic institutions on output volatility. We follow Ramey and Ramey (1995) and measure output volatility as the standard deviation of the annual growth rate of GDP per capita for each of the countries in our sample over the period 1960-2000. Figure 6 and Column 1 in table 9 confirm a strong negative correlation between democracy and output volatility, in line with the earlier literature (e.g. Rodrik 2000, Mobarak, 2005, Quinn & Woolley, 2001, all of whom find a strong negative correlation between democracy and output volatility in a reduced-form). Column 2 adds fiscal policy volatility to the output volatility regression, while column 3 adds a host of controls from Acemoglu et al (2003): inflation, exchange rate overvaluation, government consumption expenditure, openness (which may expose the country to more external shocks), and volatility in the country's terms of trade. Fiscal policy volatility is a significant determinant of output volatility, as is the Polity measure of democracy. We see that the marginal power of the democracy variables declines somewhat in columns 2 and 3, but it remains negative and significant. The fiscal policy volatility channel explains about a quarter of the negative correlation between democracy

and output volatility. Democratic institutions thus have both an indirect effect - operating through fiscal policy volatility – and a direct effect (i.e. operating through other channels) on output volatility. Columns 4 and 5 examine the robustness of this finding within an IV framework. Column 4 instruments only fiscal policy volatility (using political instability, Presidential dummy, number of elections, domestic distortions and a Latin American dummy) whereas column 5 instruments both fiscal policy volatility and Polity (using settler mortality, the dummies for Muslim countries and post-1945 independence). In the IV regressions, it appears that fiscal policy volatility can explain upto two-thirds of the negative correlation between democracy and output volatility. Columns 6-9 substitute fiscal policy volatility with trade policy volatility, and show similar results.[25] Political institutions thus drives policy volatility which in turn affects output volatility.

7. Conclusion

Amartya Sen's argument that democracy is intrinsically good irrespective of any impact on economic performance highlights the development profession's long-standing temptation to arrive at a clear *positive* conclusion on the democracy-economic performance link. Bardhan (1993) notes that in an era in which euphoric public commentators have announced the triumph of capitalist democracy, an increasing number of scholarly studies have attempted to show "with a bit of wishful thinking", a positive effect of democracy on growth. Przeworski and Limongi (1993) express a similar sentiment in concluding that social scientists know surprisingly little about the impact of

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[25] We enter the policy volatility measures separately due to strong multicollinearity between the policy volatility measures. When both policy volatility measures are included together, they explain about two-thirds of the negative link between democracy and output volatility even in the OLS specification. The results continue to hold for other measures of democracy.

democracy on growth. Instead of focusing on the democracy-growth question, this paper presents an alternative. It forges a link between democracy and stability by considering the consequences of dispersion of decision-making authority. The theoretical construct lends itself very easily to empirical work, and we create measures of volatility in fiscal and trade policies for a large sample of countries to verify that democracies do indeed exhibit more stable policy choices over time. The results are strongest for the choice of fiscal policies. Our instruments are weak and the within-country variation in data not as statistically informative for trade policies. The policy stability mechanism also helps explain the robust negative link between democracy and output volatility documented by many other economists and political scientists.

It is possible to take the mechanism we propose to extend the empirical literature on the economic consequences of political organization in useful ways. The theory isolates the distribution of policy-making authority component of political systems, which is empirically measurable at the micro level in most countries. For example, in large developing countries such as India, Brazil or Mexico, there are regional (state or district level) differences in the intensity of political competition and the distribution of political power. Using electoral data, regional indicators of political competition can be constructed to examine their impact on local policy choices and outcomes.

To keep the democracy-stability link transparent, this paper considers a simple model of political decision-making which ignores other relevant aspects of democracy as well as the potentially endogenous process of evolution of political systems. For future work, it would be useful to embed these ideas in models of the endogenous determination of the nature and distribution of political authority.

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Appendix

Proof of Proposition 1

P_T denotes $\Pr(Y{=}1)$ when the oligarch has T votes. Since T is an odd integer, we will compare P_T to P_{T+2}. As noted in the text, with a T-vote oligarch and $(n{-}1)$ other politicians, $\dfrac{n+T}{2}$ votes are required for victory. With a $(T{+}2)$-vote oligarch and $(n{-}1)$ others, $\dfrac{n+T}{2}+1$ votes are required for victory. We then have

$$P_{T+2} = q\left[1 - B\left(\frac{n-T}{2} - 2, n-1, q\right)\right] + (1-q)\left[1 - B\left(\frac{n+T}{2}, n-1, q\right)\right] \tag{A1}$$

Using (A1) and the definition of P_T given by (1), we write:

$$P_T - P_{T+2} = -q\left[\binom{n-1}{\frac{n-T}{2}-1} q^{\frac{n-T}{2}-1}(1-q)^{\frac{n+T}{2}}\right] + (1-q)\left[\binom{n-1}{\frac{n+T}{2}} q^{\frac{n+T}{2}}(1-q)^{\frac{n-T}{2}-1}\right]$$

Since $n - 1 = \left(\dfrac{n+T}{2}\right) + \left(\dfrac{n-T}{2} - 1\right)$, we have $\binom{n-1}{\frac{n-T}{2}-1} = \binom{n-1}{\frac{n+T}{2}} \equiv k$. This implies

$$P_T - P_{T+2} = k[q(1-q)]^{\frac{n-T}{2}} \cdot \left[q^T - (1-q)^T\right].$$

This means $P_T\text{-}P_{T+2}$ is positive (negative) if $q{>}0.5$ ($q{<}0.5$).

When *the ability of the oligarch (r) is greater* than the other politicians ($r{>}q$), we get:

$$P_T - P_{T+2} = k[q(1-q)]^{\frac{n-T}{2}-1} \cdot \left[(1-r)q^{T+1} - r(1-q)^{T+1}\right]$$

Proof of Proposition 2

Moving from a less democratic system to a more democratic one, the change in $Var(Y)$ is given by $\Delta V = P_T(1 - P_T) - P_{T+2}(1 - P_{T+2})$. Factoring and rearranging, we write:

$$\Delta V = (P_T - P_{T+2})\left[1 - (P_T + P_{T+2})\right].$$

Let $A = P_T - P_{T+2}$ and $B = 1 - (P_T + P_{T+2})$, so that $\Delta V = A \cdot B$. To show that ΔV is always non-positive, we need to establish the following results:

(a) When $q > 0.5$, $A \geq 0$ and when $q < 0.5$, $A \leq 0$

This is established in Proposition 1.

(b) When $q = 0.5$, $P_T = P_{T+2} = 0.5$

To establish this, we invoke the following property of the binomial distribution:

B(x,m,p) = 1 − B(m-x-1, m,1-p)

Using this property and equation (1), we can re-define P_T:

$$P_T = q\left[B\left(\frac{n-T}{2} - 1, n-1, q\right)\right] + (1-q)\left[1 - B\left(\frac{n+T}{2} - 1, n-1, 1-q\right)\right].$$

Setting $q = 0.5$, we get $P_T = 0.5$. Similarly, using the definition of P_{T+2} given by (A1), it is easy to show $P_{T+2} = 0.5$ when $q = 0.5$.

(c) P_T and P_{T+2} are increasing in q.

P_T (P_{T+2}) is the probability that *at least* $\dfrac{n+T}{2}$ $\left(\dfrac{n+T}{2} + 1\right)$ votes are for the good policy. q is the probability that *each* politician votes for the good policy. By definition, it must be the case that P_T and P_{T+2} are both increasing in q. For illustrative purposes, we can derive the exact value of the derivative $\dfrac{dP_T}{dq}$ for the most autocratic oligarchy, $T = n-2$:

Since $P_{n-2} = (1-q)q^{n-1} + q\left[1 - (1-q)^{n-1}\right]$,

$$\frac{dP_T}{dq} = (n-1)q^{n-2} + 1 - [q^{n-1} + (1-q)^{n-1}].$$

Since $q < 1$ and $n > 1$, $[q^{n-1} + (1-q)^{n-1}] \leq q + (1-q) = 1$. This implies $\dfrac{dP_T}{dq} > 0$.

(b) and (c) together imply that when $q > 0.5$, $P_T > 0.5$ and $P_{T+2} > 0.5$ and that when $q < 0.5$, $P_T < 0.5$ and $P_{T+2} < 0.5$. This means, $B < 0$ when $q > 0.5$ and $B > 0$ when $q < 0.5$. This result, together with (a) establishes that $\Delta V \leq 0$ for all values of q. Moreover, $\Delta V = 0$ only when $A = 0$, which occurs only if $q = 0$, 1, or 0.5.

Table 1.1: Summary Statistics & Correlation Between Democracy Measures[a]

Democracy Measure	N	Mean	Std. Deviation	Range	polity	constraints on executive	political rights	Vanhanen	Cheibub
polity	163	-0.22	6.45	-10 to 10	1				
constraints on executive	162	3.85	2.00	1 to 7	0.96	1			
political rights	188	5.04	1.98	1 to 7	0.91	0.91	1		
Vanhanen	164	14.71	10.61	0 to 100	0.79	0.74	0.76	1	
Cheibub	184	2.46	1.24	0 to 5	0.81	0.77	0.75	0.80	1

a: Higher numbers signify greater degree of democracy for all measures

Table 1.2: Summary Statistics

	N	Mean	Std. Deviation	Min	Max
Fiscal policy volatility (logged)	92	-2.24	0.82	-3.84	0.05
Trade policy volatility (logged)	92	-2.45	0.69	-3.91	-0.69
Output volatility (logged)	91	1.48	0.51	0.56	2.8
Political instability (logged)	105	-0.61	2.03	-6.44	1.56
Openness	128	0.36	0.4	0	2.98
Domestic distortions	169	0.35	0.51	0	5.62
GATT/WTO accession	180	1978.32	21.4	1948	2006
Ethnolinguistion fractionalization	112	0.42	0.3	0	0.93
No. of elections	104	6.58	2.74	0	17
Presidential system	93	0.62	0.47	0	1
Latin America and Caribbean	184	0.18	0.39	0	1
Sub Saharan Africa	184	0.26	0.44	0	1
Oil	184	0.1	0.31	0	1
South Asia	184	0.04	0.19	0	1
Dummy =1 if country became independent after 1945	136	0.56	0.5	0	1
Dummy = 1 if Muslim majority	136	0.23	0.42	0	1
Colonial settler mortality rate	75	4.49	1.14	1.74	6.18
Inflation	157	0.81	2.21	0.01	12.2
Terms of trade volatility	143	19.35	17.18	0	93.14
Exchange rate overvaluation	105	116.09	41.48	50.47	381.94
Government expenditure (logged)	88	2.63	0.31	1.94	3.45

Table 1.3: Policy Volatility Measures[a]

	fiscal	trade		fiscal	trade
Germany	0.02	0.02	Jamaica	0.09	0.16
France	0.02	0.03	Turkey	0.09	0.10
Netherlands	0.02	0.03	Ireland	0.09	0.04
Sweden	0.02	0.08	Benin	0.09	0.12
Austria	0.03	0.03	Peru	0.09	0.07
United Kingdom	0.03	0.03	Egypt, Arab Rep.	0.09	0.09
Belgium	0.03	0.03	Bolivia	0.09	0.08
Switzerland	0.03	0.04	Syrian Arab Republic	0.10	0.17
United States	0.03	0.02	Singapore	0.10	0.15
Spain	0.03	0.04	Pakistan	0.10	0.13
Norway	0.03	0.03	Israel	0.10	0.06
Italy	0.03	0.03	Trinidad and Tobago	0.10	0.16
Japan	0.03	0.03	Lesotho	0.11	0.09
Australia	0.04	0.03	Haiti	0.11	0.19
Portugal	0.04	0.10	Chile	0.11	0.05
Canada	0.04	0.03	Ecuador	0.11	0.16
Denmark	0.04	0.02	China	0.11	0.10
Iceland	0.04	0.04	Colombia	0.11	0.06
Finland	0.04	0.05	Mali	0.11	0.12
New Zealand	0.05	0.04	Niger	0.12	0.13
Philippines	0.05	0.08	Ghana	0.12	0.20
Costa Rica	0.06	0.17	South Africa	0.12	0.09
Panama	0.06	0.08	Algeria	0.13	0.12
Cote d'Ivoire	0.06	0.08	Central African Republ	0.14	0.12
Kenya	0.06	0.11	Gabon	0.15	0.13
Tunisia	0.06	0.09	Congo, Rep.	0.16	0.16
Greece	0.06	0.15	Zimbabwe	0.16	0.14
Uruguay	0.06	0.05	Botswana	0.16	0.10
El Salvador	0.06	0.10	Rwanda	0.17	0.17
Malaysia	0.06	0.06	Malawi	0.17	0.22
Mexico	0.07	0.07	Guinea-Bissau	0.17	0.37
Paraguay	0.07	0.22	Burundi	0.17	0.37
Mauritius	0.07	0.05	Togo	0.18	0.25
Madagascar	0.07	0.13	Senegal	0.19	0.07
Honduras	0.07	0.06	Nicaragua	0.20	0.17
Hong Kong, China	0.08	0.07	Mauritania	0.20	0.13
Sri Lanka	0.08	0.07	Nigeria	0.21	0.12
Papua New Guinea	0.08	0.09	Burkina Faso	0.22	0.11
Venezuela	0.08	0.12	Dominican Republic	0.24	0.11
Guatemala	0.08	0.08	Zambia	0.24	0.23
India	0.08	0.06	Bangladesh	0.25	0.11
Fiji	0.08	0.10	Chad	0.28	0.50
Brazil	0.08	0.08	Argentina	0.29	0.08
South Korea	0.08	0.11	Cameroon	0.35	0.10
Indonesia	0.08	0.09	Congo, Dem. Rep.	0.39	0.29
Morocco	0.09	0.09	Thailand	0.49	0.07

a: For our regressions, graphs and summary statistics we logged each of these volatility measures

Table 2: Effect of Democracy on Fiscal Policy Volatility: OLS on cross-sectional data

democracy measure	polity	constraints on executive	political rights	Vanhanen	Cheibub	polity	constraints on executive	political rights	Vanhanen	Cheibub
	-0.035**	-0.121**	-0.157***	-0.029***	-0.166*	-0.037*	-0.127**	-0.204**	-0.029**	-0.182
	(0.017)	(0.051)	(0.051)	(0.008)	(0.098)	(0.020)	(0.062)	(0.083)	(0.013)	(0.161)
political instability	0.144***	0.135***	0.121***	0.118***	0.158***	0.095*	0.087*	0.068	0.105**	0.108**
	(0.045)	(0.045)	(0.044)	(0.043)	(0.046)	(0.051)	(0.049)	(0.053)	(0.045)	-0.052
openness						0.111	0.099	0.056	0.115	0.102
						(0.179)	(0.181)	(0.194)	(0.216)	-0.183
domestic distortions						-0.093	-0.040	-0.102	0.26	0.03
						(0.364)	(0.379)	(0.341)	(0.345)	-0.378
fractionalization						0.077	0.096	0.058	-0.026	0.028
						(0.327)	(0.327)	(0.311)	(0.315)	-0.313
no. of elections						-0.021	-0.020	-0.004	-0.024	-0.016
						(0.033)	(0.033)	(0.032)	(0.031)	-0.031
Presidential system						-0.400	-0.438	-0.527*	-0.403	-0.411
						(0.303)	(0.308)	(0.314)	(0.292)	-0.379
Latin America & Caribbean						0.793***	0.796***	0.825***	0.624***	0.742***
						(0.269)	(0.254)	(0.254)	(0.229)	-0.262
sub-Saharan Africa						0.579**	0.589**	0.441*	0.411*	0.635***
						(0.228)	(0.232)	(0.239)	(0.242)	-0.229
Oil						0.354*	0.380**	0.328**	0.234	0.335*
						(0.185)	(0.184)	(0.157)	(0.196)	-0.19
South Asia						0.773*	0.800*	0.716	0.586	0.821*
						(0.425)	(0.406)	(0.443)	(0.426)	-0.415
constant	-2.063***	-1.606***	-1.444***	-1.688***	-1.689***	-2.202***	-1.732***	-1.343**	-1.735***	-1.840***
	(0.073)	(0.196)	(0.202)	(0.135)	(0.230)	(0.287)	(0.379)	(0.526)	(0.458)	(0.619)
No. of observations	90	90	90	89	90	82	82	82	82	82
R^2	0.34	0.34	0.37	0.39	0.32	0.44	0.44	0.46	0.48	0.43

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level

All variables are averaged over 1960-2000 except regional dummies and WTO accession. Fractionalization and domestic distortions are for the year 1960.

Policy volatility is calculated as the log of the standard deviation of the policy residuals from 1960 to 2000.

Political instability is calculated as the log of the standard deviation of Polity residuals from 1960 to 2000.

Table 3: Effect of Democracy on Trade Policy Volatility: OLS on cross-sectional data

democracy measure	polity	constraints on executive	political rights	Vanhanen	Cheibub	polity	constraints on executive	political rights	Vanhanen	Cheibub
	-0.051***	-0.157***	-0.197***	-0.030***	-0.259***	-0.041**	-0.122**	-0.174***	-0.020***	-0.169*
	(0.011)	(0.038)	(0.037)	(0.005)	(0.067)	(0.016)	(0.056)	(0.057)	(0.007)	(0.088)
political instability	0.104***	0.102***	0.088***	0.109***	0.117***	0.060	0.06	0.054	0.087**	0.082*
	(0.031)	(0.033)	(0.030)	(0.030)	(0.034)	(0.042)	(0.044)	(0.044)	(0.036)	-0.042
GATT/WTO accession						0.008**	0.008**	0.007**	0.005	0.006*
						(0.003)	(0.003)	(0.003)	(0.003)	-0.004
fractionalization						-0.265	-0.263	-0.296	-0.377*	-0.328*
						(0.207)	(0.202)	(0.195)	(0.204)	-0.195
no. of elections						-0.166	-0.154	-0.191	-0.02	-0.102
						(0.190)	(0.197)	(0.174)	(0.163)	-0.19
Presidential system						-0.044*	-0.044*	-0.031	-0.052**	-0.041
						(0.024)	(0.024)	(0.024)	(0.025)	-0.026
Latin America & Caribbean						0.518***	0.543***	0.416***	0.450***	0.592***
						(0.144)	(0.143)	(0.142)	(0.146)	-0.144
sub-Saharan Africa						0.402**	0.379**	0.388**	0.222	0.329*
						(0.174)	(0.175)	(0.182)	(0.148)	-0.176
Oil						0.224*	0.263**	0.202	0.206*	0.237*
						(0.123)	(0.129)	(0.143)	(0.115)	-0.139
South Asia						0.386***	0.392***	0.312***	0.157	0.382***
						(0.123)	(0.136)	(0.107)	(0.103)	-0.139
constant	-2.283***	-1.690***	-1.51***	-1.911***	-1.698***	-17.323***	-16.880**	-16.168***	-11.949*	-13.762*
	(0.053)	(0.153)	(0.154)	(0.091)	(0.169)	-6.512	(6.758)	(6.624)	(6.452)	(6.969)
No. of observations	90	90	90	89	90	82	82	82	82	82
R^2	0.51	0.51	0.56	0.54	0.49	0.61	0.61	0.63	0.62	0.6

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level

All variables are averaged over 1960-2000 except regional dummies and WTO accession. Fractionalization and domestic distortions are for the year 1960.

Policy volatility is calculated as the log of the standard deviation of the policy residuals from 1960 to 2000.

Political instability is calculated as the log of the standard deviation of Polity residuals from 1960 to 2000.

Table 4: Comparison of Effect of Alternative Measures of Democracy on Policy Volatility

	Fiscal Policy Volatility					Trade Policy Volatility				
veto points	-1.330**	-0.865	0.650	0.792	1.998	-2.129***	-2.343***	-1.617**	-1.575*	-0.818
	(0.523)	(1.533)	(1.373)	(1.415)	(1.430)	(0.372)	(0.777)	(0.800)	(0.804)	(0.878)
polity		-0.014	-0.015	0.055	0.067		0.007	0.005	0.026	0.034
		(0.046)	(0.044)	(0.062)	(0.059)		(0.022)	(0.022)	(0.04)	(0.039)
Vanhanen			-0.031**	-0.034***	-0.032***			-0.015*	-0.016**	-0.015*
			(0.012)	(0.013)	(0.012)			(0.008)	(0.008)	(0.007)
constraints on executive				-0.227*	-0.294**				-0.068	-0.110
				(0.134)	(0.125)				(0.112)	(0.106)
legislature diversification index					-0.930**					-0.584**
					(0.459)					(0.286)
political instability	0.141***	0.138***	0.120***	0.107**	0.125***	0.086***	0.087***	0.076**	0.072**	0.084**
	(0.042)	(0.043)	(0.044)	(0.044)	(0.044)	(0.031)	(0.031)	(0.032)	(0.033)	(0.034)
constant	-1.827***	-1.909***	-1.780***	-0.914	-1.409**	-1.904***	-1.866***	-1.802***	-1.543***	-1.853***
	(0.113)	(0.290)	(0.295)	(0.592)	(0.617)	(0.090)	(0.158)	(0.156)	(0.467)	(0.489)
No. of observations	90	90	89	89	89	90	90	89	89	89
R^2	0.34	0.34	0.40	0.41	0.44	0.55	0.55	0.57	0.57	0.59

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level.

Legislature Diversification Index is (1 - the total Herfindahl index for the legislature) from Database of Political Institutions, 2000

Veto points is from Henisz (2000) and considers consider both the number of independent veto points and the distribution of preferences within veto points.

All variables averaged over 1960-2000.

Policy volatility is calculated as the log of the standard deviation of the policy residuals from 1960 to 2000.

Political instability is calculated as the log of the standard deviation of Polity residuals from 1960 to 2000.

	Fiscal Policy Volatility					Trade Policy Volatility				
democracy measure	polity	constraints on executive	political rights	Vanhanen	Cheibub	polity	constraints on executive	political rights	Vanhanen	Cheibub
	-0.235**	-0.627*	-0.884**	-0.072***	-1.280**	-0.189***	-0.455**	-0.770**	-0.051***	-1.225**
	(0.102)	(0.321)	(0.368)	(0.024)	(0.520)	(0.064)	(0.185)	(0.300)	(0.010)	(0.618)
political instability	-0.147	-0.149	-0.154	0.241**	0.057	-0.376*	-0.327*	-0.429	-0.034	-0.262
	(0.237)	(0.283)	(0.249)	(0.115)	(0.190)	(0.201)	(0.179)	(0.263)	(0.074)	-0.223
openness	-0.525	-0.422	-0.732*	-0.196	-0.636*					
	(0.375)	(0.345)	(0.392)	(0.251)	(0.347)					
domestic distortions	-0.113	0.286	-0.239	0.523	0.527					
	(0.643)	(0.444)	(0.702)	(0.469)	(0.512)					
GATT/WTO accession						-0.002	0.001	-0.002	0.002	-0.011
						(0.006)	(0.005)	(0.007)	(0.003)	-0.01
fractionalization	-0.258	-0.206	-0.396	-0.211	-0.394	-0.193	-0.231	-0.269	-0.285	-0.424
	(0.509)	(0.446)	(0.513)	(0.442)	(0.541)	(0.311)	(0.259)	(0.401)	(0.175)	-0.337
no. of elections	0.087	0.077	0.125*	0.007	0.103*	0.027	0.005	0.069	-0.050*	0.062
	(0.059)	(0.059)	(0.070)	(0.037)	(0.058)	(0.052)	(0.047)	(0.062)	(0.027)	-0.059
Presidential system	-2.543**	-2.087*	-2.481**	-1.343**	-3.082**	-1.097**	-0.694	-1.053**	-0.233	-1.714**
	(1.271)	(1.097)	(1.056)	(0.536)	(1.223)	(0.491)	(0.452)	(0.458)	(0.195)	-0.853
Latin America & Caribbean	0.660	0.633	0.115	0.089	1.034*	1.818***	1.432***	1.768***	0.709***	1.618***
	(0.505)	(0.539)	(0.419)	(0.354)	(0.540)	(0.572)	(0.469)	(0.611)	(0.147)	-0.51
sub-Saharan Africa	0.457	0.535	0.359	0.071	0.192	1.050***	1.053***	0.599**	0.681***	0.495***
	(0.414)	(0.354)	(0.370)	(0.300)	(0.297)	(0.312)	(0.271)	(0.286)	(0.157)	-0.191
Oil	1.687*	1.383	1.454**	0.443	1.297*	0.533***	0.623***	0.440**	0.325***	1.783**
	(0.862)	(0.850)	(0.691)	(0.326)	(0.693)	(0.167)	(0.170)	(0.182)	(0.099)	-0.746
South Asia	1.432	1.368	0.855	0.256	1.589	1.554***	1.359***	1.232***	0.478***	1.916**
	(0.947)	(0.914)	(0.828)	(0.635)	(1.107)	(0.490)	(0.434)	(0.447)	(0.127)	-0.898
constant	-1.332*	0.694	2.326	-0.331	1.881	0.323	-3.266	4.994	-5.516	21.285
	(0.810)	(1.489)	(1.900)	(0.797)	(1.661)	(11.066)	(10.899)	(14.894)	(6.371)	(21.494)
No. of observations	53	53	53	53	53	53	53	53	53	53
R^2	0.21	0.22	0.26	0.41	0.25	0.5	0.59	0.46	0.61	0.29
OID test(p-value)	0.76	0.35	0.73	0.82	0.63	0.55	0.06	0.89	0.39	0.45
F-Test of excluded instruments	2.81**	2.35*	2.61*	21.75***	2.58**	1.25	1.26	1.11	15.93***	1
First stage partial R^2	0.16	0.14	0.14	0.39	0.17	0.11	0.12	0.08	0.32	0.07

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level.

All variables averaged over 1960-2000 except regional dummies and WTO accession. Fractionalization and domestic distortions are for the year 1960.

Policy volatility is calculated as the log of the standard deviation of the policy residuals from 1960 to 2000. Political instability is calculated as the log of the standard deviation of Polity residuals from 1960 to 2000.

Instruments for democracy: Colonial settler mortality rates (Acemoglu, Johnson and Robinson 2001); dummy for Muslim majority countries; dummy for countries that became independent after 1945.

The last 3 rows report the p-value from a test of overidentification, an F-test of excluded instruments and a partial R^2 from the first stage regressions.

Table 6: Effect of Democracy on Policy Volatility in Panel Data (pooled OLS)

	Fiscal Policy Volatility				Trade Policy Volatility			
	baseline	baseline+ controls	lagged polity	lagged fiscal policy volatility	baseline	baseline+ controls	lagged polity	lagged trade policy volatility
Polity measure	-0.035***	-0.022***	-0.013*	-0.016**	-0.049***	-0.033***	-0.034***	-0.021***
	(0.004)	(0.006)	(0.007)	(0.007)	(0.005)	(0.006)	(0.007)	(0.007)
political instability	0.140***	0.115***	0.094***	0.084***	0.109***	0.067***	0.031	0.043*
	(0.021)	(0.022)	(0.024)	(0.023)	(0.021)	(0.024)	(0.025)	(0.024)
openness		0.064	0.025	0.044				
		(0.049)	(0.057)	(0.054)				
GATT/WTO accession						-0.131	-0.123	-0.040
						(0.100)	(0.106)	(0.108)
Presidential system		-0.118	0.014	-0.041		0.065***	-0.051***	-0.041*
		(0.104)	(0.104)	(0.110)		(0.022)	(0.019)	(0.023)
no. of elections		-0.024	-0.093***	-0.089***		0.437***	0.428***	0.376***
		(0.022)	(0.023)	(0.023)		(0.103)	(0.102)	(0.100)
Latin America & Caribbean		0.448***	0.364***	0.304***		0.778***	0.632***	0.574***
		(0.094)	(0.096)	(0.095)		(0.095)	(0.092)	(0.094)
sub-Saharan Africa		0.557***	0.498***	0.357***		0.258*	0.228	0.183
		(0.091)	(0.099)	(0.089)		(0.148)	(0.147)	(0.144)
Oil		0.305***	0.303***	0.224**		0.589***	0.534***	0.515***
		(0.106)	(0.109)	(0.112)		(0.150)	(0.122)	(0.158)
South Asia		0.565***	0.494**	0.436**		-0.069	-0.092	-0.110
		(0.175)	(0.205)	(0.182)		(0.084)	(0.082)	(0.081)
lagged dependent variable				0.201***				0.129**
				(0.058)				(0.051)
constant	2.601***	2.109***	2.362***	1.894***	2.480***	2.064***	2.377***	2.090***
	(0.036)	(0.189)	(0.229)	(0.242)	(0.040)	(0.109)	(0.103)	(0.137)
No. of observations	342	277	237	236	348	282	241	242
R^2	0.34	0.46	0.44	0.50	0.34	0.50	0.51	0.49

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level

All variables are averaged by decades (1960-1969; 1970-1979; 1980-1989; 1990-2000) except regional dummies and WTO accession

Policy volatility is calculated as the log of the standard deviation of the policy residuals by decade.

Political instability is calculated as the log of the standard deviation of Polity residuals by decade.

Table 7: Effect of Democracy on Fiscal Policy Volatility in Panel Data (Fixed and Random Effects)

	Fixed Effects					Random Effects				
	polity	constraints on exec	political rights	Vanhanen	Cheibub	polity	constraints on exec	political rights	Vanhanen	Cheibub
democracy measure	-0.021**	-0.063**	-0.045	-0.026***	-0.080*	-0.024***	-0.073***	-0.084***	-0.014***	-0.142***
	(0.008)	(0.025)	(0.036)	(0.009)	(0.049)	(0.007)	(0.020)	(0.026)	(0.004)	(0.037)
political instability	0.054**	0.053**	0.036	0.084***	0.056**	0.094***	0.092***	0.079***	0.115***	0.100***
	(0.027)	(0.027)	(0.031)	(0.031)	(0.027)	(0.023)	(0.023)	(0.024)	(0.025)	-0.022
openness	-0.042	-0.029	-0.298**	0.150	-0.062	0.049	0.062	-0.021	0.047	0.04
	(0.114)	(0.116)	(0.131)	(0.146)	(0.116)	(0.061)	(0.061)	(0.064)	(0.067)	-0.06
Presidential system	-0.552	-0.551	-0.638*	-0.615	-0.570	-0.141	-0.137	-0.086	-0.142	-0.176
	(0.358)	(0.358)	(0.360)	(0.464)	(0.364)	(0.117)	(0.116)	(0.114)	(0.122)	-0.117
no. of elections	0.004	0.003	-0.037	0.013	-0.007	-0.011	-0.011	-0.055**	-0.006	-0.017
	(0.022)	(0.021)	(0.026)	(0.024)	(0.021)	(0.019)	(0.019)	(0.023)	(0.021)	-0.019
fractionalization						-0.104	-0.113	-0.094	-0.17	-0.153
						(0.160)	(0.160)	(0.153)	(0.172)	-0.155
Latin America & Caribbean						0.460***	0.447***	0.382***	0.386***	0.441***
						(0.118)	(0.118)	(0.112)	(0.122)	-0.114
sub-Saharan Africa						0.602***	0.609***	0.485***	0.500***	0.638***
						(0.125)	(0.124)	(0.121)	(0.139)	-0.12
Oil						0.319**	0.333**	0.313**	0.351**	0.316**
						(0.147)	(0.147)	(0.137)	(0.156)	-0.143
South Asia						0.610***	0.626***	0.498**	0.511**	0.650***
						(0.212)	(0.212)	(0.206)	(0.217)	-0.205
constant	2.950***	3.131***	4.354***	2.581***	3.220***	2.172***	2.394***	2.994***	2.406***	2.580***
	(0.478)	(0.474)	(0.577)	(0.564)	(0.483)	(0.245)	(0.258)	(0.321)	(0.289)	(0.273)
No. of observations	277	277	242	241	277	277	277	242	241	277
No of countries	81	81	81	81	81	81	81	81	81	81
R^2	0.07	0.07	0.11	0.08	0.05	0.46	0.46	0.46	0.44	0.47

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level

All variables are averaged by decades (1960-1969; 1970-1979; 1980-1989; 1990-2000) except regional dummies. Fractionalization and domestic distortions are calculated for the year 1960.

Policy volatility is calculated as the log of the standard deviation of the policy residuals by decade.

Political instability is calculated as the log of the standard deviation of Polity residuals by decade.

Table 8: Effect of Democracy on Trade Policy Volatility in Panel Data (Fixed and Random Effects)

	Fixed Effects					Random Effects				
	polity	constraints on exec	political rights	Vanhanen	Cheibub	polity	constraints on exec	political rights	Vanhanen	Cheibub
democracy measure	-0.013	-0.041	-0.009	-0.009	-0.084	-0.030***	-0.083***	-0.095***	-0.020***	-0.150***
	(0.010)	(0.029)	(0.039)	(0.010)	(0.057)	(0.007)	(0.022)	(0.026)	(0.005)	(0.042)
political instability	0.015	0.015	0.030	0.036	0.018	0.058**	0.057**	0.046*	0.100***	0.064***
	(0.030)	(0.030)	(0.031)	(0.035)	(0.030)	(0.025)	(0.025)	(0.024)	(0.026)	(0.025)
accession	-0.047	-0.049	-0.107	-0.071	-0.061	-0.056	-0.067	-0.103	-0.002	-0.059
	(0.131)	(0.129)	(0.124)	(0.141)	(0.127)	(0.097)	(0.097)	(0.091)	(0.11)	(0.098)
Presidential system	-0.251	-0.253	-0.273	-0.643	-0.294	-0.111	-0.087	-0.039	-0.165	-0.109
	(0.418)	(0.418)	(0.385)	(0.543)	(0.421)	(0.117)	(0.118)	(0.105)	(0.117)	(0.125)
no. of elections	0.077***	0.078***	-0.010	0.087***	0.075***	0.070***	0.069***	-0.019	0.081***	0.062***
	(0.024)	(0.024)	(0.027)	(0.027)	(0.023)	(0.022)	(0.022)	(0.024)	(0.023)	(0.021)
fractionalization						0.028	0.022	-0.001	-0.163	-0.019
						(0.154)	(0.159)	(0.138)	(0.163)	(0.163)
Latin America & Caribbean						0.449***	0.428***	0.389***	0.348***	0.422***
						(0.118)	(0.120)	(0.104)	(0.117)	(0.122)
sub-Saharan Africa						0.787***	0.814***	0.611***	0.562***	0.840***
						(0.120)	(0.122)	(0.11)	(0.136)	(0.124)
Oil						0.258*	0.285**	0.2	0.340**	0.258*
						(0.141)	(0.144)	(0.123)	(0.147)	(0.148)
South Asia						0.590***	0.599***	0.536***	0.460**	0.632***
						(0.202)	(0.208)	(0.185)	(0.201)	(0.215)
constant	2.315***	2.470***	2.706***	2.559***	2.553***	2.003***	2.298***	2.788***	2.362***	2.363***
	(0.254)	(0.278)	(0.315)	(0.349)	(0.301)	(0.135)	(0.166)	(0.192)	(0.174)	(0.182)
No. of observations	282	282	246	246	282	282	282	246	246	282
No of countries	82	82	82	82	82	82	82	82	82	82
R^2	0.06	0.06	0.02	0.07	0.06	0.5	0.49	0.49	0.48	0.49

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level

All variables are averaged by decades (1960-1969; 1970-1979; 1980-1989; 1990-2000) except regional dummies and WTO accession. Fractionalization is calculated for the year 1960.

Policy volatility is calculated as the log of the standard deviation of the policy residuals by decade.

Political instability is calculated as the log of the standard deviation of Polity residuals by decade.

Table 9: Output Volatility, Democracy and Policy Volatility

	Univariate	Baseline	Baseline + controls	Volatility instrumented	Polity and volatility instrumented	Baseline	Baseline + controls	Volatility instrumented	Polity and volatility instrumented
Polity measure	-0.054***	-0.042***	-0.038***	-0.020*	-0.024*	-0.024***	-0.025***	-0.008	-0.016*
	(0.006)	(0.008)	(0.008)	(0.011)	(0.014)	(0.007)	-0.008	(0.009)	(0.009)
fiscal policy volatility		0.178***	0.148**	0.460***	0.237*				
		(0.060)	(0.060)	(0.154)	(0.125)				
trade policy volatility						0.395***	0.384***	0.557***	0.447***
						(0.060)	(0.065)	(0.113)	(0.122)
inflation			-0.005	-0.025	-0.020		-0.004	-0.008	-0.004
			(0.017)	(0.027)	(0.026)		(0.015)	(0.030)	(0.029)
terms of trade volatility			0.002	0.003	0.005		0.001	0.001	-0.000
			(0.003)	(0.003)	(0.003)		(0.003)	(0.003)	(-0.004)
exchange rate overvaluation			0.002	0.002	0.002*		0.002	0.001	0.001
			(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)
government expenditure			0.114	0.194	0.113		0.221	0.357**	0.315
			(0.151)	(0.170)	(0.218)		(0.143)	(0.145)	(0.217)
openness			0.128	0.148	0.265***		0.124*	-0.108	0.104
			(0.115)	(0.140)	(0.073)		(0.067)	(0.153)	(0.323)
constant	1.583***	1.958***	1.273***	1.732***	1.242***	2.496***	1.649***	1.770***	1.573***
	(0.042)	(0.142)	(0.359)	(0.426)	(0.405)	(0.15)	(0.314)	(0.441)	(0.419)
No. of observations	90	90	85	78	52	90	85	69	47
R^2	0.45	0.51	0.55	0.4	0.49	0.61	0.64	0.64	0.6
OID Test (p-value)				0.4	0.2			0.55	0.17
F-Test of excluded instruments (polity)				2.89**	14.34***			5.05***	13.81***
First stage partial R^2 (polity)				0.19	0.66			0.26	0.74
F-Test of excluded instruments (policy volatility)					4.53***				4.89***
First stage partial R^2 (politcy volatility)					0.43				0.5

Robust standard errors in parentheses; *** - significant at 1% level, ** - significant at 5% level * - significant at 10% level; All variables are averaged over 1960-2000.

Policy volatility is calculated as the log of the standard deviation of the policy residuals from 1960 to 2000.

Instruments for democracy: Colonial settler mortality rates (Acemoglu, Johnson and Robinson 2001); dummy for Muslim majority countries; dummy for countries that became independent after 1945.

Instruments for fiscal policy volatility: political instability, dummy for Presidential governments, number of elections, domestic distortions and a Latin American dummy

Instruments for trade policy volatility: political instability, dummy for Presidential governments, number of elections, WTO accession and a Latin American dummy

The last 5 rows report the p-value from a test of overidentification, F-tests of excluded instruments and a partial R^2's from the first stage regressions.

F-test and partial R^2 is reported separately for each of the instrumented variables - polity and policy volatility
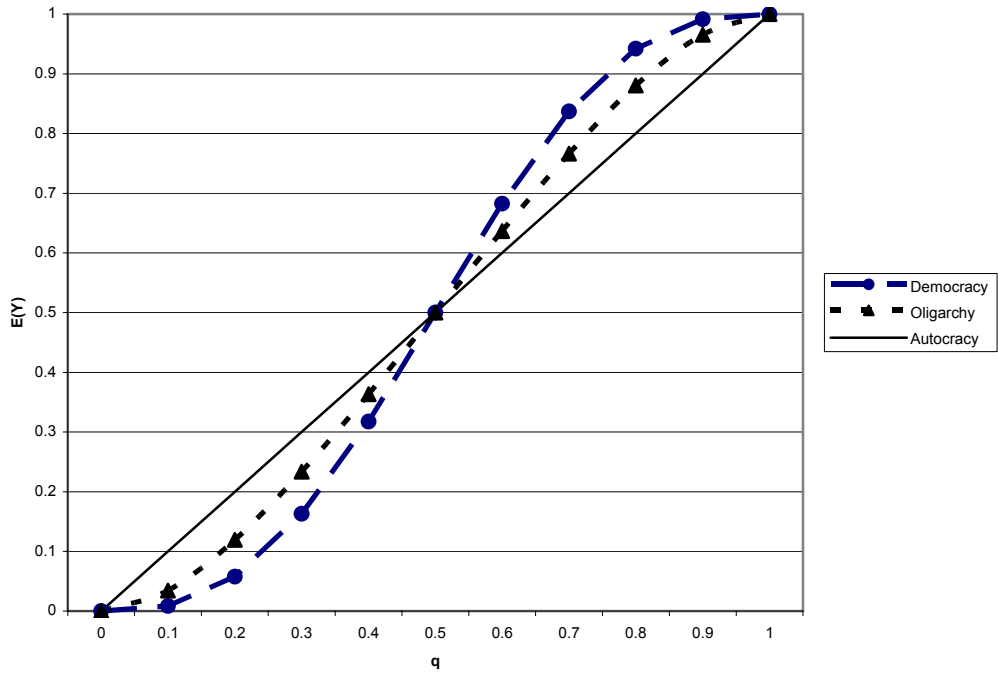
Figure 1: E(Y) Under Different Political Systems

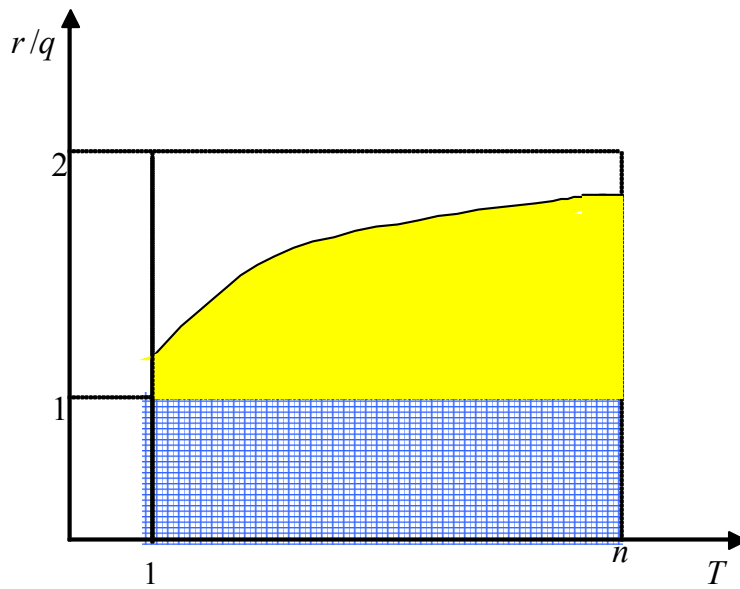**Figure 2: Effect of Decentralization when the Oligarch has Superior Ability**

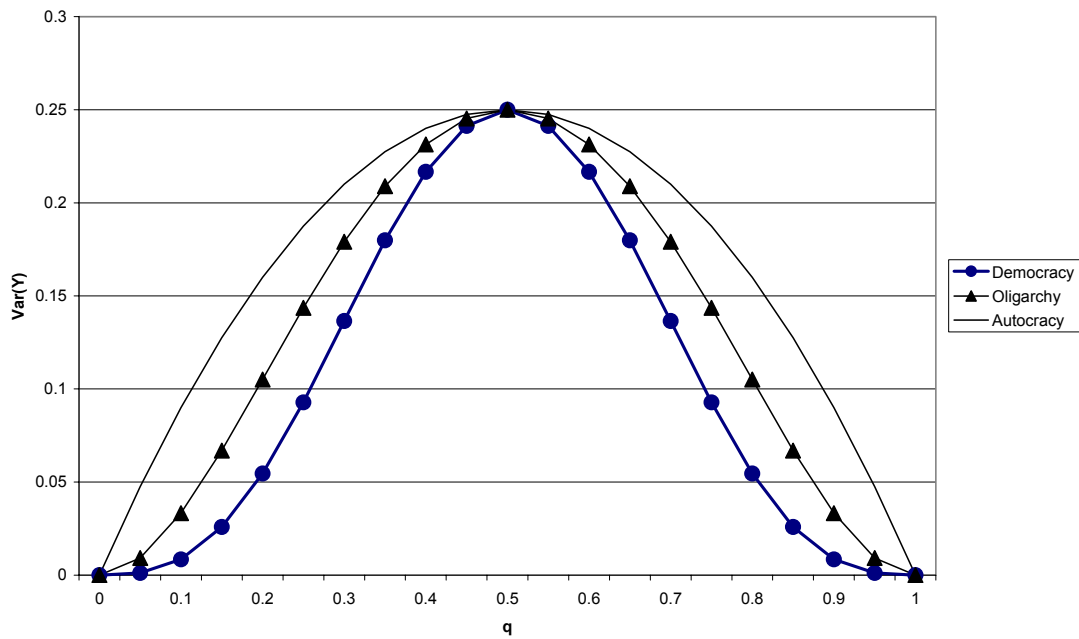## Figure 3: Var(Y) Under Different Political Systems
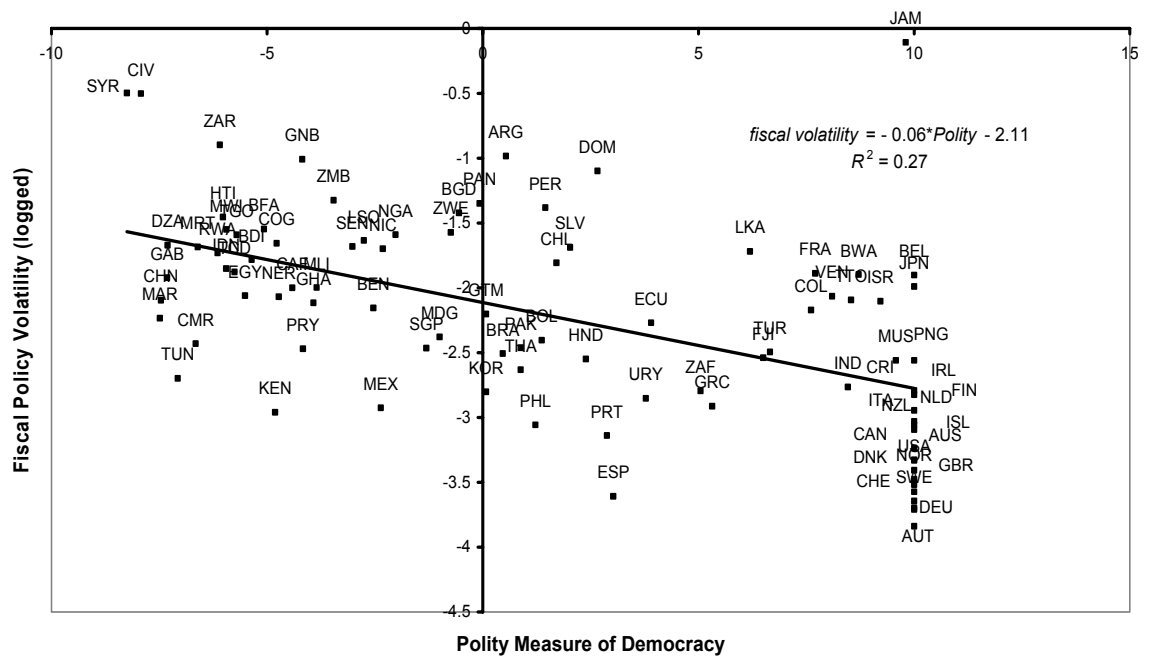

Figure 4: Democracy and Fiscal Policy Volatility

fiscal volatility = - 0.06*Polity - 2.11
$R^2 = 0.27$

Figure 5: Democracy and Trade Policy Volatility

trade volatility = -0.07*Polity - 2.32
$R^2 = 0.46$

Trade Policy Volatility (logged)

Democracy (Polity Measure)

Figure 6: Democracy and Output Volatility

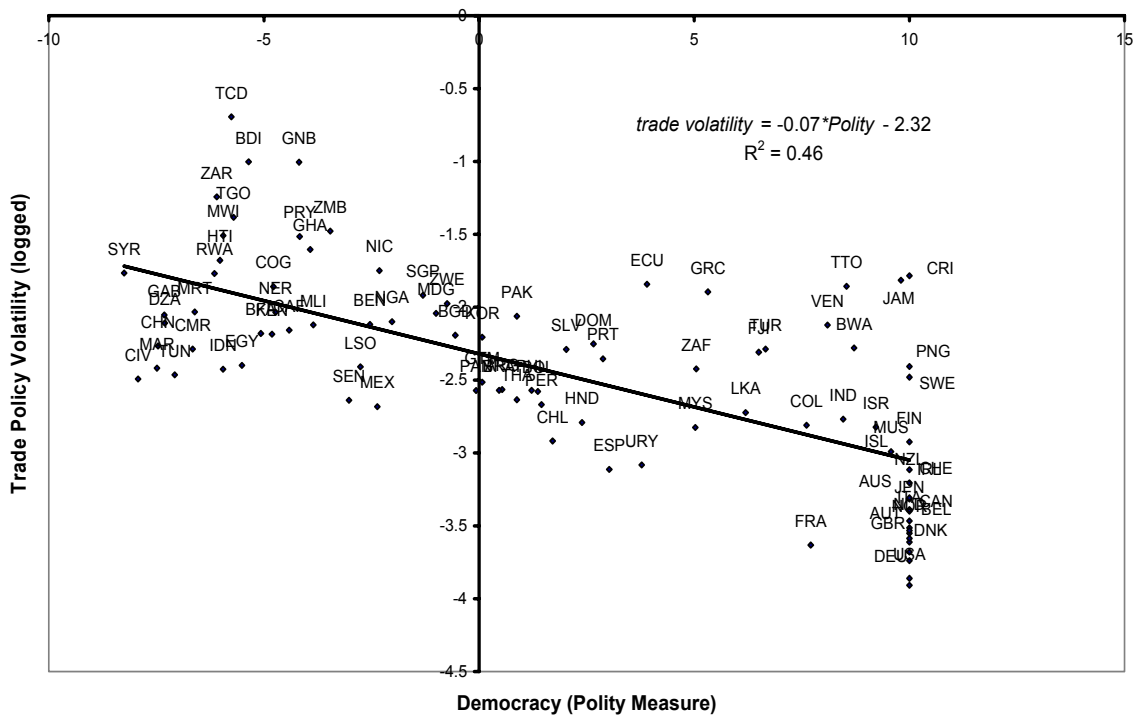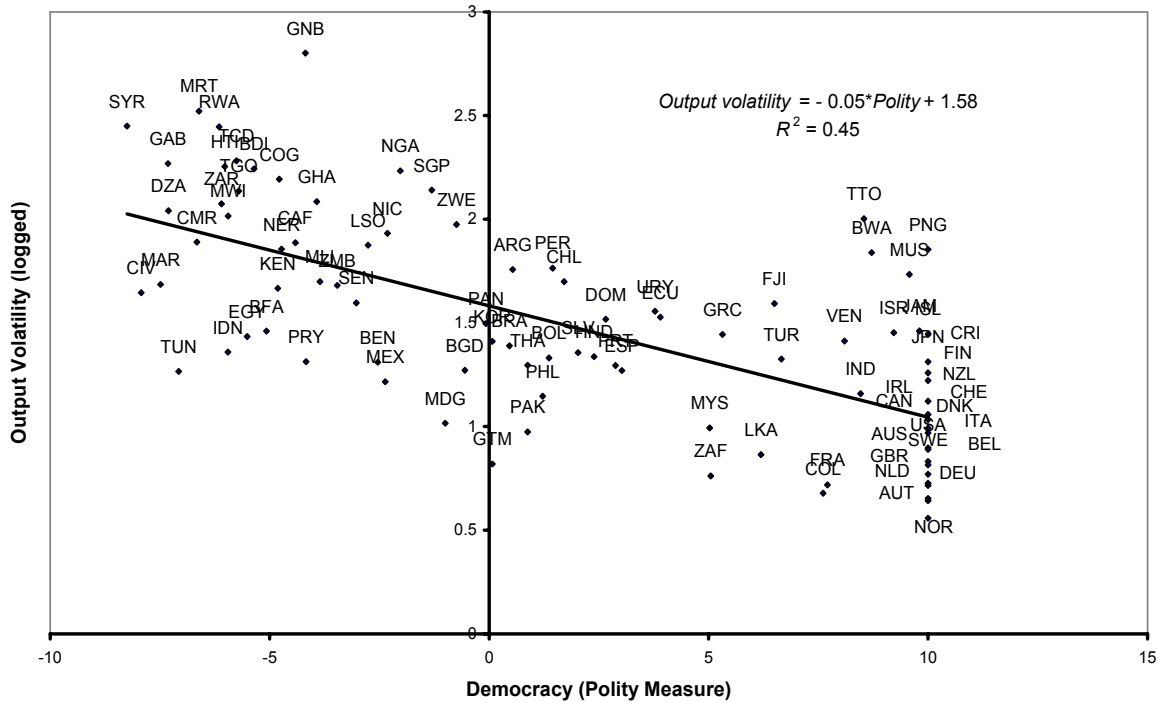Output volatility = - 0.05*Polity + 1.58
$R^2 = 0.45$

Output Volatility (logged)

Democracy (Polity Measure)

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