

## **Democracy and National Economic Performance:**

### **The Search for Stability**

#### *ABSTRACT*

Does democracy affect national economic performance? Previous analyses of democracy's effect on economic performance generally begin with an unsound assumption--voters demand the highest rate of economic growth. From an analysis of the likely risk/return preferences of voters, this paper develops the hypothesis that democracies differ from dictatorships in that democracies reflect the risk preferences of citizens. The results, based on a sample of 108 countries, 1974-1989, are consistent with this hypothesis. Democracies, compared to autocracies, are unquestionably characterized by stable growth rates. The results are robust both to changes in modeling assumptions and to trimming the upper and lower extremes of the sample. Three studies from the comparative economic voting literature are re-examined: those by Powell and Whitten 1993, Pacek and Radcliff 1995, and Wilkin et al 1997. Risk, measured as volatility, is shown in each model to be a negative and statistically significant influence on incumbent vote shares.

## *Introduction*

Does democracy affect national economic performance and if so, how? No question is more central to the study of political economics. The existing scholarly work on the subject is well known for its contradictory theoretical and empirical findings. In this paper we advance a modified perspective that offers some resolution of the prior results. This resolution assumes that voters evaluate economic performance in two dimensions--rate and stability over time--rather than the more conventional single dimension--rate of growth. Our analysis proposes that economic performance in more democratic systems will reflect *both* the aversion of voters to economic volatility *and* their desire for increased income.

This suggests the key hypothesis of the study, that more democratic systems differ from less democratic systems by having either growth characterized by low volatility or higher volatility accompanied by higher rates of growth. We will show in an analysis of 108 countries (1974-89) that when two dimensions of economic performance are examined--the rate *and* volatility of growth--more democratic countries unquestionably have distinctively favorable rate and volatility characteristics than do less democratic countries. Using Leamer's (1983, 1985) "extreme bounds analysis," we show that these results appear to be extremely robust to changes in conditioning information and to exclusion of extreme observations.

Next, we present evidence strongly supporting our hypothesis that this effect results from the tendency of voters to penalize incumbent governments for high economic volatility and reward them for lower volatility. This demonstration involves adding a measure of economic volatility (or, alternatively, a measure of risk-adjusted growth) as an independent variable to models used in three published studies of comparative economic voting. We find that increasing prior volatility is negatively and statistically significantly linked to incumbent vote shares.

### *Democracy's Effect on Economic Growth: A Theoretical and Empirical Review*

Whether and how democracy and long-run economic growth are associated is a secondary question for many political scientists and moral philosophers. Democracy is a moral economy that is

broadly superior on philosophical grounds independent of economic performance.

Even so, political economists have puzzled at length about democracy's possibly deleterious effects on national economic performance (for recent reviews, see Alesina and Perotti 1994; Keech 1995; Przeworski, Alvarez, Cheibub, and Limongi 1996; Remmer 1995; Sirowoy and Inkles 1990; and Wittman 1995). It has often been claimed that democratic politics impose costs, or make economic adaptation more costly. A "strong hand" may be better suited than democratic political institutions to manage the challenge of industrialization and rapid economic growth.

### **A Negative Relationship?**

The hypothesized negative relationship between democracy and growth has theoretical underpinnings rooted in redistributive democratic politics (see Keech 1995 for a useful review). Since Adam Smith, political economists have worried that political demands for redistribution of wealth and income are easily realized in democracies. Insofar as redistribution reduces growth, democracies will grow less rapidly than non-democracies. Alesina and Rodrik 1994 and Persson and Tabellini 1994 offer modern versions. High levels of inequality are harmful for subsequent economic growth, they suggest, because in democracies, high inequality leads to policies that reallocate national income from investment to consumption—thereby slowing growth.

Democracy's theorized deleterious effects on economic performance are not limited to shifting national income from investment to consumption. Olson 1982 predicts that stable democracies will be overwhelmed by interest groups, which use political activity to gain rents and, as a side consequence, reduce national wealth ("sclerosis"). Buchanan and Wagner 1977 predict an unending growth of government, which eventually will strangle the economy. Nordhaus 1975 demonstrates that democratic partisan competition can lead to unnecessary manipulation of growth rates, which will be eventually destructive and costly to correct. Barro and Gordon 1983 show that policy-makers in democracy face a "time-inconsistency problem" which is very difficult to solve within the context of democratic institutions, and which makes inflation much more likely. In short, many prominent economists have developed theory for the claim that democracy harms economic performance.

Not all recent theorizing about democracy and growth has produced bleak predictions. In one very important line of argument, Wittman and others note that democratic competition is inherently effective as a mechanism for revealing information (Wittman 1989, 1995; Babba 1997). Therefore, Wittman argues, the more developed the democracy, the more highly developed the institutions that guarantee transparency of policy and policy-making processes. The information thus revealed--about preferences, the state of the world, and elite action, and prior policy impacts--is useful both to elites and to ordinary voters. It enables citizens to monitor more effectively the behavior of elected officials. It has the effect of reducing the probability of government officials adopting policies that are purely rent-seeking or self-serving relative to the probability that such policies would be adopted in an undemocratic setting. It makes, over time, democracy a system of moderation and constraint, with equilibrium properties (Przeworski 1991).

Several studies build on North (e.g., 1989) in arguing that some institutions critical to growth (especially property rights) are enhanced in democracy--thereby encouraging growth (e.g., Kormendi and Meguire 1985, Knack and Keefer 1995, Clague, Keefer, Knack, and Olson 1996, World Bank 1997). As Pastor and Sung 1995 note, private sector actors are more likely to undertake investment in settings where property rights are better protected, and they find that higher rates of investment are correlated with democratic regimes. Other studies, Scully 1992, 1997, in particular, go beyond property rights to link a broader conception of liberty to stronger national economic performance.

In theoretical terms, however, much of the recent scholarly work represents a remarkable moderation of the optimism of "modernization theory," which held that democracy and economic growth were reinforcing processes. (See, e.g., Lipset 1960; Rostow 1960.) What do the empirical studies show?

### **Ambiguous Empirical Results**

While much of the post-1960 theoretical work on democracy and economic growth is pessimistic regarding democratic performance, the empirical tests of that link have produced ambiguous results. Sirowy and Inkles 1990, reviewing 15 empirical investigations (drawn from 13 reports), found that 11 showed either no relationship or a conditional relationship between growth and democracy. Przeworski

and Limongi 1993 review 18 studies (with 21 sets of findings), and also find inconsistent results: eight studies reported a positive link between democracy and growth, eight reported a negative link, five others, no link. Subsequent studies are similarly inconsistent, for example: Helliwell 1994, negative; Keefer and Knack 1997, negative/none; Leblang 1997, positive; Przeworski et al. 1996, none; Burkhart and Lewis-Beck 1994, none; Pourgerami 1992, marginally positive; Weede 1996, mixed; Feng 1997, negative.

Prior literature suggests two especially important sources of such inconsistencies. The first is inconsistent modeling assumptions, and the second is selection bias.<sup>1</sup>

*Inconsistent Modeling Assumptions.* Leamer 1983 notes that differences, sometimes minor, in model specification lead to very different empirical results with very different substantive interpretations. Leamer proposed that scholars undertake "sensitivity analysis" to see if their econometric results can be attributed to their modeling assumptions. As he put it, "an inference is not believable if it is fragile, if it can be reversed by minor changes in [modeling] assumptions" (1983, 38).

Leamer's critique is relevant for studies of democracy and economic growth since the models used by different investigators do vary widely. For example, in a recent note, Leblang 1997 excludes investment from his model, even though Levine and Renelt 1992 and Faberger 1994 demonstrate that investment is the most consistently robust correlate of long-run growth. Keefer and Knack's 1997 models also exclude investment. Helliwell 1994 includes investment in his analysis, but omits some education and population measures included by others. Alesina and Rodrik 1994, and Persson and Tabellini 1994 omit from their models any measure of labor force growth. Both typically do include some indicator of human capital formation. Given that it is apparently unlikely that we will agree precisely on the appropriate model, if scholars were to employ some version of Leamer's (1983, 1985) extreme bounds

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<sup>1</sup> There are, of course, many differences between these studies that cannot be explored here. Feng, for example, uses 3SLS and a 1960-1980 cross-section; LeBlang uses three panels of ten-year cross-sections; Pourgerami apparently reports estimates for a single-year cross-section; Przeworski et al. use survival analysis; and Burkhart and Lewis-Beck use a large TSCS. Most, except for Pourgerami and Burkhart-Lewis-Beck, can appropriately be characterized as long-run growth models.

analysis, we might come closer to knowing whether democracy's economic effects (or lack thereof) arises from some small detail of model specification.

*Selection Bias.* Przeworski and Limongi 1993 (PL) point to a very different problem. In their view, selection bias, not inconsistent modeling assumptions, undercuts most empirical examinations of the link between democracy and economic performance. If some factors lead countries to "select" democracy, and those factors also lead independently to good or bad economic performance, regression models will result in biased and inconsistent estimates of the impact of democracy on growth. The solution to this problem would be to implement a two-step estimating procedure (see Green 1993; Maddala 1983).

In order to correct for selection bias, scholars must identify the selection mechanism. In the very best studies on the topic, we find two proposed selection mechanisms, which are, however, seemingly inconsistent. One set of authors propose that poorly performing authoritarian regimes are likely to be displaced by democracies, whereas poorly performing democracies are likely to experience a change of government in an election (Przeworski and Limongi 1993). As a result of this selection mechanism, we would mistakenly find a *negative* relationship between economic performance and democracy. Other authors argue convincingly that economic failure "causes" dictatorships in poor countries, while democracies, which appear randomly ("spring up"), or spread by geographic contagion, are sustained by economic success (Przeworski, Alvarez, Cheibub and Limongi 1996). Thus, econometric analysis might mistakenly find a *positive* relationship between democracy and economic growth.

It is quite likely that there is one or more selection mechanism at work. It may also be true that the divergent empirical results stem predictably from sample composition effects. To our knowledge, no one has yet advanced a general account linking a selection mechanism to the empirical results.

We believe, however, that failure to model the selection mechanism is probably not the main source of inconsistency in the existing literature.<sup>2</sup> And we also judge that the Przeworski-Limongi

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<sup>2</sup> As observed above, the results of prior studies reviewed by Przeworski and Limongi and by Sirowy and Inkeles do not offer strong support for the presence of either mechanism. Some well-regarded econometric studies involving selection processes (e.g., returns to college education, see Grogger and Edie 1996), treat the problem as an omitted

rejection of "standard regression models" is probably overstated, given that there is currently no well-developed, widely accepted theory of the genesis of democracy that reliably shows how the selection mechanism is linked to economic performance. We do believe that selection processes are important to consider. We also accept Leamer's proposal that any results obtained should be examined for "fragility."

*An Alternative Solution: Risk and Expected Return*

Consider a third explanation for the conflicted theory and ambiguous empirical results. *Perhaps scholars have misjudged the objectives of democratic citizens concerning the economy.* Recent studies of public opinion's effect on public policy show, broadly, that the public get what they want (see, e.g., Stimson, Erikson, and MacKuen 1995; Page and Shapiro 1993). Wittman 1995 demonstrates that the political market is neither less nor more efficient than consumer markets in transmitting information about preference. It is certainly possible that democratic citizens willingly trade lower growth rates with greater stability for the chance of higher, but unstable growth. If so, then the prior studies, which have focused on the rate of growth, will have missed an important aspect of democratic economic performance, and may mischaracterize what democracy contributes to economic performance.

We know from financial economics that investment risk and expected return are positively associated. If we pose the question of the possible link between economic growth and democracy in the risk and return framework of financial economics, then the issue is this: do voters want the high risk (i.e.,

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variable question, not as a problem requiring a two-step estimation. In that case, the approach to estimation is simply to include (control for) the selection variable (ability) in the model of earnings that also shows the independent effect of college education. The analog omitted variable in the case of democracy and growth could be some lagged indicator of economic performance, possibly interacted with prior regime type, that would have "caused" the selection of democracy. To anticipate the empirical results reported below, our experiments with such specifications show that previous rates of economic growth, taken alone or in interaction with baseline democracy, have no statistically significant effects, and do not influence our estimates of baseline democracy's effect on subsequent national economic performance. We also included in our estimates other measures (e.g., primary and secondary education rates, per capita income) that some have suggested are predictors of future democracy.

volatility) that is generally associated with high expected return? After all, the point of the financial economists is precisely that running higher risks brings with it no guarantee of higher returns, and empirical investigations readily show that higher risk often brings with it lower returns. The analysis that follows draws an analogy between democratically controlled economic policy (broadly construed) and private investment decisions.

## **Risk and Return**

An axiom of financial economics is that risk and return are positively associated--for investors to hope to earn higher returns in any single investment, they must select an investment that embodies higher risk of zero or negative returns.<sup>3</sup> Risk is defined in financial economics as the variability of financial returns, and operationalized as the volatility of observed returns (i.e., the standard deviation). The "expected return" is the most likely return for an investment. The relationship between risk and expected return is typically portrayed graphically, with risk or volatility (s) on the horizontal axis, and expected return (Z) on the vertical axis; the "risk/return frontier" traces the minimum-variance locus--a line showing what return rational investors should demand for a given level of risk (Sharpe 1970; Ingersoll 1987, 82-7). Efficient investments produce optimal returns for a given level of risk. An inefficient investment is "inside" the frontier and provides a lower return.<sup>4</sup> Thus, a low return/low risk investment can be just as efficient as a high return/high risk investment because there is no available investment with

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<sup>3</sup> Generally speaking, this is true for portfolios, or combinations of investments, too, although if investments' returns are negatively correlated, a portfolio can substantially increase the return over a single investment while substantially reducing risk.

<sup>4</sup> For obvious reasons, we do not follow this analogy through the steps of calculating a portfolio of "investments" (i.e., countries) that could minimize variance. This is a relevant question from the point of view of investors to the extent that they can make investments that are intended to reflect the performance of different economies (or "buying" different countries). Voters and other interests participating in democratic politics are not involved in this kind of diversification. In terms of the financial economics analogy, voters have to put all their eggs in one basket, but they have some ability to influence the nature of the basket.

equally low risk and a higher return. More efficient investments are those closer to the efficient frontier; they have the best rate of growth, given a level of variance (or vice versa). It is perfectly rational for investors to seek different degrees of risk exposure, and law often requires that some investment portfolios (e.g., those of pension funds) must strictly limit risk exposure.

Let us draw an analogy between private investment decisions and national economic performance. Following this analogy, "risk" can be thought of as the volatility of a nation's growth rate over time (the standard deviation of a nation's annual economic growth). "Return" can be thought of as the observed (ex post average) national growth rate. As with investments, risk and expected return in economic growth can be portrayed graphically (following the convention of financial economics), with expected return on the vertical axis, and risk on the horizontal axis. Efficiency can be operationalized as any point near to the analogue to the efficient frontier, which is the line made by the risk-return performance of the world's best-performing economies. We call this analogue to the efficient frontier *the efficient countries' line*. The deviation from the efficient countries' line measures how far from the risk-return performance of the leading economies a nation is—it measure a country's *growth gap*.

It is, of course, true that some parts of growth rates and growth volatility differ among nations for reasons that have little to do with government policy. The widely adopted theoretical notion of "conditional convergence" in economic growth implies that nations can be thought of as having "growth trajectories" related to their current level of development, capital investment, and store of "human capital." The notion of conditional convergence suggests that among similarly endowed countries, poorer countries grow more rapidly than rich countries (Baumol, Blackman, and Wolff 1989).

The risk/return analogy from financial economics is apt, even so. Many government economic policies have the effect of stabilizing the economy, thereby dampening volatility in growth rates. Counter-cyclical fiscal and monetary policies, for example, are employed world-wide by governments. Various social welfare guarantees have come to be referred to as "automatic stabilizers." Institutions have been developed to enhance financial stability (e.g., deposit insurance and balance-sheet surveillance) and to guarantee the orderly resolution of disputes about property rights. And, while it is questionable to what

extent government policies toward private investment predictably *increase* the rate of growth — risklessly or otherwise (Easterly et al. 1993), it is clear that governments can pursue policies that predictably *decrease* growth or increase volatility, or both. A government's ability to undermine growth is, in fact, the primary claim of the negative hypotheses reviewed above.

Perhaps one of the clearest examples of the relationship between risk/return and government policies involves international trade. It is axiomatic in economics that trade liberalization increases "the wealth of nations." It is also true that trade openness increases a nation's exposure to international shocks, which an obvious potential source of volatility. Hence, countries with large shares of imports and exports should be wealthier than they otherwise would be, but will also be more exposed to economic volatility than they would otherwise be.

Another government strategy some have recommended for predictably increasing growth rates is for a government to invest in such a way so as to change international comparative advantage. By using industrial policies or trade barriers, it has been suggested, governments might be able to create advantage in manufacturing products, but only by running a risk that the resulting firms might be inefficient and drain wealth away from a nation (e.g., World Bank 1993). The investments in human capital made by governments in Central and Northern Europe are examples of government investments in comparative advantage in skilled labor that appear to have paid off. Investment in education is not a riskless investment, however: highly educated individuals may emigrate, and the investment payoff may not be realized.

### **Democracy and risk and return**

Democracy's distinctive feature (compared to non-democracies) is that it is a mechanism whereby citizens have a routinized opportunity to oust incumbent politicians.<sup>5</sup> Democracy can be thought of as an equilibrium (Przeworski 1991) whereby deviations from citizen preferences (or changes in voter preferences) are adjusted, and where elite behavior is circumscribed. We expect democracies, therefore, broadly to reflect citizen preferences and to limit rent-seeking behavior by elites. We believe that two

main mechanisms moderate the volatility of democracy. The first is literally the preference of voters for avoiding risk. The second is the information-revealing character of democratic competition, which makes large abuses harder to achieve and raises the likelihood that policies are consistent with the preferences of voters.

What do citizens want regarding economic growth and risk? We observe that voters want increased wealth, as they apparently judge politicians based upon national economic performance (Lewis-Beck 1988; Powell and Whitten 1993). While citizens want increased wealth, do they want the increased risk associated with governments seeking the highest possible rate of growth?

The public opinion survey data on growth and risk thin, but when questions have been asked, they show that U.S. voters identify economic instability as one of their greatest fears.<sup>6</sup> As the well-known "equity premium puzzle" shows, investors are risk averse, even when they have an opportunity to diversify away risk.<sup>7</sup> Since voters have even fewer options to diversify away the risk of a failed political

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<sup>5</sup> Particularly useful are discussions in Dahl 1971; Riker and Weimer 1993, and Przeworski 1991.

<sup>6</sup> For example, an April 1974 "State of the Nation Survey" (Question ID: USGALLUP.74POTA.Q02) asked 625 U.S. respondents "What are your fears and worries for the future?" 25% identified "economic instability," which was the highest response to any question, topping health or other concerns. (In the same survey, 23% identified "ill-health, accident, death, or continued illness (physical or mental)" as their greatest worry.) The same or very similar question was asked several times in the 1970s, and economic instability was always the first or second leading concern. (See USGALLUP.76POTM.Q07A; USGALLUP.74POTB.Q02; USROPER.780651.R03). When the question was asked in September of 1964 (USGALLUP.633POS.Q05B1), economic instability (13%) took third place to war (48%) and communism (25%). After 1979, questions on domestic economic instability do not appear in the Roper Center's Public Opinion Online. Accession at Roper Center 1998.

<sup>7</sup> Individuals can acquire portfolios that include assets from other countries, and can thereby diversify the some aspects of the risk of poor home country performance. Individuals do not, however, diversify internationally as recommended by theory (Baxter and Jermann 1997). This point is consistent with, but not dependent upon, ideas about risk aversion that have been illustrated in various ingenious ways by Kahneman and Tversky (1990) in experimental situations.

economic strategy than do investors in investment markets, we expect voters to be unwilling to tolerate economic volatility.

Voting is the main mechanism whereby citizens can punish or reward politicians for undesired outcomes. Comparative voting studies provide consistent evidence that incumbent politicians have compelling reason to be risk averse regarding economic policies. Pacek and Radcliff 1995 report that economic decline harms incumbent politicians in democracies of emerging market economies, but that incumbents gained little electoral benefit from increased economic performance. Voting studies in advanced industrial nations show evidence that voters reward as well as punish incumbents for economic performance (Erikson 1989; Lewis-Beck 1988; Powell and Whitten 1993). In either case, the incentive for incumbent politicians is clear: avoid strategies with a high risk of economic downturn.

In this light, the transparency features of democratic political life are important. Democracy enables citizens to monitor more effectively the behavior of elected officials, and apportion praise or blame appropriately.

More democratic countries are more likely to pursue policies leading to outcomes that are consistent with citizen risk/return preferences, which is for low risk growth, unless the risks are well compensated. Other things equal, more democratic countries will be clustered near the efficient countries' line. Non-democracies, lacking a routinized mechanism for realizing citizen preferences, will be located all over the graph.

Democracies, then, should be distinctive *not* in their high or low rates of growth, but in the way growth is related to volatility. Citizens everywhere would reject higher economic volatility, but only in democracies could we expect these preferences to be reliably reflected in outcomes. The argument, in summary, is that because voters have an ongoing ability to call a halt to an experiment that they judge to be failing, or to halt an experiment once it has paid adequate returns, democracies will be nearer to, rather than farther from, the efficient countries' line. What we expect is common to all democracies is that voters will be relatively more effective in demanding that additional risks be compensated, and that democracies will tend to be nearer the efficient countries' line than will non-democracies. Democratic

governments will not, in general, be located deep in the interior space of the growth/volatility graph: that outcome is the special preserve of the non-democracy.

In summary, we hypothesize:

H<sub>1</sub>. *The more democratic the country, the more its economic performance will be characterized by combinations of economic growth and volatility close to the efficient countries' line; and*

H<sub>2</sub>. *Voters punish incumbent governments for high rates of volatility and reward them for lower volatility.*

### *Hypotheses Testing*

We will examine the hypotheses in two sections, the first assessing the democracy and economic performance. In the second section, we build on prior work scholars on comparative economic voting in assessing whether voters punish incumbents for high rates of uncompensated volatility. We seek to establish in the second section a domestic-level mechanism for the cross-national phenomenon we observe in the first section.

### **National Economic Performance - Dependent Variable**

Our interest is in economic growth over time *in relationship to* the volatility of growth (i.e., risk) over time. Our hypothesis is that as democracy increases, observed economic performance will be closer to the efficient countries' line described conceptually in the text above. To describe this relationship, we use data on growth and volatility calculated from data in the well-known Penn World Tables Mark 5.6. Our sample period, 1974-89 matches the dates used in Levine and Renelt's (1992) well-known study.<sup>8</sup> We first generate a graph with the rate of growth on the vertical axis, and the (logged) variance of growth on the horizontal axis. We next plotted a line "north-west" of the most "efficient" cases in our analysis. The most efficient countries are those with the highest average growth rates for a given degree of volatility or uncertainty. We began with line estimated from a regression equation that described the slope and intercept of the "best cases," and then adjusted the intercept to insure that all the cases lay

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<sup>8</sup> The data are easily available to other scholars and the Levine and Renelt results provide a useful benchmark for our work.

below the frontier.<sup>9</sup> Because we have used a constant slope, the precise definition of the line--i.e., its dependence on the details of this particular sample--is not a source of influence on our results.<sup>10</sup>

[Figure 1 about here]

Our dependent variable is the vertical deviation from the efficient countries' line from the growth-variance coordinates of each country.<sup>11</sup> By definition *this distance is zero or negative* for all cases--the

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<sup>9</sup> The efficient countries' line used in Figure 1 is given by  $Y=12.5(\log)X$  where  $Y$  is the observed growth rate and  $X$  is the observed growth volatility. We have performed the analysis using unlogged volatility with the same substantive results. The logged measure is, however, more normally distributed, and the regression residuals are better behaved with the logged specification.

<sup>10</sup> The key is the definition of a reference line that stipulates that there must be increasing volatility associated with increasing returns. While precise coefficients would change, the relative relationships of the coefficients of interest would not change even with a different slope for the efficient countries line.

<sup>11</sup> Is this vertical distance is appropriate distance to examine? If countries trying to improve their performance, they might not follow this vertical distance, but rather the shortest distance--a distance defined as a line beginning at the country's observed growth/variation combination and intersecting the efficient countries' line at a perpendicular. In fact, these two distances (the vertical and the shortest) are precisely proportional, and therefore any results that hold true for the vertical distance will of necessity hold true for the "shortest distance" as well. The logic of this proportionality is as follows. Connect the efficient countries' line to any point below that line (i.e., any growth/variability combination) with vertical and horizontal lines that form a right angle at the selected point. This defines a right triangle, ABC, where C is the right angle, and the line segment AB is the hypotenuse and lies on the efficient countries' line. In right triangle ABC, the distance we call the "growth gap" is the vertical line segment AC. The shortest distance to the hypotenuse, call this line CD, is the altitude of the right triangle ABC. The line CD creates two new right triangles, each of which is similar to triangle ABC. A theorem of geometry is that two triangles are similar if they share an angle in common and both contain a right angle. A characteristic of similar triangles is that their similar sides (i.e., two hypotenuses, the two "long" sides, the two "short" sides) are proportional. The lines AC and CD in these two similar triangles must, then, be proportional. In two similar right triangles, the "short" legs of the two triangles will be perfectly proportional all the time, and that is exactly the case

line passes through or just slightly above the most "efficient" points, and all other points lie to the interior. The deviation from the line indicates how far below the estimated "efficient" growth rate the observed growth rate of a particular country is, given the observed degree of volatility. We refer to this below as "risk-adjusted growth," or the "growth gap." Under our hypothesis, this deviation should be smaller for democracies than for non-democracies; that is, the coefficient on a measure of democracy should be *positive* indicating higher risk-adjusted growth rates (smaller negative deviations) as the degree of democracy increases.

### **National Economic Performance - Independent Variables**

Democracy has been operationalized in various ways, and the task of doing so has engendered some controversy.<sup>12</sup> Several standard quantitative measures are very highly correlated. In a useful validation study, Bollen 1993 recommends the widely-cited scales published by Freedom House, referred to as the Gastil scales.<sup>13</sup> Burkhart 1997 revisits the question, and comes to similar conclusions about the utility of the Gastil/Freedom House scales. We therefore use Gastil scales here.

The Gastil scales include one seven-point scale for "political freedom" and another seven-point scale for civil rights. Following Burkhart and Lewis-Beck 1994, we have adopted the convention of summing the scales together. We then calculated averages for the period 1974-89, and also for the "base"

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in our analysis. See Wallace and West 1982, 117-119.

<sup>12</sup> See, for example, the various articles gathered in Diamond and Plattner 1996

<sup>13</sup> Bollen suggests that the Gastil measure is preferable to a widely available alternative provided by Jagers and Gurr 1996 in the Polity III data set. Others using the Gastil measure are Keefer and Knack 1997, Burkhart and Lewis-Beck, 1994, and Helliwell 1994. The Polity III updates the Polity II data set described in Gurr et al 1990. Przeworski et al. 1996 elected to construct a new measure. We found a correlation of .94 between the 1974-89 average of the Gastil data and a 1974-89 average of the ten-point Democracy scale from the Polity III data set. Our base measure (averaging 1972-73) was correlated at .90 with a similar Polity III average. We used the 1974-89 average Gastil Index to correctly predict 92 percent of the classifications of democratic/non-democratic used by Alesina and Rodrik 1994.

period 1972-73. These averages were then rescaled so that they ranged from 0-1 with 1 being the most democratic and 0 being the least democratic. Our models also include a measure of contemporaneous political change, which is the difference between the base-line democracy score and the democracy scale averaged over the sample period. In both cases, we expect positive associations with risk-adjusted growth, but we include the estimated contemporaneous relationship between democracy and economic performance primarily as a control variable rather than as the main object of study at this point. (We do not estimate simultaneous equations in this cross-sectional investigation.)

To examine whether democracy is associated with risk-adjusted growth, we build on standard models of economic growth. Our model for risk-adjusted growth is based on the widely-cited Barro 1991 cross-sectional growth model. We have taken special note of the reviews of the growth literature by Barro and Sala-i-Martin 1995, Fagerberg 1994, and Levine and Renelt 1992. The Fagerberg and Levine and Renelt studies identify initial level of income and investment share of national income as essential elements in growth models.

As determinants of risk-adjusted growth, then, we follow these scholars in including investment (as a share of GDP), baseline levels (1973) of real per capita income, secondary school enrollment rates (1960), and annual rates of population growth (1974-89).<sup>14</sup> Alesina and Rodrik 1994 and Persson and

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<sup>14</sup> Population growth has been included as a crude, but readily available measure of labor supply when used by economists, and as a generic measure of development when used by sociologists. Labor supply is a standard component of classical economic growth models. Levine and Renelt 1992 report that population growth was included in 29 (or 71 percent) of the 41 studies they reviewed; Fagerberg reported that population measures were included in 16 of the 28 studies he surveyed (55 percent). Levine and Renelt are troubled by the fact that population growth has often entered with the wrong sign. The negative association is, of course, well-known (e.g., Blanchet 1991). Whether the ambiguity about causality is substantially greater than for some other variables regularly included in growth models is dubious. Note that while Levine and Renelt classify population growth as being "fragile" it is one of the least fragile of the fragile measures--that is, it is always reasonably close to statistical significance.

Tabellini 1994 use primary education levels (1960) in their analysis of growth, and to assure comparability we also add that variable to our base models (although it is noteworthy that many other scholars do not always add these "human capital" measures).<sup>15</sup> The initial level of income, investment, and population growth are expressed in logs.<sup>16</sup>

To try to capture the potential impact of external shocks on volatility, we included a measure of imports as a percentage of gross domestic product. Many scholars have hypothesized that such shocks have significantly adversely affected performance. In testing for robustness of this specification to additional controls, we also examined the impact on our dependent variable of two additional measures of trade exposure that may be related to economic volatility. The first is a measure of primary materials exports as a share of GDP, and the second is a logged measure of volatility in the terms of trade.

Except for the variable of interest, baseline democracy, we treat all of the independent variables as control variables. The estimated coefficients are not of direct interest in this investigation, but are used to insure the comparability of our results to those of other scholars.

### **National Economic Performance - Data Sources**

Average growth and volatility are computed from the Penn World Tables Mark 5.6 (Heston, Summers, Nuxoll, and Aten 1995). Data on most of the other economic variables come from publicly available data sets developed by Levine and Renelt 1992. The measure of natural-resource exports as a percentage of GDP comes from Sachs and Warner 1997, and the data on logged change in terms of trade is from Bruno and Easterly 1998. This study covers long-run behavior for the period 1974-89 and baseline data are drawn from 1972-73. Our complete data set includes observations for 119 countries, but many countries have missing data for one or more variables. The "base model" reported below contains observations for 108 countries.

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<sup>15</sup> Primary and secondary school enrollment rates are taken to measure the baseline stock of human capital.

<sup>16</sup> The growth models upon which we build are descendants of Harrod-Domar/Solow models that are specified as multiplicative interactions between capital and labor, each, exponentially weighted. When log-transformed, this specification is rewritten as an additive model.

Figure 1 plots averaged data 1974-89 on growth rates (vertical axis) and growth volatility (horizontal axis) for 108 countries (all former Soviet bloc countries are excluded), and uses different symbols for countries depending on level of democracy.<sup>17</sup> From Figure 1, one can see that almost all countries that were highly democratic in 1972-73 are located near the efficient countries' line, 1974-89. Moderately democratic countries are rather broadly dispersed, but generally have more stable economies than the non-democracies, and they are no more likely to have slow growth (i.e., average growth <1.0 percent) than are the non-democracies. Non-democracies include both the slowest-growing and the fastest growing cases (the latter of which are almost all Asian countries). The high volatility countries are all non-democratic.

Several important observations can be made about the data in Figure 1. First, long-run average growth rates of 4.0 percent or higher have been rare. Long-run average negative growth has been much more common. Relative to the lowest-variance cases, the cases that define the efficient countries' line experienced favorable increases in growth rates relative to increased volatility (i.e., there were more than proportional gains in growth for the additional gains in volatility). Very few cases, however, are located at the efficient countries' line past a relatively low level of volatility--there are no cases of increasing gains associated with increasing volatility after the standard deviation exceeds 5. The more highly democratic countries in this sample are *not* distinguished by being "slow," but by being steady. Sustained, low average and uneven growth is most pronounced among poor, non-democratic states.

### **National Economic Performance - Regression Results**

Does the relationship seen in Figure 1 hold up in a multivariate model? Model 1 in Table 1 is our

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<sup>17</sup> The countries are grouped in terms of their points on the combined Gastil scales. The most democratic countries are those that scored a 13 or 14, the least democratic are those that scored 2, 3, or 4. The other groupings represent pairs of scores: 5-6, 7-8, 9-10, 11-12. The case of Taiwan, which is not included in our estimates below because of missing data, is omitted from figures 1. If it were included it would be just slightly above the efficient countries' line.

"base" model for risk adjusted growth--the "growth-gap." The signs and levels of significance of the estimated coefficients of the control variables are broadly consistent with our expectations based primarily on previous studies of economic growth. Note again that these control variables include the initial level of wealth, the country's average ability to invest out of income, and its exposure to international shocks in terms of the import share of GDP. The model appears to perform well from a statistical point of view. In all estimates, we report Newey-White heteroscedasticity-consistent standard errors (White 1984).

The estimated coefficient of the level of a nation's democracy (1972-73) is positive and highly statistically significant. The more democratic a nation in 1972-73, the closer was its subsequent risk-adjusted growth rate to the performance of the world's leading economies—the smaller its growth gap. The improvement in performance is quite substantial. The coefficient on baseline democracy (1972-73) translates into a 66 percent reduction in the size of the mean growth gap due to the difference between no democracy and maximum democracy measured by the Gastil scale. In short, the cross-sectional econometric estimates show that the story in Figure 1 is robust to multivariate analysis.

The cross-sectional research design does not allow for any strong conclusions about the contemporaneous relationship between becoming more democratic and economic performance. The dynamics of the relationship are better revealed with other methods. It is worth noting, even so, that the estimates of the contemporaneous relationship are positive and statistically significant in most models we estimated, consistent with the theoretical position we have developed above.

### **Robustness Checks**

Are these results robust to changes in the conditioning information? Do the results derive from the "whimsical assumptions," as Leamer 1983 put it, of the investigators? Levine and Renelt 1992 employ cross-sectional regression analysis using Leamer's (1983, 1985) extreme-bounds analysis (EBA) "to test the robustness of coefficient estimates to alterations in the conditioning information" (Levine and Renelt 1992, 942-3). We employ it here.

The robustness checks are as follows. We ran numerous regressions, adding each time some

other plausible independent variables, to see if the initial level of democracy has a relatively stable statistical relationship to "growth-gap." The point is to assure that the relationship of interest is not dramatically affected by the changes in the conditioning information. Table 2 reports the results of these checks. The results for the initial level of democracy are extremely robust to the sequential inclusion of a wide range of potential control variables, including measures of the size of government, the rate of inflation, and the number of revolutions and coups. The democracy results also robust to the inclusion of dummy variables representing East and Southeast Asia, Sub-Saharan Africa, and Latin America.

Most importantly, the coefficient is robust to the addition of two additional variables describing the international exposure of the economies and which may be particularly linked to variability in the economy. The first is the share of primary exports in GDP, and the second is a measure of variability in change in the terms of trade over the sample period. For various reasons, we suspected that baseline democracy might not be robust to these controls. The measure of variability in the terms of trade is available for only about half the countries in our sample. Those countries for which data are available are significantly more democratic, more wealthy, higher growing, and more stable than those without observations. In short, this test involved a substantial reduction in variation in both our dependent variable and in the independent variable of interest. As it turns out, the coefficient on baseline democracy was significant, and the magnitude was approximately the same.

Model 2 in Table 1 includes simultaneously a wide array of control variables; this may reasonably be termed the "kitchen-sink" model. Versions of model 2 were used by Levine and Renelt 1992 as strong tests for whether coefficient of the variable of interest is robust to the inclusion of a many different variables.<sup>18</sup> In these data, the estimated coefficient of the initial level of democracy does appear to be affected by the simultaneous inclusion of such a broad array of variables. The coefficient estimate of democracy's association with Growth-gap decreased from 12.3 to 7.2. The coefficient estimate, however, is still positive and statistically significant. Altogether, these tests suggest that the estimated

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<sup>18</sup> We omit several Levine and Renelt 1992 variables that are collinear with democracy: e.g., CIVIL, which is an indicator of civil rights, and SOC, which is an indicator of a socialist economy.

relationship is broadly robust. In short, base year democracy is strongly associated with subsequent "efficiency" in economic growth.

Outliers do not drive our results. A concern might arise from the fact (obvious in Figure 1) that Growth Gap could be large for countries with high growth variance. However, even after dropping (simultaneously) the 10 highest variance cases and the 10 lowest variance cases, our estimated coefficient on base-year democracy remains strongly positive, and statistically indistinguishable from the original estimate. That is, even when we reduce the sample by nearly 20 percent by dropping the cases likely to have unusual leverage, the estimated coefficient of the democracy variable is positive and statistically significant.<sup>19</sup> Similarly, we excluded all of the most extreme cases of democracy (combined Gastil scale scores of 14, 13, 3, 2) and the results on democracy were still preserved, again with coefficients that are statistically indistinguishable from the unconstrained results.

Finally, we omitted from the analysis all OECD member countries and East Asian countries. As the reader can see from Model 7, Table 2, the parameter estimate is statistically significant, and nearly identical to that in Model 1.

### *Comparative Economic Voting*

We observe a strong association between democracy and stable growth, and we have some evidence suggesting that this association is due to voters' risk aversion. One implication of our analysis is that voters dislike volatility--and certainly dislike volatility that is not accompanied by fairly significant increases in economic growth rates. An empirical implication of our analysis is that incumbents are punished by voters for increased economic volatility, and rewarded for decreased volatility. To our knowledge, scholars have not tested this hypothesis.

We suspect that there is a "selection bias" problem in examining the link between voters and volatility. As the reader can see from Figure 1, very few democracies are characterized by high volatility 1974-89. To study the effects of volatility on voters, however, we need to study democracies. And it is our argument, of course, that democracy itself contributes independently to economic stability. We can

only look for voter response in settings where voters are allowed to speak--i.e., in democracies. Thus, we suspect that our proposed selection mechanism results in a sample that is biased against our hypothesis.

If voters reliably punish politicians for volatility, and if politicians anticipate voter response, and if politicians can moderate instability, then policy-makers will learn to avoid the limits, and to stay "magically" within them. The graphical evidence from Figure 1 strongly suggests that this anticipation would be rational. Consequently, we expect that voters have some satisficing rule about country-specific variability so that they punish "unanticipated" volatility and reward "unanticipated" stability.

The comparative economic voting literature provides us with a relatively well-developed set of voting models in the peer-reviewed literature. To explore the effects of volatility on voting, we simply extend the analyses from three recently published studies on comparative economic voting. We believe this provides a straightforward test of the proposition that voters react negatively to economic volatility. Does an indicator of volatility or risk-adjusted growth contribute statistically to the analyses of comparative economic voting? If so, then the plausibility of our basic assumptions about voter risk aversion should be strongly validated. Moreover, if we are correct about selection bias, this test would be a very conservative one.

### **Comparative Economic Voting — Models, Methods, Data, and Regression Results**

We have built on comparative economic voting studies by Powell and Whitten 1993, Pacek and Radcliff 1995, and Wilkin, Haller, and Norpoth 1997.<sup>20</sup> For the full details of the analyses, we refer the

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<sup>19</sup> These and the next referenced results are available from authors upon request.

<sup>20</sup> We thank Guy Whitten and Ben Radcliff for providing the data used in their studies, which were invaluable guides in replicating the data. The original data from the Powell and Whitten 1993 study has been lost, but Prof. Whitten constructed a very similar data set, from which only the data for Greece and the data to compute "previous government swing" were unavailable. (Email correspondence, Guy Whitten with (author).) The Wilkins, Haller, and Norpoth 1997 study contains a data appendix from which we took their data. We used *Keesings' Contemporary Archives* to cross-check and validate the data, and, for the PW study, we computed "Previous Government Vote Swing" from Keesings'. In general, the data for the dependent variables used in the other studies are very close to

reader to the respective papers. We report only the details essential to presenting our results.

We operationalize volatility as follows. Volatility enters two different ways, depending on the definition of the dependent variable specified in these three studies. When, as in the Wilkin, Haller, and Norpoth 1997 study, the dependent variable is the *level* of the incumbent (dominant party) vote and no information is provided about past voting, volatility is entered as the standard deviation of economic growth over the past five years: i.e., the level of volatility.<sup>21</sup> When the model includes a measure of past incumbent vote share, as with both Powell and Whitten 1993 and Pacek and Radcliff 1995, then volatility is measured as the difference between the volatility of the most recent five years and the volatility of the previous five years: i.e. change in volatility.

We also estimate models where we operationalize risk-adjusted growth as the ratio of growth for the most recent year divided by the volatility for the most recent five years, and use it as an independent variable.<sup>22</sup> This operationalization is similar to the "growth-gap" measure used above. It has the obvious imprecision that it treats low growth countries with very different degrees of volatility as being similar.<sup>23</sup> Nonetheless, this risk-adjusted measure is positively correlated with growth-gap in our cross-sectional sample, and provides a proxy measure of the joint effect of growth and volatility.

*Our hypothesis is that volatility will be negatively associated with votes for incumbents, and that risk-adjusted growth will be positively associated with votes for incumbents.* (Because of the strength of the theory and results derived above, we will use one-tailed tests to examine volatility.)

Powell and Whitten (1993) used regression analysis to examine 102 elections in 19 advanced

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the data used in this study, and the details are available on request.

<sup>21</sup> Based on annual data calculated from Penn World Tables 5.6.

<sup>22</sup> That is, change in per capita national income, purchasing power party adjusted, for the most recent full year divided by the standard deviation of growth for the five years ending in the most recent year.

<sup>23</sup> For example, the Austrian economy prior to the 1983 election had a risk-adjusted growth of .31, and the Indian economy prior to the 1971 election had a risk-adjusted growth of .09. Both economies grew at roughly .7%, but the five year volatility of Austria in 1983 was 2.36, whereas the five year volatility for India was 8.27.

industrial nations from 1969-1988. A primary finding of their paper was that the full effects of comparative economic voting were evidenced only in those countries that were characterized by democratic institutions that give rise to what they term "clear responsibility" in the minds of voters for economic policy.<sup>24</sup>

Powell and Whitten's dependent variable was change in the percentage of the votes in parliament (or the lower house) for the incumbent party or coalition. The independent variables include the percentage of the votes won by the parties comprising the incumbent government in the previous election (i.e., at  $t-1$ ), the "swing" of the vote toward those parties in the previous election (i.e.,  $(t-1)-(t-2)$ ), various comparative economic indicators, and a dummy variable for a minority government.

We use their model and very similar data to examine the subsample of countries with "clear responsibility" for economic affairs,<sup>25</sup> to replicate their findings, then add indicators of volatility or risk-adjusted growth. The results are presented in table 3. Model 1 in table 3 is a replication of Powell and Whitten 1993, 407, model 2. The adjusted R-square is .22 (compared to .21 in the original), and the coefficient of comparative growth is .533 (compared to .490) with similar levels of statistical significance. The other results are broadly similar to those reported by Powell and Whitten 1993, apart from the "right-wing" interaction terms.

[Table 3 about here]

Model 2 of table 3 includes our volatility change measure ( $\Delta Volatility$ ). Its coefficient is negative (as hypothesized) and statistically significant at the .01 level. The adjusted R-square of the new equation increased from .22 to .30. Comparative GDP growth remains positive and statistically significant. In model 3, we add risk-adjusted growth, simultaneously dropping change in volatility and comparative

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<sup>24</sup> Other scholars refer to this clarity of responsibility as "majoritarianism" (e.g., Freeman 1989.)

<sup>25</sup> These countries included Australia, Austria, Canada, France, Great Britain, Ireland, Japan, New Zealand, Sweden, and the United States. The data for growth and variance are taken from the Penn World Tables, Mark 5.6 (Heston, Summers, Nuxoll, and Aten 1995), except for data series with the years 1993 or 1994. The growth (per capita, ppp adjusted) and the associated volatility data for these years are taken from Maddison 1995.

GDP growth. This coefficient is also positive and statistically significant (in a one-tailed test) as expected.

Pacek and Radcliff 1995 present an economic voting study of 51 elections in eight emerging market economies. The Pacek and Radcliff model uses the level of the incumbent vote as a dependent variable, and prior vote for the incumbent as an independent variable. In tests reported in table 4, we examine 43 of these cases, omitting only the cases, all from the 1950s, where the data necessary to compute change in volatility are unavailable in the Penn World Tables data compendium.

Change in Volatility, once added to the Pacek and Radcliff model, is statistically significant and correctly signed (model 2), and produces an increase in adjusted R-square over the base model. The coefficient on risk-adjusted growth (model 3, table 4) is large, but not statistically significant, and the overall fit in Model 3 is essentially identical to the initial Pacek and Radcliff specification (from Model 1). The results from Model 2 confirm that economic volatility appears to shape the electoral fate of incumbent governments in both emerging market and advanced industrial nations.

[Table 4 about here]

The Wilkin, Haller, and Norpoth 1997 (WHN) study examined the effects of GDP growth and logged inflation on the *level* of support for the dominant party in an incumbent governing coalition. The WHN sample includes 38 elections in 38 different countries, mixing both developed and developing cases. The time frame is 1989-1994. In Table 5, model 1, we replicate their results from WHN model 1 (1997, 308), omitting several cases for reasons described in the notes to Table 5. The results are very similar to the WHN published results.

[Table 5 about here]

In model 2, we add *level* of five-year volatility to the model. The coefficient on volatility is negative, as expected, and statistically significant. As in the original WHN model, inflation approaches statistical significance, with a positive (but "wrong") sign. With volatility added, the explanatory power of the model increased from an adjusted R-square of .16 to .21. In model 3, we add risk-adjusted growth, which enters with a coefficient that is positive, as hypothesized, and statistically significant. Volatility

matters here too for understanding comparative economic voting. Again, the model with risk-adjusted growth explains less variance than one with growth and past volatility entered separately.

Unlike both the Powell and Whitten and the Pacek and Radcliff models, the WHN model does not include any measure of prior coalition vote. As a further experiment, we modified the WHN model by estimating, for the same sample, a simplified version of the Powell and Whitten model (models 4 and 5). That is, the dependent variable is *change* in support for the incumbent party (coalition), with the addition of past vote level for the incumbent party and the previous vote swing for that party, as in Powell and Whitten 1993. In model 4, we enter change in volatility, which has a negative sign and is highly statistically significant. Inflation is now statistically significant and properly signed (negative). GDP growth is no longer statistically significant, and the coefficient has a negative sign. The past level of incumbent support and the previous vote swing are statistically significant in the analyses. In model 5, we omit volatility and GDP growth, and add risk-adjusted growth. The resulting coefficient is not statistically significant and is incorrectly signed.

The evidence for comparative economic presented in Tables 3, 4, and 5 are all consistent, and all show that prior economic volatility works to the detriment of incumbents. In most cases, the electoral impact of recent growth diminishes significantly when volatility is added to the model. The simple additive specification, which seems statistically superior, provides a very pessimistic message for elected officials--the penalty for increased volatility may make it exceedingly risky to pursue higher growth policies, if growth and volatility are positively correlated in a particular country. The alternative specification, of risk-adjusted growth, suggests much less of a penalty for increased volatility, but there is still a large electoral premium for stable growth.

This link between volatility and voting has not, to our knowledge, been established previously. It offers a domestic level mechanism for the cross-national phenomenon we observed initially--democracies exhibit stable growth because voters appear to reward or punish incumbents accordingly.

### *Conclusion*

We proposed here a new way of trying to reconcile the inconsistent empirical and theoretical

literature about the relationship between democracy and economic growth. This new way involves assuming that voters in democracy care about two aspects of their economic life--their prosperity relative to the past (i.e., growth) and the instability they experience (volatility). Most of the prior research on the economy and democracy focuses on only one part of this concern--increasing prosperity.

We argued that more democratic systems reflect their more highly developed mechanisms for reflecting the risk-aversion of citizens. The implication of our analysis is that we should observe a strong, robust, positive association between democracy and various risk-adjusted measures of economic growth. We do, in fact, observe a strong, statistically robust, positive association between democracy and risk-adjusted economic growth. Our findings suggest that there is no systematic increase in growth rates that accompany the increased risk of "investing" in nondemocratic settings. We also observed strong evidence that citizens penalize incumbents for uncompensated volatility, and reward them for high rates of stable growth.

These results point to a new agenda for research on how democratic institutions affect economic performance. This new agenda would examine economic performance not just in terms of rates, but in terms of the degree of variability around the trends. In the case of growth, we have proposed that one straightforward way to do this is in terms of risk-adjusted growth. In further research, scholars should continue to probe the dynamic relationship between democracy and risk-adjusted growth. We also need to know much more about the political correlates of economic volatility. Above all, this new agenda will follow Wittman 1995 in developing the implications of the proposition that democracy is the economically efficient form of government. It will look to the historical development of democracies and the way in which volatility has been a factor (distinguishable from prosperity) in electoral outcomes. It will, of course, seek confirmation of the search for stability in newly democratizing societies. And, perhaps most important, this agenda will involve the search for better understanding of economic volatility in the processes "selecting" for and against democracy.

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**Table 1: Democracy Is a Robust Determinant of Economic Growth as Measured by the "Growth Gap"**

	<u>Model 1</u>		<u>Model 2</u>	
	(Basic Model)			
<u>Variable</u>	<u>Growth Gap</u> regression coefficient	<u>(std. err)</u>	<u>Growth Gap</u> regression coefficient	<u>(std. err)</u>
Initial GDP per capita (log)	-2.022	(1.147)	-3.637**	(1.320)
Investment Share (log)	6.283*	(2.517)	0.8844	(2.550)
Secondary-School enrollment	3.665	(5.626)	1.832	(5.086)
Primary-School enrollment	-1.063	(2.810)	2.364	(3.183)
Population Growth (log)	-2.392*	(0.976)	-1.830*	(0.813)
Imports as % of GDP (log)	-3.200**	(1.336)	-4.229**	(1.506)
<b>Index of Democracy, 1972-73</b> <b>(Gastil Index)</b>	<b>12.267**</b>	<b>(3.376)</b>	<b>7.176*</b>	<b>(3.463)</b>
Change in Democracy, 1974-89	13.464**	(4.337)	6.199	(4.520)
Gov. Expenditures as % GDP			13.709	(15.313)
Growth of Government Share			-0.149	(0.216)
Revolutions/coups			-4.143	(2.971)
Africa dummy			-6.927**	(1.861)
Latin America dummy			-5.318*	(1.758)
Growth of domestic credit			0.0097	(0.023)
Stand. Deviation of domestic credit			-0.0080	(0.014)
Export-share growth			-0.331*	(0.156)
Intercept	-2.138	(9.269)	4.685	(9.567)
Adj. R <sup>2</sup>	.41		.62	
Observations	108		91	

\*0.05&gt;p-value&gt;0.01; \*\*p-value&lt;0.01

**Table 2. Summary of Sensitivity and Robustness Results for Estimated Coefficient of Index of Democracy**

	Variables	Regression Coeff. on Democracy	Standard Error	t-ratio	adj R <sup>2</sup>	Number of Observations.
1.	base model (Table1, model 2)	12.267**	3.376	3.63	.41	108
2.	<i>sets of controls:</i> STDC, REVC, GOV	10.512**	3.506	3.00	.46	91
3.	X, PI, REVC added	12.025**	3.549	3.388	.43	106
4.	Natural Resource Exports as percentage of GDP (SXP) and logged changes in Volatility of terms of trade	11.780*	5.359	2.198	.47	45
5.	Natural Resource Exports as percentage of GDP (SXP) added	12.011**	4.132	2.907	.47	89
6.	E. Asia, L. America and other "emerging market" dummies added	12.295**	3.331	3.691	.46	108
7.	OECD and E. Asia countries omitted from the analysis	12.288**	3.668	3.348	.14	82

\*0.05>p-value>0.01; \*\*p-value<0.01

Notes: The dependent variables are the observed value of a nation's average rate of growth, 1974-89, minus the predicted value of its growth for the same period. The efficient countries' line, which is the line on Figure 1 given by  $Y=12.5*(\log)X$ , is used to generate the predicted, or fully risk-compensated, rate of growth. The predicted value of growth is generated by multiplying the risk (standard deviation) of a nation's growth by  $12.5*(\log)X$  to yield the risk-compensated growth. A positive coefficient on a variable implies that it is associated with "over-performance." It contributes to a rate of growth higher than a risk adjusted rate. Coefficients were estimated using ordinary least squares (OLS) with heteroscedasticity-consistent covariance matrix, White 1984. Natural-resource Exports as a percentage of GDP (SXP) is from Sachs and Warner 1997. Volatility in Terms of Trade is from Bruno and Easterly 1998. The other variable names are those used by Levine and Renelt 1992, and are defined in the table above except X, which is export share of GDP, and PI, which is average inflation of GDP deflator. The models and results replicate those found in Levine and Renelt 1992, 947 (Table 1), which are in turn based on Leamer 1983.

Table 3 — Comparative Economic Voting in Majoritarian Countries —

A Replication of Powell and Whitten 1993 with Volatility and Risk-Adjusted Growth Added  
 Dependent Variable — Change in the Vote Share of the Incumbent Governing Coalition

<u>Variable</u>	<u>Model 1</u> (Base)	<u>Model 2</u> (Base + $\Delta$ Volatility)	<u>model 3</u> (Base + Risk Adjusted Growth)
Comparative GDP Growth	.533* (.259)	.509* (.246)	
Change in Volatility (Five year average)		<b>-1.00**</b> <b>(.398)</b>	
Risk-adjusted growth (ppp adjusted)			<b>.955**</b> <b>(.321)</b>
Comparative inflation	-.119 (.215)	-.266 (.213)	-.016 (.207)
Comparative Unemployment	-.336 (.189)	-.295 (.180)	-.322 (.180)
Right-wing Comparative Inflation	.101 (.379)	.308 (.369)	.055 (.357)
Right-wing Comparative Unemployment	.201 (.312)	.248 (.297)	.355 (.304)
Minority Government	2.883* (1.115)	3.060** (1.061)	2.084 (1.071)
Previous Government Vote Percentage	.084 (.081)	.695 (.077)	.068 (.077)
Previous Government Vote Swing	-.226* (.103)	-.196* (.098)	-.278** (.099)
Intercept	-7.627* (3.841)	-7.278* (3.650)	-8.092* (3.675)
Number of Observations	58	58	58
R-squared	.33	.41	.38
Adj. R <sup>2</sup>	.22	.30	.28
Standard Error of Regression	3.58	3.39	3.43

(Standard errors are listed below the coefficients) \*.05>p-value>0.01; \*\*p-value<0.01. We use one-tailed tests for volatility and risk-adjusted growth, and two-tailed tests otherwise.

Notes: The table is a nearly exact replication of Powell and Whitten (1993, 407) model 2. Coefficients were estimated using ordinary least squares (OLS), following Powell and Whitten 1993. The data for Greece, used in the original analysis, are no longer available.

Table 4 — Economic Voting in the Developing World —

A Replication of Pacek and Radcliff 1995 with Volatility and Risk-Adjusted Growth Added  
Dependent Variable — Level of the Vote Percentage of the Governing Coalition

<u>Variable</u>	<u>Model 1</u> Level of Votes (Base Model)	<u>Model 2</u> Level of Votes (Base + $\Delta$ Volatility)	<u>Model 3</u> Level of Votes (Base + Risk- Adjusted Growth)
Growth (per capita PPP adjusted)	.882 (.518)	.652 (.496)	
Change in Volatility (Five year average)		<b>-.671*</b> (.295)	
Risk-adjusted growth (ppp adjusted)			<b>2.159</b> (1.423)
Growth x growth dummy	-.881 (.772)	-.714 (.728)	-.334 (.541)
Previous Government Vote Percentage	.306 (.209)	.398* (.198)	.348 (.209)
Election Follows Irregularity	-2.388 (4.339)	-3.254 (4.090)	-2.928 (4.369)
Previous Government Vote Swing Intercept	24.438* (8.818)	21.080* (8.407)	22.101* (8.740)
Number of Cases	43	43	43
R-squared	.77	.81	.77
Adj. R <sup>2</sup>	.69	.73	.68
Standard Error of Regression	6.54	6.13	6.59

Standard errors are listed below the coefficients. \*0.05>p-value>0.01; \*\*p-value<0.01  
We use one-tailed tests for volatility and risk-adjusted growth, and two-tailed tests otherwise.

Notes: The table is a replication of Pacek and Radcliff (1995, 752). As in Pacek and Radcliff 1995, coefficients were estimated using ordinary least squares (OLS) with country dummies (not reported). The data for elections in the 1950s are omitted because of the unavailability of data for change in volatility.

Table 5 — Comparative Economic Voting from Argentina to Venezuela —

A Replication of Wilkin, Haller, and Norpoth 1997 with Volatility and Risk-Adjusted Growth Added  
 Dependent Variable — Level of (or Change in) the Vote Share of the Largest Governing Party

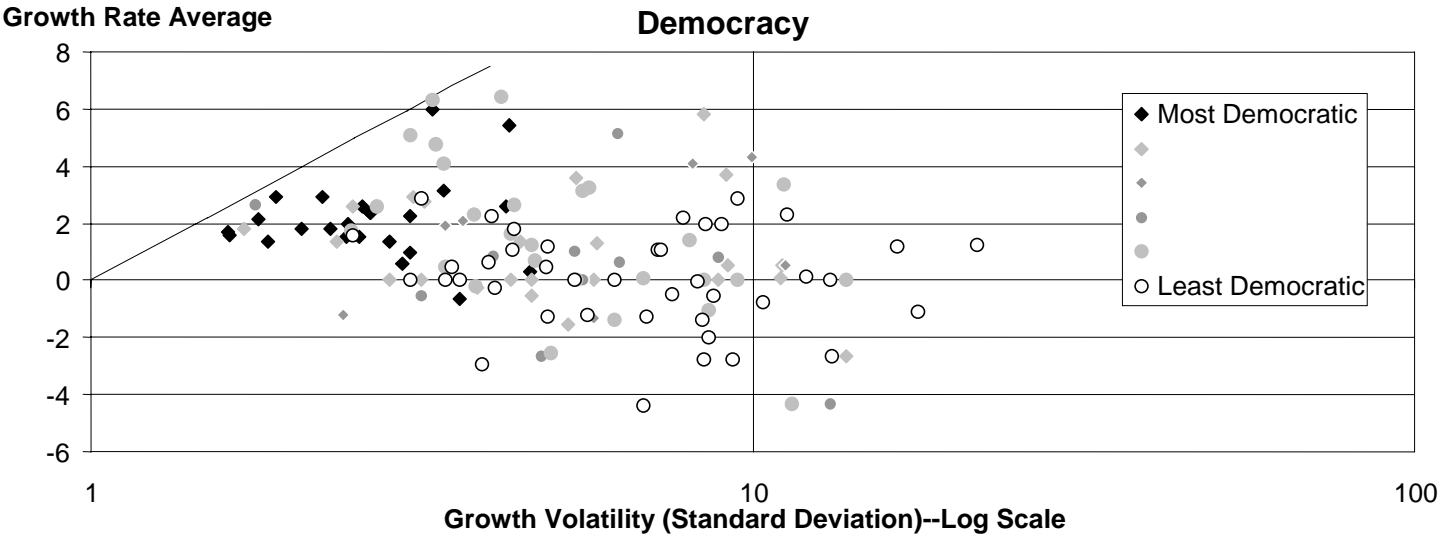
<u>Variable</u>	<u>Model 1</u> Level of Votes (Base Model)	<u>Model 2</u> Level of Votes (Base + Volatility)	<u>Model 3</u> Level of Votes (Base + Volatility)	<u>Model 4</u> Change in Votes (Base, past voting + $\Delta$ Volatility)	<u>model 5</u> Change in Votes (Base, past voting + Risk Adjusted Growth)
Log of Inflation	3.264 (2.578)	5.391 (2.795)	2.033 (2.544)	-4.815* (2.403)	-3.926 (2.354)
GDP Growth	1.523** (.529)	1.314* (.529)		-.341 (.592)	
Volatility (Five year average)		<b>-1.921*</b> (1.125)			
Change in Volatility (Five year average)				<b>-2.221**</b> (.956)	
Risk-adjusted growth (ppp adjusted)			<b>2.047**</b> (.772)		<b>-.481</b> (.800)
Previous Government Vote Percentage				.456* (.176)	.609** (.169)
Previous Government Vote Swing				-.027** (.009)	-.019* (.0008)
Intercept	-27.440** (3.246)	30.950** (3.762)	29.477** (2.985)	-15.908* (5.982)	-22.529* (5.793)
Number of Cases	34	34	34	33	33
R-squared	.21	.28	.19	.55	.47
Adj. R <sup>2</sup>	.16	.21	.14	.47	.39
Standard Error of Regression	9.31	9.03	9.66	8.27	8.85

Standard errors are listed below the coefficients. \*.05>p-value>0.01; \*\*p-value<0.01

We use one-tailed tests for volatility and risk-adjusted growth, and two-tailed tests otherwise.

Notes: The table is a replication of Wilkin, Haller, and Norpoth (1997, 308) model 1. Coefficients were estimated using ordinary least squares (OLS). The data for Ecuador and Malta, used in the original analysis, are either unavailable or unreliable. Mexico, used in the original analysis, is excluded because of its —3 score on the summed autocracy/democracy index from Polity III. (See Jagers and Gurr 1996; Burkhart 1997.) The incumbent party vote total for 1991 Zambian election is excluded because Zambia's autocracy/democracy score moved from —9 to +6 in 1991. The data for previous government vote swing are unavailable for Cyprus, and that case is dropped in models 4 and 5. (The results from models 1-3 are consistent, with or without data for Cyprus.)

**Figure 1. Growth Rates and Growth Volatility, 1974-89, By Level Of**



**Democracy and National Economic Performance:  
The Search for Stability**

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