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Free to Squander? Democracy, Institutional Design, and Economic Sustainability, 1975–2000

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Abstract:

While democracy's effect on economic growth has come under intense empirical scrutiny, its effect on economic sustainability has been noticeably neglected. We assess the effects of regime type and democratic institutional design on economic, or "weak" sustainability. Sustainability requires that stocks of capital do not depreciate in value over time. The World Bank gauges the rate of net investment in manufactured, human, and natural capital, a unified indicator of weak sustainability (the genuine savings rate). All four indicators of democracy we examine show that freer societies have higher genuine savings rates because they invest more in human capital, create less CO_2 damage, and extract fewer natural resources per economic unit produced, even if they show lower net investment in manufactured capital. Democracies may trade off immediate material welfare gains for future pay-offs. This finding justifies why scholars should assess the effects of regime type on more than just immediate growth or the rate of change of manufactured capital. Among democracies, we find that pure parliamentary systems spend more on education than do presidential ones, but exhibit no statistically significant difference for the overall genuine savings rate. Proportional representation electoral systems fare worse than plurality when it comes to genuine and net national savings, even though they do better on education spending. The results taken together show that differences in regime type and democratic institutional design allow for different trade-offs. The results are robust to a range of specifications and a developing country only sub-sample.

> … sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development … are all in harmony and enhance both current and future potential to meet human needs (WCED 1987: 46).

The late Mancur Olson (1993: 575) lamented that 'the moral appeal of democracy is now almost universally appreciated, but its economic advantages are scarcely understood.' Since then, however, there has been enormous effort devoted to the topic of democracy's economic (dis)advantages, unfortunately the bulk of it to the issue of economic growth, the rate at which manufactured capital accumulates, the dynamics of budget deficits, government consumption and the like (Barro 1998; Olson 2000; Przeworski et al. 2000). In addition, many studies discuss and examine the effects of institutional design among democracies on public policy performance and its economic consequences in similar terms (Lijphart 1984, 1999; Powell 2000; Persson, Roland and Tabillini 1997, 2003; Strøm, Müller, and Bergman 2004). But not all public spending is the same. Increases in income can be coterminous with declining future well-being due to unsustainable use of natural and environmental assets and insufficient investment in the skills and knowledge of human beings, the gatekeepers of the future capital stock (Atkinson et al. 1999; Dasgupta and Mäler 2001; López 2003; Neumayer 2003; Pearce and Warford 1993; WCED 1987).

According to the pioneers of the concept of sustainable development, humanity is obliged "to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own" (WCED 1987: 8). Achieving sustainability requires conscious decisions about how best to augment total capital, including natural and human capital. How then does regime type affect the paths of economic, or so-called weak sustainability of societies? We test several different measures of democracy and democratic institutional design on the World Bank's indicator of weak sustainability (genuine savings), which measures the rate at which investment in manufactured, human, and natural capital exceeds its depreciation (Hamilton 2000; World Bank 2002).[1]

Genuine savings is net national savings (mainly net investment in manufactured capital) minus resource depletion (fuel, minerals, ores, metals, and forests), minus costs of CO_2 pollution, plus

[1] The term 'genuine savings' was coined by Kirk Hamilton and subsequently appears as 'net adjusted savings' in the World Development Indicators.

investment in human capital. While traditional national accounting treats government spending on education as consumption, the adjusted savings treats it as a proxy variable for investment in human capital. The importance of genuine savings stems from its ability to indicate whether changes in the total capital stock are beneficial or detrimental to future well-being. As Dasgupta (2001: 87) has written,

> Genuine investment is the social worth of net changes in an economy's capital assets. It is a comprehensive notion, including as it does the social worth of net changes in manufactured and human capital, public knowledge, and natural capital. Thus, ensuring that social well-being is sustainable involves taking care that the economy's assets are managed well.

The genuine savings rate, or genuine investment rate as Dasgupta (2001) prefers to call it, captures the trade-offs policy makers face in allocating resources for the maintenance and enhancement of various forms of capital. In other words, it measures how 'well' they manage a country's total capital stock. If resources are being used unsustainably, together with higher pollution, and lower investment in human capital, then a society is ostensibly on an unsustainable path of development (Dasgupta 2001; Hamilton and Clemens 1999). This approach is known as weak sustainability. In contrast, strong sustainability is the view that all natural capital should be kept intact and that substitutability between forms of capital is either not possible or very strictly limited. In this paper we focus on weak sustainability since we believe sustainability must leave at least some room for substitutability. Also, weak sustainability is a necessary condition for achieving strong sustainability.

Our results are easy to summarize. Controlling for a range of economic, political, demographic, and social variables, we find that higher levels of political democracy are associated with higher genuine savings because democracies invest more in human capital, create less CO_2 damage and extract fewer natural resources per unit of economic output produced for creating wealth, even if they accumulate manufactured capital at lower rates than autocracies. Among the democracies alone, we find few differences among parliamentary, direct presidential and mixed systems. Proportional representation electoral systems are negatively associated with genuine savings, through lower net national savings rates, even though they have higher levels of educational spending compared with

plurality electoral systems. The level of fractionalization in government does not matter for the overall genuine savings rate. While the results on institutional variations within democracies on sustainability and its components are mixed, we establish quite robustly that democracies outperform autocracies, results that are consistent across several measures of democracy.

Our results suggest that scholars interested in the behavior of democratic governments under differing institutional environments should assess the nature of the trade-offs inherent in economic policy making, not just judge single dimensions, such as economic growth, budget deficits, or welfare spending. Our results suggest that despite possible negative effects of democracy on short-term economic growth and investment in manufactured capital, democracy promotes the long-term welfare of society by raising the genuine savings rate. They also caution against the popular presumption that the combination of parliamentary system with proportional election is the most beneficial one, at least when it comes to achieving sustainability.

The article is structured as follows: We first discuss issues surrounding democracy and weak sustainability. We then introduce our measure of sustainability, present the methods, data and results and conclude with a discussion of the implications of our findings.

How Does Democracy Affect Sustainability?

Research on democracy and socio-economic outcomes has been mainly undertaken in three broad areas. First, scholars have addressed the effect of democracy on public expenditures, investment in manufactured and human capital and economic development. The second area of research is on the effect of democracy on the environment and patterns of resource extraction, whilst the third area is on the effect of institutional design within democracies on public policy performance.

Starting with the first strand of research, regime type could affect sustainability through public expenditures, investment in manufactured and human capital and its effect on per capita income. The post-war focus on economic development and the ideological rivalry between the superpowers heightened interest in democracy and development, often operationalized as economic growth (Sirowy and Inkeles 1991). In general, an early consensus emerged to suggest that there was a “cruel dilemma”

between democracy and development (Bhagwati 1966). Democracies at low income levels were regarded as inherently unstable and since political instability deters development, it was better to let development bring democracy in its train (Huntington 1968). The rapid growth of authoritarian East Asian countries stood in stark contrast with democratic "failures" in many parts of the globe.

Recently, however, the rush to freedom prompted a fresher focus on democracy's economic impact. This research was also driven by interest in endogenous growth theory in economics, and interest in new institutionalism in several fields of the social sciences. Technological change, investment decisions, and other important sources of growth are endogenous to societies and are determined by political institutions as much as by market forces (Barro 1998; Lucas 1988; North 1990; Romer 1986). The new round of empirical analyses yielded mixed results, but the weight of the evidence suggests that democracy has no direct relationship with growth. Yet it may influence growth indirectly via higher rates of accumulation of human capital (Baum and Lake 2003; Krieckhaus 2004; Lake and Baum 2001; Przeworski et al. 2000; Przeworski and Limongi 1993). Others argued that democracies promoted efficiency because ~~it~~ they created political stability for investors and promote technological development because of higher quality entrepreneurial talent (Olson 1993). Even if communist dictatorships sported very high growth rates in the post-war years, they were unsustainable because dictatorship and autarchy were inefficient at producing high quality goods and sustaining high levels of wealth over time. Moreover, the wealth that had been created often came at the expense of environmental quality, as many parts of the old USSR attest to. It may also have come at the expense of social capital, which is manifest in the social upheaval in many parts of the USSR and the Balkans. The expected superiority of democracy to create wealth is rarely supported in the data, however, and as some suggest, once human capital is accounted for, democracy is associated negatively with growth (Barro 1998; Barro 1996; Gasiorowski 2000). China, on average, does much better than India despite the recent surge in the country's growth rates, Vietnam better than Bangladesh etc. However, autocracies seem to have a higher variability in their growth rates than democracies. Well-run autocracies do better than democracies, but poorly run autocracies also do much worse (Almeida and Ferreira 2002).

Those who see democracy conflicting with economic development argue that democracies succumb to populist tendencies and redistribute wealth, which may reduce investment and destroy entrepreneurial talent (de Schweinitz 1964; Haggard 1990; Keech 1995). Populism could lead to profligate spending that increases inflation and reduces savings and investment, thereby affecting growth and sustainability (Mueller and Stratmann 2003).[2] Moreover, democratic governments might run high deficits because organized labor will lobby for higher wages at the same time as demand for the provision of public goods in the general population rises. Indeed, several scholars show that democracies have larger governments (Boix 2001). High demand for spending, lower ability to collect taxes coupled with low growth could mean a vicious circle leading into unsustainable development.[3] The future could be squandered for present consumption. Profligate spending patterns may come with high rent-seeking and special interest politics. Such politics leads to larger government spending that may hamper growth and efficient investment, which may add up to unsustainable use of resources and environmental damage, even if democracies are found to spend more on human capital.

Despite the heavy focus on growth, no study to date has addressed the degree to which democracies are able to trade off possible profligate patterns of spending with sustainable allocation of resources over the longer run. While most scholars focus on regime type and the size of the public sector itself, what really matters is on what the money is spent and how this affects weak sustainability. Wasteful government expenditures, such as a good deal of military expenditures and the latest model of aircraft for the President, are different from productive expenditures for the education of people. Neither do those who find that democracies spend more on public goods tell us the opportunity costs incurred in the process. In short, the existing empirical evidence on how democracies and autocracies may promote sustainability via capital investment and public expenditures is both

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[2] There is little empirical work to date on public and private savings behavior under democratic and authoritarian conditions (Edwards 1995; Loayza, Schmidt-Hebbel, and Servén 1999). The World Bank has an entire research section on this, which has thus far not addressed how democracy associates with savings behavior (Loayza, Schmidt-Hebbel, and Servén 2000).

[3] Some find that there is no difference in the tax rates between democracies and autocracies, however (Cheibub 1998).

mixed and insufficient as it is not clearly focused on the trade-offs inherent in the sustainability concept.

The second broad area of research focuses on democracy's effects on the environment and ecosystems upon which future welfare depends as well as on the rate and sustainability of natural resource extraction. Here the arguments made are similar to those made with respect to economic growth. Some have suggested that democracies are likely to sacrifice society's long-term welfare to short-term gains for individuals, that democracies fail to adopt necessary but painful policies of restructuring, or that they pursue strategies based on electoral considerations, not coherent policy, and that democracy is often "captured" by rapacious "capitalists," whose search for profits is granted priority over communitarian interests. Even democracies with strong left-wing governments may be unsympathetic to measures of environmental protection because of electoral pressures to create growth and employment.[4] But it is more common today to argue the opposite effect. Payne (1995) summarizes five broad arguments as to why democracy should have a beneficial effect on environmental protection: 1) democracy creates a political climate in which information can flow freely and citizens can act on that information to organize and press demands upon government, 2) democratic government is responsive to popular demands and 3) democratic governments are better able to implement innovative policies and draw lessons from successes and failures, 4) democratic governments are more likely to participate in international cooperative ventures to solve global problems, including environmental problems; and 5) democracies are often market-based economic systems and these can be harnessed to provide environmental as well as purely economic benefits. In other words, democracies should get the mix of policies for sustainability right.

The empirical evidence for the impact of democracy on the environment is mixed. Gleditsch and Sverdrup (1995) examine the relationship among democracy, development and 'good environmental

[4] Of course, growth and job creation and the "greed" of capitalists can drive sustainability by creating wealth, but the question is: at what environmental cost? See Gleditsch and Sverdrup (1995) for a summary of the arguments against democracy, and Neumayer (2003b) for a discussion of left-wing politics and environmental issues.

performance' using nine environmental indicators.[5] They find that democracy has a positive effect on the environment, although its positive effect on development results in environmental damage, sometimes outweighing beneficial effects. Democracy's primary effect on the environment seems to come from the mobilization of counter forces that lessen environmental problems to some extent. Gleditsch and Sverdrup (1995: 15) conclude that "it seems clear that how people organize themselves matters." On the other hand, Midlarsky (1998: 358) found 'no uniform relationship between democracy and the environment.' For three indicators of environmental quality (deforestation, CO_2 emissions, and soil erosion by water), he found significant negative relationships between democracy and environmental quality. Two studies undertaken by economists similarly fail to provide consistent and robust evidence for a beneficial effect of democracy on air and water pollution even though the majority of the evidence weighs in democracy's favor (Torras and Boyce 1998 and Barrett and Graddy 2000). In a more recent effort, Reuveny and Li (2004) find that democracy leads to lower CO_2 emissions per capita, lower NO_x emissions per capita, less organic pollution in water, lower deforestation rates, and less land degradation. They conclude that democracy reduces the extent of human activities that directly degrade the environment.

Democracy can also affect the rate and sustainability of natural resource extraction. The so-called 'resource curse' literature argues that corrupt, elitist and non-accountable governments extract natural resources ferociously and channel resource rents into non-productive wasteful consumption expenditures as well as private savings of the small ruling elite on foreign bank accounts (Auty 2001). Democratic governments need to spread the benefits from resource extraction more evenly across society and need to show that they have put the rents to productive use for the social good, as otherwise they will be punished at the ballot box. Also, some argue that democracies on average are less prone to corruption (Sandholtz and Koetzle 2000). Of course, causality runs in both directions as many have noted how natural resource abundance hinders the development of a civil society and

[5] They include the following negative indicators: 1) emissions of climate gases per capita; 2) emissions of CO_2 per capita, 3) deforestation, 4) threats to biodiversity, 5) lack of safe drinking water, 6) lack of sanitary services and 7) population growth. Their positive indicators are 8) signed and ratified environmental treaties and 9) number of environmental organizations.

democratic forms of governance (Jensen and Wantchekon 2004; Ross 2001). However, natural resource abundance does not necessarily imply non-democratic governance as Bolivia, Botswana, Chile, Ecuador, Papua New Guinea, Trinidad and Tobago, Venezuela and other examples attest.

The third broad area of research that speaks to this issue is the differing effect of democratic institutional design on public policy performance. The question may not only be one of democracy versus authoritarianism, but also what types of democracy matter most? Research in comparative politics has long been concerned with the question of how institutional design affects political outcomes (Diamond and Plattner 1993; Lijphart 1984; Lijphart 1999; Powell 2000; Rockman and Weaver 1993; Strøm, Müller, and Bergman 2004). In this line of research, democracies are not created equal. They exist in a variety of institutional forms, varying along such lines as electoral rules, presidential versus parliamentary government, federal versus centralized authority, unitary versus coalitional government structures etc. These differing institutional features in turn shape the policy arena in ways that lead to different outcomes.

Arendt Lijphart (1984, 1999), for example, identifies two broad categories of democracy — consensual and majoritarian. According to Lijphart (1999: 275–300), the bundle of institutional features that make up the consensus model of governing results in a more democratic system (more representative, more accountable to the voter, less corrupt, less removed from the people, with greater political quality, higher voter turn out and more satisfied constituents). It apparently produces better policy (with a strong community orientation and imbued with social consciousness), and in a better manner (more consultative and inclusive). Lijpart's two influential categories and Powell's (2000) distinction between majoritarian and proportional visions are both composites of several institutional features. They are more sophisticated versions of the older arguments for the virtues of parliamentary government compared to the presidential model and the virtues of proportional representation (PR) compared to those of a majoritarian electoral system.[6] There are, however, commonalities in the reasoning at work in both literatures.

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[6] For a review of issues, see Rockman and Weaver (1993) and Müller, Bergman, and Strøm (2004).

Institutional design then configures democracy in ways that moderate the degrees to which representation, delegation, and accountability function (Müller, Bergman, and Strøm 2004; Przeworski, Stokes, and Manin 1999). Thus, different types of democracy will vary in their capacity to accommodate new demands (Rockman and Weaver 1993; Vogel 1993), solve the agency problem between the voters and their representatives and the representatives and public officials who carry out policy, and they will differ in the number and nature of each system's "veto-points" that would allow (or constrain) policy change at will (Crepaz 1998). They will also differ in the degree to which parochial, or special interests dominate the policy agenda to the detriment of general social welfare (Persson and Tabellini 1999). On the whole, the parliamentary-PR combination emerges with the more positive evaluation since it is associated with stronger representation of diffuse and general as opposed to special interests (Crepaz 1998). Yet again, empirical findings have been mixed (Cheibub, Przeworski, and Saiegh 2004; Müller, Bergman, and Strøm 2004).

How does this debate relate to questions of democracy and sustainability? Of particular interest here is the impact of institutional design on public spending. It is argued that proportional representation frequently leads to the necessity of forming coalitional governments, leading to greater fractionalization, which in turn increases government instability, which in turn results in higher government spending and larger budget deficits (Persson, Roland, and Tabellini 2003; Roubini and Sachs 1989). Moreover, a divided government without proper checks and balances is supposed to drive spending since each organ of government will pursue its own spending agenda (Persson, Roland, and Tabellini 1997). Politicians manage to appropriate more rents for themselves in such systems. Others dispute these broad claims on empirical grounds (Beck et al. n.d.; Borrelli and Royed 1995). In this literature, it is frequently assumed that this larger spending is undesirable policy performance, with the implication that such spending is not sustainable over the long run. For our purposes, however, it is not enough to note that differing institutional choices are supposed to effect fiscal and other related policies. Instead, what matters is what the money is spent on. Interestingly, while parliamentary regimes have higher spending, they also provide more public goods than presidential regimes (Persson, Roland and Tabellini 2000). The same is true for proportional as opposed to

plurality electoral systems, which spend more on goods grounded in local interests (Lizzeri and Persico 2001; Milessi-Ferretti, Perotti and Rostagno 2002). Fredriksson and Millimet (2004a) report that parliamentary systems have higher taxes on gasoline consumption, which they interpret as environmental taxes even though this is problematic as their main purpose might be revenue raising. Fredriksson and Millimet (2004b) provide evidence that regimes with a proportional electoral system have stricter environmental policies. Even with respect to economic growth, Persson (2004) reports that reforming authoritarian regimes into parliamentary democracies with proportional representation seems to boost the adoption of growth-promoting structural policies, whereas converting autocracies into presidential plurality democratic systems does not.

From the many possible sets of institutional features that make up the world's democracies, we examine whether parliamentary systems outperform presidential ones, and whether the type of electoral system (proportional representation, plurality, or mixed) affects sustainability and its components, controlling for the degree of fragmentation within government. Given the number of possible institutional design features that could be included in such testing and the variations within the category of parliamentary systems, testing only two (albeit central ones) can constitute only a first cut at the issue of the impact of institutional design on weak sustainability. Nevertheless, knowing broad patterns of empirical association is valuable not only for instructing the academic debate on the subject, but also for those debating and revising constitutions to create better social outcomes.

This paper will contribute to the debate on institutional design in at least two ways. First, much of the parliamentary-presidential, PR-majoritarian debate concentrates heavily upon the established OECD democracies over the course of a few years. Our data set stretches well beyond these in both time and space, greatly enlarging the number of data points available for analysis. Second, the research on public spending focuses heavily on the level of spending and the size of government, but does not address the type of spending. Some forms of spending, such as on education are clearly better for economic sustainability. We test these democratic, institutional features on yet another measure of overall economic policymaking and its outcomes, namely sustainability. Our measure of sustainability

and its components (discussed below) allow us to say more about *on what* money is spent on as well as to gauge the trade-offs inherent in economic and social policymaking.

How to measure weak sustainability?

As the seminal publication on sustainable development by the World Commission on Environment and Development (WCED) quoted at the outset suggests, sustainability is a process that depends on the nature of investments that a society chooses to make towards the future. The World Bank tries to capture this dimension with the genuine savings rate. It is calculated as follows:

> GS = (investment in manufactured capital – net foreign borrowing + net official transfers – depreciation of manufactured capital + current education expenditures – net depreciation of natural capital and cost of atmospheric pollution) / Gross National Income (GNI)

Note that investment in manufactured capital minus foreign borrowing plus net official transfers minus depreciation of manufactured capital is equal to net national savings. While the traditional national accounting treats government spending on education as consumption, the adjusted savings treats it as investment. This is regarded as a first approximation to the full value of human capital investment, which is difficult to measure precisely. Depreciation of natural capital covers non-renewable resource extraction such as fossil fuels and minerals as well as forestry and is measured as price minus average cost times the amount of resources extracted. Cost of atmospheric pollution is approximated by the damage caused by carbon dioxide emissions. It is apparent then from the formula above that negative genuine savings could be driven by high consumption (i.e. low investment in manufactured capital), high resource depletion, high pollution, while investment in education remains low, which would clearly lead to a profligate, unsustainable path for a society. On the other hand, higher genuine savings is achieved via investment in manufactured capital with relatively lower depletion of the resource base, higher investment in human capital and lower damage to the environment. Quite simply, then, savings of all forms of capita is the essence of sustainability (Atkinson et al. 1999).

Until quite recently, economists viewed the growth of gross domestic product (GDP) as the yardstick of development. Gross domestic product and the investment required for the growth of

output were thought of as involving merely manufactured capital (and sometimes human capital). The degradation of natural capital in the process of economic activity was unaccounted in GDP statistics. Green accounting processes began as an important corrective for making GDP reflect the degradation of the environment and the depletion of natural resources as a result of economic production. In reaction to this, the World Bank embarked on estimating the 'Wealth of Nations' to include manufactured, human, and natural capital of countries as a first step towards monitoring the progress of nations in terms of sustainability (World Bank 1997). The changes in the redefined estimates of wealth, therefore, indicate whether the development trajectory of any given country is unsustainable over time. Importantly, however, these data also show that the most important component of most nations' capital stocks is human capital (unfortunately, social capital is left out of the calculations because of the complex issues surrounding its measurability). These results are another source of caution as to why debates around regime types and institutional variation that look at single measures such as government spending should be cautious about substantive interpretations of results. Since traditional national accounts treats spending on education as consumption one might be led to believe that all spending is wasteful. However, spending on developing skills and knowledge of people is not the same as burning public money in wasteful expenditures. The World Bank's measure of sustainability allows us to explore this issue. An added advantage is that the data are available in time-series format for a large number of countries spanning over 25 years. Genuine savings data are taken from the World Bank's (2002) World Development Indicators (WDI) CD-Rom, where they are called "net adjusted savings". We use this source, but we drop Angola and Sudan from the sample since their data seem to be reported with error as they are often below -100% and are inconsistent with other data published at the Bank's website. In addition, the 1991 value for Kuwait was set to missing as it was unusually low and clearly affected by the Iraq occupation and the ensuing Second Gulf War.

Methods & Data

This study employs pooled time-series, cross-section (TSCS) data to gauge the effect of democracy and its institutional design on the genuine savings rate and each of the components of this composite

measure. Given our arguments about gauging democracy's effects on a composite indicator that capture some sense of trade-offs implicit in policymaking, we focus primarily on the genuine savings rate (which is the composite), but also test each of the components. We think that it is useful to know through which of the four components democracy and its institutional features affect sustainability. While we should ideally model each component with relevant controls for each, we keep the models the same for each component using the same control variables as when the overall genuine savings rate is the dependent variable. This tactic is not entirely satisfactory since each of the components should ideally be modeled separately. We hope to pursue this further in future research.

The data allow up to 129 countries to be tested with all controls included. We first discuss the control variables in the model and then our operationalization of regime type and institutional design. There are no clear models to guide the determinants of genuine savings. We control for the following factors because of their theoretical connection with our measures of democracy, or their direct effects on the dependent variable. In general, the models account for important factors predicting the net national savings rate, so as to control as fully as possible, but parsimoniously, for its determinants.[7] Note that fiscal policy variables such as government expenditures, tax revenues etc. cannot be included in the estimations as explanatory variables since they form part of GS and their inclusion would therefore effectively construct a partial identity between the left-hand side and the right-hand side of the equation.

The models control for level of per capita income since richer countries have higher savings rates and supposedly exhibit better environmental standards on several dimensions (Baghwati 1999; Frankel 2003; Loayza, Schmidt-Hebbel, and Serven 2000; Ogaki, Ostry, and Reinhart 1995; Shafik 1994). We use Gross National Income (GNI) per capita in purchasing power parity. All the data are

[7] We have largely relied on the World Bank's research program on savings across the world to pick several variables found to be associated with public and private savings rates (Loayza et al. 1998). The basic model employs per capita wealth, growth rate, and urbanization. For robustness, we also test investment rate, broad money supply (m2/GDP), and age dependency ratio. Using these variables lowers the sample of countries considerably. The World Bank's research on savings can be accessed at: http://www.worldbank.org/research/projects/savings/savinwld.htm.

obtained from World Bank (2002) unless noted otherwise.[8] We also include a squared income term to allow for a diminishing effect of per capita income on weak sustainability.[9] We control for the year-to-year change in per capita income levels (economic growth), since it is often thought that higher rates of growth require more intensive use of environmental resources, but it is also often found to be associated with the rate of investment in manufactured capital. On the other hand, higher growth may enable increases in other forms of capital, such as manufactured and human capital that reduce the direct dependence of people on natural resources (Coxhead and Jayasuriya 2003; Loayza et al. 1998). There is mixed evidence on the effects of growth rates on pollution and environmental quality (Grossman and Krueger 1995; Strern, Common, and Barbier 1996).

The level of democracy, savings rates, and environmental stress can be affected by demographic factors (Dahl and Tufte 1974; MEA 2003).[10] Thus, population size (total population), population density (people per square kilometer), and the share of urban population in total population are included in the models. Urbanization has important implications for levels of pollution and investment in manufactured capital because it is argued that consumption rises with rising urbanization (Shafik 1994). Democracy also relates to trade openness. Many argue that democracy increases openness (Milner 1999). Trade relates positively with the genuine savings rate because of its association with higher efficiency and less corruption (Frankel and Romer 1999; Gatti 1999; Wei 2000). On the other hand, trade openness is also related to higher government spending (Rodrik 1996). Our measure of trade dependence is simply the sum of imports and exports divided by GDP.

The models include the degree to which countries are dependent on natural resource exports because resource depletion will be higher among these countries. Several early studies on the topic indicate a strong relationship between resource exports and lower genuine savings. Apparently, high

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[8] The dataset and Stata do-files to generate the results will be made available upon publication.

[9] Note that some of the dimensions of the sustainability index, such as CO_2 damage will be affected in the opposite direction given the logic of the environmental Kuznets curve (EKC), which is that pollution increases with rising income but diminishes at higher levels (Frankel 2003).

[10] Neo-Malthusian views and anti-globalization views generally coincide on issues of sustainable development. There is a lively debate in the literature between the neo-Malthusians and the cornucopians, or those who think substitution of natural resources with human ingenuity is possible. For the classic debate, see (Myers and Simon 1994). Most texts on environmental security and economic sustainability sample this debate (Conca and Dabelko 1998).

resource dependence often leads to low growth, lower than normal investment in human capital, and other maladies that hamper sustainability – the familiar 'resource curse' hypothesis highlighted in the literature (Atkinson and Hamilton 2003; Auty 2001; Gylfason 2000; Hamilton 2001; Sachs and Warner 2001). We use a discrete variable that takes the value of one if exports of petroleum are greater than 30% of GDP as our control variable.[11] This measure is obtained from an independent source (Fearon and Laitin 2003). All these variables are lagged one year to mitigate simultaneity bias and some are logged to mitigate the effect of extreme values.

Finally, control variables for experience with armed conflict, which presumably influences savings rates and the degree to which extractive activity, corruption, and accumulation of manufactured capital proceeds. We compute a count of peace years since 1946 with the help of the BTSCS method of Beck, Katz and Tucker (1998) utilizing the Uppsala-PRIO civil war data that uses a threshold of 25 or more battle deaths to be counted as war (Gleditsch et al. 2002). We also add the incidence of civil war to account for ongoing civil war, again taken from the Uppsala-PRIO data. The baseline model is then:

$$GS = \beta_0+\beta_1 \text{ x income}+\beta_2 \text{ x income}^2+\beta_3 \text{ x growth}+\beta_4 \text{ x population}+\beta_5 \text{ x trade}+\beta_6 \text{ x density}+\beta_7 \text{ x urbanization}+\beta_8 \text{ x fuel exports}+\beta_9 \text{ x mineral exports}+\beta_{10} \text{ x civil war}+\beta_{11} \text{ x peace years}+\beta_{12} \text{ x year (linear form)} \ldots$$

To this baseline model containing 12 control variables, we add our regime type and institutional variables selectively. What democracy is and how exactly to measure it are thorny questions (Bollen and Paxton 2000; Collier and Levitsky 1997; Dahl 2000; Freedom House 2004; Gurr and Jaggers 1995). Some capture dimensions of democracy somewhat differently than the most widely used measure in political science, the Polity data (Gurr and Jaggers 1995; Henisz 2000; Vanhanen 2000).[12] As Bollen and Paxton (2000) show, there are biases that systematically enter into the coding of democracy in subjective indicators, such as the Freedom House (2004) data on political and civil liberties.[13] Alternatively, one could use objectively derived data based on voting turnout and the narrowness of electoral victory, or competition, between parties for control of the government

[11] We have no data for other resources, but note that oil is by far the major natural resource in value terms.
[12] The Polity data are available at http://www.cidcm.umd.edu/inscr/polity.
[13] The Freedom House data are available at: www.freedomhouse.org.

(Vanhanen 2000).[14] Vanhanen's measure captures Robert Dahl's (2000) conceptualization of democracy as "Polyarchy," which is an equally weighted index of the level of electoral participation and degree of party competition at elections. Whatever the conceptualization of democracy, the measures currently in use are very highly correlated with each other. Some scholars have warned, however, that even though measures of democracy differently arrived at correlate well, they are not interchangeable (Casper and Tufis 2002). We adopt their advice and follow a strategy of testing several accepted measures that stress one or another theoretical aspect of why democracy matters for sustainable development.

For our purposes, the democracy measure should capture adequately dimensions that reflect such aspects as representation and accountability, which matter for the various issues over sustainability discussed above. Secondarily, the measure should reflect normative aspects, such as the degree to which people enjoy political and civil rights. People are either free to squander or save! Thus, we employ the Polity data as our primary measure of democracy, but we also test Polyarchy (the only measure of democracy that is coded on the basis of actual electoral data), and Freedom House's civil and political liberties index. In short, Polity gauges the nature of the election of government and constraints on executive power, Polyarchy measures objective levels of participation and competition, and Freedom House's data capture the degree of political rights and civil liberties.

The Polity IV (version 2) dataset codes 5 institutional dimensions of democracy. This version of the data corrects in weighted form the interregnum years that were previously coded as missing. The Polity measure gauges democracy and autocracy along six dimensions:

a. institutional measures regarding transfer of executive power

b. extent to which executive power is subject to competitive elections

c. extent of opportunities for non-elites to gain executive power

d. de facto constraints on the executive

e. extent of opportunity for political expression

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[14] The Vanhanen Polyarchy data are available at: http://www.sv.ntnu.no/iss/data/vanhanen/.

f. extent to which non-elites have access to institutional structures for political expression

We follow the norm by subtracting the autocracy value from the democracy value, adding 11 to create an overall scale of democracy ranging from 1 to 21. Since we are interested in all increases of democracy from a previous level, we utilize the entire scale, but we also test a dummy variable for regime type by assigning the value 1 if democracy ranges from 16–21, and 0 if the values are between 1 and 15 (autocracy) to accommodate those who argue that a regime is either democratic or not (Przeworski et al. 2000). This variable correlates almost perfectly (r = 0.96) with others who have used the Polity data in a dichotomous manner (Fearon and Laitin 2003). Polyarchy is the degree of competition, derived as 100 minus the share of the largest winning party's vote times the percentage share of votes cast relative to total population. In other words, polyarchy captures the narrowness of victory by the largest winning party in any general election times the number of people participating in deciding (see Vanhanen 2000 for details). Democracy, thus, is a function of both dimensions. For the Freedom House measure, we use the sum of scores of both dimensions of the Freedom House data — political rights and civil liberties — and invert the scores so that the index of rights stretches from 2 (least free) to 14 (most free).[15]

After tests of democracy's effect on sustainability, we look at the impact of institutional design on sustainability among the democracies in the following manner. We employ the World Bank's Dataset on Political Institutions (Beck et al. 2001), which gauges the type of political system, the electoral system for choosing legislators, and the degree of fractionalization of government. We include dummy variables for pure parliamentary systems and the mixed category of 'presidents chosen by an elected assembly', leaving out the direct presidential system as the omitted reference category. Electoral systems are either built on pure proportionality or plurality systems or a mixture thereof. For the mixed types, we use Beck et al.'s (2001) information on how the majority of the parliamentary seats are chosen to decide whether the electoral system is principally one of proportionality or

[15] The Freedom House scores for 1981 are scored until August 1982 and scores for 1982 stretch from August to November 1983. Thus we take the 1981 scores for 1982 also (gap between August and December). In this way, the scores from August 1982-November 1983 become scores for 1983 (1 month gap), and scores from November 1983-November 1984 become scores for 1984 etc.

plurality. We include a dummy variable for proportional electoral systems, leaving the plurality systems as the omitted reference category. Government fractionalization is measured as the probability that two randomly picked members of the government will belong to the same political party. Proportional representation systems are supposed to lead to greater government fractionalization, but the bivariate correlation between these two variables is low, r=0.19. We restrict these sets of analyses only to countries that make the required threshold on the Polity scale to be coded as a democracy (see above). The appendix contains summary descriptive variable information and bivariate correlation matrices.

The analysis of time-series cross-section (TSCS) data generally poses several problems in the estimating process. TSCS models often allow for temporally and serially correlated errors as well as for heteroskedasticity. The well-known Parks method based on the feasible generalized least squares method (FGLS), which is close to the OLS method, is discredited for underestimating the true variability of the parameter estimates, which some report to be as high as 200% (Beck and Katz 1995). They propose 'panel corrected standard errors' (PCSE) as an alternative procedure. We use this method, assuming an AR1 process to deal with autocorrelation. The Rho coefficient computed in the AR1 process accounts for serially correlated errors in the model (Stata 2003).

Results

Table 1 reports the PCSE regression results of regime type on the genuine savings rate for each of the indicators of democracy.

----------Table 1 about here----------

The first column reports results with the continuous Polity index. As seen there, democracy has a positive and statistically significant effect on genuine savings, net of the control variables. A one-point increase in the polity scale increases genuine savings by 0.16 points, which means a shift from a perfect autocracy of value 1 on the index to a perfect democracy of value 21 would mean an increase

of 3.6 points of the genuine savings rate. Since the mean GS score is 6.6, this would effectively mean that moving from strict autocracy to perfect democracy increases average GS by roughly 48%. For the dummy variable constructed from the Polity index in column 2, moving from an autocracy to a democracy increases the genuine savings rate by 1.8 points, or 27% of the average genuine savings rate over the 25-year period. In column 3, we see that an increase of 1% in the combined level of participation and competition increases the genuine savings rate by .07 points. Raising the polyarchy score from its minimum to its maximum level increases the genuine savings rate by 3.3 points. For the remaining measure of democracy, Freedom House's civil and political liberties index, a one point increase raises the genuine savings rate by 0.20 points and a move from minimum to maximum by 2.4 points.

The control variables largely test in accordance with theoretical expectations. Higher per capita income raises genuine savings, but at a diminishing rate. Economic growth is not a statistically significant determinant. Greater trade openness, a larger population size and density are associated with higher genuine savings, whereas the opposite is the case for major oil exporters and the urbanization rate. Civil war experience has a negative effect on the genuine savings rate. A longer period of peace years raises the genuine savings rate.

We now turn to Polity's effects on each of the components of genuine savings, namely net national savings (mainly net investment in manufactured capital), education expenditures, carbon dioxide damage caused and resource depletion, all relative to a country's GNI.[16] Table 2, column 1, shows that increasing democracy decreases the net national savings rate. Democracies seem to consume more and invest less in manufactured capital than autocracies. This result is also true for Polyarchy, and Freedom House's political and civil liberties index (see tables 3 & 4).

----------Tables 2, 3, & 4 about here ----------

[16] Note that because in PCSE regressions a separate Rho coefficient of auto-correlation is estimated in each regression, the coefficients of variables in the regressions on the sub-components of sustainability will not necessarily add up to the coefficient size of variables in the regression on the aggregate sustainability measure.

Table 2, column 2 reveals, however, that democracies as measured by Polity invest more in human capital, measured as education spending. This result holds for the other two indicators of democracy as well. Democracy is also good news for those concerned about CO_2 pollution (see column 3). While the Polity measure and Freedom House are associated with less CO_2 emissions per economic unit produced, the Polyarchy measure has the same negative coefficient sign, but is not statistically significant. Our results support others who show that democracy reduces atmospheric pollution, net of the level of income (Reuveny and Li 2004). In Table 2, column 4, Polity democracy is negatively related to resource depletion, and this result is net of the major oil export dummy variable. This result too is common to all the indicators of democracy (tables 3, column 4 & tables 4, column 4). It seems that democratic politics might be a way to solve problems of resource abuse, but democracy might be hard to achieve given the difficulties of democratization within countries abundant in natural resources, which are also often plagued by political instabilities and civil war (Collier and Hoeffler 2001; de Soysa 2002; Fearon and Laitin 2003; Jensen and Wantchekon 2004; Ross 2001). We now turn to institutional design among the democracies and its effect on genuine savings and its components. Note that despite the high correlation between the political system and electoral system variables, we include both simultaneously. Entering them separately instead hardly affects results.

Table 5 shows that among democracies, the distinction between type of government system (direct presidential, presidential-parliamentary, and parliamentary) does not matter decisively for the aggregated measure of sustainability, genuine savings (column 1). In column 2, it seems that it does not matter for net national savings either. In column 3, parliamentary systems have higher education expenditures than the direct presidential system. Presidential systems with an elected assembly are associated with higher CO_2 damage than direct presidential systems in column 4. For resource depletion, the type of government system does not matter (column 5). The result on education spending generally supports those who find that pure parliamentary systems spend more, albeit in this case on education. With respect to electoral systems, PR electoral systems have a decidedly negative effect relative to plurality systems on the genuine savings rate. PR systems also show a significantly negative effect on net national savings (manufactured capital), but are associated with higher spending

on education. Interestingly, PR systems that are thought to allow greater voice for small parties such as the Greens, do not seem to encourage lower CO_2 production per economic unit produced.[17] Thus, the effect of a proportional electoral system on components of sustainability is mixed, but its overall effect is negative as the result reported in column 1 shows. Our results support those who argue that PR may encourage larger consumption (lower investment in manufactured capital) in general, but we also find that spending on education is higher among PR systems (Persson, Roland, and Tabellini 2003). As concerns the degree of government fractionalization, it has no statistically significant effect on the overall genuine savings rate. Higher fractionalization seems to discourage net national savings, but only marginally so.

----------Table 5 about here----------

We conducted several tests of sensitivity and checks for robustness. We add two variables strongly related to savings, but doing so reduces the sample of countries drastically. These variables are identified in the general savings literature as additional determinants of savings (Loayza et al. 1998). First, we enter a term for the total money supply (M2) and secondly enter the age dependency ratio. Controlling for both variables, which are statistically significant in the models, the reported effects of democracy remain unaffected. We next test only a sub-sample consisting of developing countries by dropping 21 OECD countries from the complete sample (Western Europe, North America, Japan, Australia, and New Zealand). The basic results on democracy remained unchanged. This suggests that the results are quite robust to sample size and specification.

[17] This result is somewhat at odds with Fredriksson and Millimet (2004b), but the dependent variables are different as they look at CO_2 emission reduction, whereas our focus is on CO_2 damage per unit of GNI. Clearly, the effect of democratic institutional variation on environmental outcomes deserves more of our attention, which we leave to future research.

Conclusion

Democracy is ostensibly triumphant, but its benefits to society are questioned on many grounds (Shapiro and Hacker-Cordón 2002). In particular, there is little evidence that it aids economic development, a factor vital for underwriting the consolidation of recent democratic gains (Barro 1998; Mueller and Stratmann 2003). Others, however, show how democracy enhances future growth indirectly through human capital investment (Baum and Lake 2003; Lake and Baum 2001). The concept of sustainable development that values the preservation of resources and the environment for future generations moderates how one views immediate economic benefit, so that raising incomes is balanced with intergenerational equity and the quality of growth (Thomas et al. 2000). How then does democracy fare when one compares its performance over time for making the trade-offs required for raising current well-being without harming the future? To answer this question, we use the World Bank's measure of genuine savings, which measures the rate of net investment in all forms of capital, including human and natural capital. Democracies are more sustainable than autocracies, even though they invest less in manufactured capital. It seems that democracies spend more on human capital accumulation, create less CO_2 damage, and deplete fewer resources per unit of economic output produced in the creation of wealth. Together these effects are strong enough to compensate for democracy's negative effect on investment in manufactured capital such that democracies have higher overall genuine savings rates than autocracies. Our results thus confirm and yet qualify the effect of democracy found in existing studies. Yes, democracies spend more than autocracies and have thus lower investment in manufactured capital. However, at the same time, it matters on what public money is spent on and democracies spend more on productive purposes such as education. Democracies might not have a better economic performance in the short-term as measured by growth rates, but they are more protective of the long-term welfare of society.

We also test various aspects of democratic institutional design on sustainability because of the implication that differing institutional rules shape outcomes among the democracies. Holding several variables constant, we find that parliamentary systems seem to be better than direct presidential ones when it comes to spending on education, but otherwise there is little difference between the two

systems. More importantly, there are no statistically significant differences among types of political system when it comes to the overall genuine savings rate, which is after all the only thing that matters in terms of weak sustainability. The type of electoral system, on the other hand, matters. PR electoral systems, which are associated with the so-called consensual types of governance, have worse records for investment in manufactured capital and the overall genuine savings rate, although they do spend more on education. This confirms existing studies, which suggest that PR systems spend more and invest less in manufactured capital (Roubini and Sachs; Persson, Roland, and Tabellini 1997, 2003). These results taken together reflect the complex nature of the trade-offs involved in economic policymaking that may determine the sustainability path of societies. They also put into doubt the proposition that the parliamentary-PR combination outperforms other systems (Crepaz 1998), at least with respect to achieving weak sustainability.

Our main finding that democracy benefits sustainability is robust to a variety of specifications and holds for a sub-sample consisting of only developing countries. In conclusion, we find that democratic policymaking is associated with better prospects for sustainable development. Our results, like those of others, may suggest that the general pessimism toward the economic performance of democracies might be highly premature, as others too have suggested (Lake and Baum 2001).

Table 1: PCSE regressions of regime type on the genuine savings rate, 1975–2000

	(1)	(2)	(3)	(4)
Polity	0.16***			
	(0.04)			
Polity_dummy		1.77***		
		(0.57)		
Polyarchy			0.07**	
			(0.03)	
Freedom House				0.20**
				(0.10)
Ln gni/pc	12.62***	12.78***	13.80***	12.69***
	(4.78)	(4.79)	(4.91)	(4.83)
$(\text{Ln gni/pc})^2$	-0.48*	-0.48*	-0.53*	-0.46
	(0.29)	(0.29)	(0.30)	(0.29)
Econ.Growth	0.02	0.02	0.02	0.00
	(0.03)	(0.03)	(0.03)	(0.03)
Urban pop.%	-0.19***	-0.19***	-0.21***	-0.20***
	(0.03)	(0.03)	(0.03)	(0.03)
Ln trade/gdp	2.30***	2.31***	2.30***	2.31***
	(0.68)	(0.68)	(0.67)	(0.67)
Ln pop.size	0.57**	0.61**	0.66**	0.65**
	(0.28)	(0.28)	(0.27)	(0.28)
Ln pop.density	1.60***	1.61***	1.50***	1.54***
	(0.24)	(0.25)	(0.25)	(0.25)
Oil dummy	-9.46***	-9.67***	-9.45***	-9.52***
	(1.45)	(1.48)	(1.45)	(1.46)
Civil war	-0.93*	-0.90*	-0.91*	-0.76
	(0.49)	(0.49)	(0.50)	(0.50)
Peace years	0.07***	0.07***	0.07***	0.07***
	(0.02)	(0.02)	(0.02)	(0.02)
Year	-0.29***	-0.28***	-0.29***	-0.28***
	(0.07)	(0.07)	(0.07)	(0.07)
Constant	490.33***	482.37***	494.15***	478.22***
	(143.84)	(142.54)	(143.18)	(144.30)
Observations	2564	2564	2563	2572
No. countries	129	129	129	129

Absolute standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2. PCSE regressions on components of genuine savings, 1975–2000 (Polity).

	(1)	(2)	(3)	(4)
	Nns/gni	Educ/gni	CO_2dam/gni	Res.depl/gni
Polity	-0.10***	0.01**	-0.00**	-0.20***
	(0.04)	(0.00)	(0.00)	(0.04)
Ln gni/pc	19.06***	0.00	2.00***	3.98
	(4.05)	(0.59)	(0.34)	(3.40)
(Ln gni/pc)^2	-0.94***	0.03	-0.13***	-0.29
	(0.24)	(0.03)	(0.02)	(0.21)
Econ.Growth	0.03	-0.00	-0.00	0.01
	(0.03)	(0.00)	(0.00)	(0.02)
Urban pop.%	-0.11***	0.01	0.01***	0.09**
	(0.02)	(0.00)	(0.00)	(0.04)
Ln trade/gdp	3.68***	0.26***	0.10*	1.09*
	(0.64)	(0.08)	(0.06)	(0.58)
Ln pop.size	1.40***	-0.12***	0.09***	0.46*
	(0.27)	(0.04)	(0.03)	(0.26)
Ln pop.density	0.72***	-0.27***	0.00	-1.26***
	(0.23)	(0.05)	(0.02)	(0.31)
Oil dummy	4.16***	-0.18**	0.12***	9.56***
	(1.11)	(0.07)	(0.04)	(1.85)
Civil war	-0.85**	0.02	-0.01	0.38
	(0.42)	(0.05)	(0.02)	(0.37)
Peace years	0.03**	0.00	-0.00**	-0.03*
	(0.02)	(0.00)	(0.00)	(0.02)
Year	-0.32***	-0.01	0.02***	-0.05
	(0.06)	(0.01)	(0.00)	(0.10)
Constant	522.71***	24.54	-55.79***	83.38
	(120.39)	(15.18)	(10.48)	(194.94)
Observations	2564	2564	2564	2564
No. countries	129	129	129	129

Absolute standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3. PCSE regressions on components of genuine savings, 1975–2000 (Polyarchy).

	(1)	(2)	(3)	(4)
	Nns/gni	Educ/gni	CO_2dam/gni	Res.depl/gni
Polyarchy	-0.11***	0.01**	-0.00	-0.13***
	(0.03)	(0.00)	(0.00)	(0.03)
Ln gni/pc	16.83***	0.04	1.98***	1.58
	(4.06)	(0.60)	(0.34)	(3.26)
(Ln gni/pc)^2	-0.76***	0.03	-0.13***	-0.12
	(0.24)	(0.04)	(0.02)	(0.20)
Econ.Growth	0.03	-0.00	-0.00	0.01
	(0.03)	(0.00)	(0.00)	(0.02)
Urban pop.%	-0.12***	0.00	0.01***	0.10***
	(0.02)	(0.00)	(0.00)	(0.04)
Ln trade/gdp	3.78***	0.27***	0.10*	1.24**
	(0.65)	(0.08)	(0.06)	(0.58)
Ln pop.size	1.48***	-0.11***	0.09***	0.48*
	(0.27)	(0.04)	(0.03)	(0.25)
Ln pop.density	0.65***	-0.28***	-0.01	-1.24***
	(0.23)	(0.05)	(0.02)	(0.30)
Oil dummy	4.07***	-0.18**	0.13***	9.96***
	(1.09)	(0.07)	(0.05)	(1.87)
Civil war	-0.81*	0.03	-0.01	0.38
	(0.42)	(0.05)	(0.02)	(0.38)
Peace years	0.04**	0.00	-0.00**	-0.03*
	(0.02)	(0.00)	(0.00)	(0.02)
Year	-0.34***	-0.01	0.02***	-0.07
	(0.06)	(0.01)	(0.00)	(0.09)
Constant	564.12***	25.68*	-54.16***	122.57
	(120.37)	(15.36)	(10.10)	(183.37)
Observations	2563	2563	2563	2563
No. countries	129	129	129	129

Absolute standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. PCSE regressions on components of genuine savings, 1975–2000 (Freedom House).

	(1)	(2)	(3)	(4)
	Nns/gni	Educ/gni	CO_2dam/gni	Res.depl/gni
Freedom House	-0.30***	0.02**	-0.01***	-0.35***
	(0.08)	(0.01)	(0.00)	(0.10)
Ln gni/pc	18.48***	-0.07	2.00***	3.72
	(4.10)	(0.59)	(0.34)	(3.41)
(Ln gni/pc)^2	-0.87***	0.04	-0.13***	-0.26
	(0.24)	(0.03)	(0.02)	(0.21)
Econ.Growth	0.01	-0.00	-0.00	0.01
	(0.03)	(0.00)	(0.00)	(0.02)
Urban pop.%	-0.13***	0.00	0.01***	0.09**
	(0.02)	(0.00)	(0.00)	(0.04)
Ln trade/gdp	3.68***	0.29***	0.10*	1.16**
	(0.65)	(0.08)	(0.06)	(0.58)
Ln pop.size	1.43***	-0.10***	0.09***	0.45*
	(0.27)	(0.04)	(0.03)	(0.26)
Ln pop.density	0.64***	-0.28***	-0.00	-1.29***
	(0.23)	(0.04)	(0.02)	(0.32)
Oil dummy	4.14***	-0.18**	0.13***	9.81***
	(1.13)	(0.07)	(0.04)	(1.88)
Civil war	-0.69*	0.02	-0.01	0.37
	(0.41)	(0.05)	(0.02)	(0.37)
Peace years	0.05***	0.00	-0.00**	-0.02
	(0.02)	(0.00)	(0.00)	(0.02)
Year	-0.35***	-0.01	0.02***	-0.08
	(0.06)	(0.01)	(0.00)	(0.09)
Constant	590.67***	24.70*	-53.31***	148.21
	(122.69)	(14.66)	(10.20)	(185.99)
Observations	2572	2572	2572	2572
No. countries	129	129	129	129

Absolute standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Governmental fractionalization, political and electoral system and genuine savings.

	(1)	(2)	(3)	(4)	(5)
	G.sav/gni	Nns/gni	Educ/gni	CO_2dam/gni	Res.dpl/gni
Parliamentary	0.87	0.04	0.55***	0.02	-0.19
	(0.73)	(0.73)	(0.16)	(0.04)	(0.47)
President_assembly	-2.44	-1.97	0.15	0.25***	0.05
	(1.58)	(1.39)	(0.18)	(0.10)	(0.51)
PR electoral system	-1.62**	-1.71**	0.36***	0.06	0.35
	(0.68)	(0.70)	(0.12)	(0.07)	(0.36)
Govt. fractional.	-0.40	-0.93*	0.04	-0.01	-0.56
	(0.57)	(0.54)	(0.07)	(0.05)	(0.43)
Ln gni/pc	29.51***	32.62***	-0.49	2.23***	-1.90
	(8.21)	(6.63)	(1.42)	(0.40)	(5.93)
(Ln gni/pc)^2	-1.41***	-1.75***	0.06	-0.14***	-0.01
	(0.48)	(0.39)	(0.08)	(0.03)	(0.35)
Econ.Growth	0.06	0.04	-0.00	-0.00	-0.01
	(0.04)	(0.03)	(0.00)	(0.00)	(0.03)
%urban pop.	-0.22***	-0.17***	0.01**	0.01***	0.06***
	(0.03)	(0.03)	(0.01)	(0.00)	(0.02)
Ln trade/gdp	2.35***	2.11**	0.25**	0.26***	0.30
	(0.90)	(0.93)	(0.13)	(0.10)	(0.72)
Ln pop.size	0.53*	1.20***	-0.16***	0.10***	0.50**
	(0.28)	(0.31)	(0.05)	(0.03)	(0.23)
Ln pop.density	0.08	0.10	-0.26***	0.02**	-0.31*
	(0.26)	(0.29)	(0.06)	(0.01)	(0.17)
Oil dummy	-8.64***	3.70***	-0.42**	0.13***	9.27***
	(1.80)	(1.43)	(0.17)	(0.05)	(2.05)
Civil war	1.11	1.14	-0.03	-0.08***	0.08
	(0.77)	(0.72)	(0.07)	(0.03)	(0.61)
Peace years	0.06***	0.05**	0.00	-0.00***	0.00
	(0.02)	(0.02)	(0.00)	(0.00)	(0.02)
Year	-0.20***	-0.22***	-0.02*	0.02***	-0.05
	(0.08)	(0.06)	(0.01)	(0.00)	(0.06)
Constant	255.06	272.20**	40.01*	-55.08***	113.88
	(163.99)	(132.99)	(21.48)	(11.33)	(141.82)
Observations	1197	1197	1197	1197	1197
No of countries	88	88	88	88	88

Absolute standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix

Summary statistics:

	N	Mean	Std. Deviation	Min.	Max.
Genuine savings	2572	6.6	12.3	-61.4	50.4
Polity	2564	12.5	7.5	1	21
Polyarchy	2563	13.2	13.4	0	47.1
Freedom House	2572	8.5	3.9	2	14
Pres. elected by assembly	1280	0.06	0.23	0	1
Parliamentary	1280	0.57	0.50	0	1
Proportional represent.	1228	0.50	0.50	0	1
Govt. fractionalization	1226	0.25	0.28	0	1
Income (log)	2572	8.0	1.1	5.4	10.4
Economic growth	2572	1.2	5.3	-43.7	35.5
Pop. Urban	2572	50.1	24.2	4	100
Trade (log)	2572	4.1	0.6	1.8	6.1
Population (log)	2572	16.1	1.5	12.8	20.9
Pop. density (log)	2572	3.8	1.4	0.3	8.8
Oil export dummy	2572	0.1	0.4	0	1
Civil War	2572	0.2	0.4	0	1
Peace Years	2572	20	16.5	0	54

Correlation matrix of variables:

	1	2	3	4	5	6	7	8	9	10	11	12
(1) Gen. Saving												
(2) Polity	0.29											
(3) Polyarchy	0.29	0.83										
(4) Freedom House	0.30	0.90	0.84									
(5) Income	0.26	0.58	0.70	0.65								
(6) Growth	0.25	0.10	0.11	0.11	0.09							
(7) Pop. urban	0.04	0.45	0.59	0.53	0.82	0.02						
(8) Trade	0.11	0.01	0.08	0.05	0.20	0.06	0.18					
(9) Population.	0.02	0.10	0.08	0.05	0.06	0.06	0.05	-0.61				
(10) Pop. density	0.28	0.18	0.20	0.16	0.16	0.11	0.09	0.13	0.18			
(11) Oil export	-0.48	-0.21	-0.17	-0.16	0.04	-0.10	0.16	0.08	-0.01	-0.12		
(12) Civil War	-0.05	-0.02	-0.09	-0.11	-0.12	-0.04	-0.12	-0.26	0.28	0.13	-0.04	
(13) Peace Years	0.20	0.26	0.36	0.37	0.39	0.09	0.30	0.14	-0.12	-0.05	-0.05	-0.50

Correlation matrix of institutional variables:

	1	2	3
(1) Pres. elected by assembly			
(2) Parliamentary	-0.27		
(3) Proportional representation	-0.00	-0.02	
(4) Govt. fractionalization	-0.11	0.10	0.22

References:

Almeida, Heitor and Daniel Ferreira. 2002. Democracy and the Variability of Economic Performance. *Economics and Politics* 14(3):225-258.

Atkinson, Giles, Richard Dubourg, Kirk Hamilton, Mohan Munesinghe, David Pearce, and Carlos Young. 1999. *Measuring Sustainable Development: Macroeconomics and the Environment*. Cheltanham: Edward Elgar.

Atkinson, Giles, and Kirk Hamilton. 2003. Savings, Growth and the Resource Curse Hypothesis. *World Development* 31 (11):1793–1807.

Auty, Richard M., ed. 2001. Resource Abundance and Economic Development, UNU/WIDER studies in development economics. Oxford: Oxford University Press.

Barrett, Scott and Kathryn Graddy. 2000. Freedom, Growth, and the Environment. *Environment and Development Economics* 5(4):433-456.

Barro, Robert J. 1996. Democracy and Growth. *Journal of Economic Growth* 1:2–27.

Barro, Robert J. 1998. Determinants of Economic Growth: A Cross-Country Empirical Study. Cambridge, MA: MIT Press.

Baum, Matthew A., and David A. Lake. 2003. The Political Economy of Growth: Democracy and Human Capital. *American Journal of Political Science* 47 (2):333–347.

Beck, Nathaniel, and Jonathan N. Katz. 1995. What To Do (and Not To Do) with Time-Series Cross-Section Data. *American Political Science Review* 89 (3):634-647.

Beck, Nathaniel, Jonathan N. Katz, and Richard Tucker. 1998. Taking Time Seriously: Time-Series-Cross-Section Analysis with a Binary Dependent Variable. *American Journal of Political Science* 42 (4):1260–1288.

Beck, Thorsten, George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh. 2001. New Tools in Comparative Political Economy: The Database of Political Institutions. *The World Bank Economic Review* 15 (1):165–176.

Beck, Thorsten, George Clarke, Alberto Groff, Philip Keefer, and Patrick Walsh. n.d. New Tools and New Tests in Comparative Political Economy: The Database of Political Institutions. Washington, DC: World Bank.

Bhagwati, Jagdish. 1966. *The Economics of Underdeveloped Countries*. New York: McGraw-Hill.

Bhagwati, Jagdish. 1999. Economic Freedom: Prosperity and Social Progress. Paper read at Conference on Economic Freedom and Development, 17-18 June, at Tokyo.

Boix, Carles. 2001. Democracy, Development, and the Public Sector. *American Journal of Political Science* 45 (1):1–17.

Bollen, Kenneth, and Pamela Paxton. 2000. Subjective Measures of Liberal Democracy. *Comparative Political Studies* 33 (1):58-86.

Borrelli, Stephen A., and Terry J. Royed. 1995. Government 'Strength' and Budget Deficits in Advanced Democracies. *European Journal of Political Research* 28:225–260.

Casper, Gretchen, and Claudiu Tufis. 2002. Correlation Versus Interchangeability: The Limited Robustness of Empirical Findings on Democracy Using Highly Correlated Datasets. *Political Analysis* 11 (2):1–11.

Cheibub, Antonio José. 1998. Political Regimes and the Extractive Capcity of Governments: Taxation in Democracies and Dictatorships. *World Politics* 50 (3):349–376.

Collier, David, and Steven Levitsky. 1997. Democracy with Adjectives: Conceptual Innovation in Comparative Research. *World Politics* 49 (April):430–451.

Collier, Paul , and Anke Hoeffler. 2001. Greed and Grievance in Civil War. Washington, DC: World Bank Research group on Civil War, Crime, and Violence.

Conca, Ken, and Jeffrey D. Dabelko, eds. 1998. *Green Planet Blues: Environmental Politics from Stockholm to Kyoto*. 2nd Edition ed. Boulder, CO: Westview.

Coxhead, Ian, and Sisira Jayasuriya. 2003. The Open Economy and the Environment: Development, Trade and Environment in Asia. Cheltenham: Edward Elgar.

Crepaz, Markus. 1998. Inclusion Versus Exclusion: Political Institutions and Welfare Expenditures. *Comparative Politics* 31(1): 61-80.
Dahl, Robert A. 2000. *On Democracy*. New Haven, CT: Yale University Press.
Dahl, Robert A., and Edward Tufte. 1974. *Size and Democracy*. Palo Alto, CA: Stanford University Press.
Dasgupta, Partha. 2001. *Human Well-Being and the Natural Environment*. Oxford: Oxford University Press.
Dasgupta, Partha, and Karl-Göran Mäler. 2001. Wealth as a Criterion for Sustainable Development. *World Economics* 2 (3):19–44.
de Schweinitz, Karl jr. 1964. *Industralization and Democracy*. New York: Free Press.
de Soysa, Indra. 2002. Paradise is a Bazaar? Greed, Creed, and Governance in Civil War, 1989–1999. *Journal of Peace Research* 39 (4):395–416.
de Soysa, Indra and Eric Neumayer. 2005. False Prophet, or Genuine Savior? Assessing the Effects of Economic Openness on Sustainable Development, 1980-1999. *International Organization* (forthcoming).
Diamond , Larry, and Marc F. Plattner. 1993. *The Global Resurgence of Democracy*. Baltimore, MD: Johns Hopkins University Press.
Edwards, Sebastian. 1995. Why are Savings Rates So Different Across Countries? An International Comparative Analysis. Cambridge, MA: National Bureau of Economis Research.
Fearon, James D., and David D. Laitin. 2003. Ethnicity, Insurgency, and Civil War. *American Political Science Review* 97 (1):1–16.
Frankel, Jeffrey A. 2003. The Environment and Globalization. Cambridge, MA: NBER.
Frankel, Jeffrey A., and David Romer. 1999. Does Trade Cause Growth? *American Economic Review* 89 (3):379–399.
Fredriksson, Per G. and Daniel L. Millimet. 2004a. Comparative Politics and Environmental Taxation. *Journal of Environmental Economics and Management* 48 (1):705-722.
Fredriksson, Per G. and Daniel L. Millimet. 2004b. Electoral Rules and Environmental Policy. *Economics Letters* 84 (2):237-244.
Freedom House. 2004. Freedom in the World 2003: Survey Methodology. New York: Freedom House.
Gasiorowski, Mark J. 2000. Democracy and Macroeconomic Performance in Underdeveloped Countries: An Emprical Analysis. *Comparative Political Studies* 33 (3):319–49.
Gatti, Roberta. 1999. Explaining Corruption: Are Open Countries Less Corrupt? Washington, DC: Worldbank.
Gleditsch, Nils Petter and Bjorn Otto Sverdrup. 1995. Democracy and the Environment. Paper presented to the 36th Annual Convention of the International Studies Association, Chicago, IL, 21-25 February.
Gleditsch, Nils Petter, Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg, and Havard Strand. 2002. Armed Conflict 1946–2001: A New Dataset. *Journal of Peace Research* 39 (5):615–637.
Grossman, Gene M., and Alan B. Krueger. 1995. Economic Growth and the Environment. *Quarterly Journal of Economics*:353–377.
Gurr, Ted R., and Keith Jaggers. 1995. Tracking Democracy's Third Wave with the Polity III Data. *Journal of Peace Research* 32 (4):469–482.
Gylfason, Thorvaldur. 2000. Natural Resources, Education, and Economic Development. London: Center for Economic Policy Research.
Haggard, Stephen. 1990. *Pathways From the Periphery*. New York: Oxford University Press.
Hamilton, Kirk. 2000. Genuine Savings as a Sustainability Indicator. Washington, DC: World Bank.
Hamilton, Kirk. 2001. The Sustainability of Extractive Economies. In *Resource Abundance and Economic Development*, edited by R. M. Auty. Oxford: Oxford University Press.
Hamilton, Kirk, and Michael Clemens. 1999. Genuine Savings Rates in Developing Countries. *The World Bank Economic Review* 13 (2):333–356.
Henisz, Witold J. 2000. The Instititutional Environment for Economic Growth. *Economics and Politics* 12 (1):1-31.

Huntington, Samuel P. 1968. *Political Order in Changing Societies*. New Haven, CT: Yale University Press.
Jensen, Nathan, and Leonard Wantchekon. 2004. Resource Wealth and Political Regimes in Africa. *Comparative Political Studies* 37 (7):816–841.
Keech, William R. 1995. *Economic Politics: The Costs of Democracy*. Cambridge: Cambridge University Press.
Krieckhaus, Jonathan. 2004. The Regime Debate Revisited: A Sensitivity Analysis of Democracy's Economic Effect. *British Journal of Political Science* 34:635–655.
Lake, David A., and Matthew A. Baum. 2001. The Invisible Hand of Democracy: Political Control and the Provision of Public Services. *Comparative Political Studies* 34 (6):587–621.
Lijphart, Arend. 1984. Democracies: Patterns of Majoritarian and Consensus Government in Twenty-One Countries. New Haven: Yale University Press.
Lijphart, Arend. 1999. *Patterns of Democracy*. New Haven, CT: Yale University Press.
Lizzeri, Alessandro and Nicola Persico. 2001. The Provision of Public Goods under Alternative Electoral Incentives. *American Economic Review* 91(1):225-239.
Loayza, Norman, Humberto López, Klaus Schmidt-Hebbel, and Luis Servén. 1998. *Saving in the World: Stylized Facts*. Washington, DC: World Bank.
Loayza, Norman, K Schmidt-Hebbel, and L Serven. 2000. What Drives Private Saving Across the World? *Review of Economics and Statistics* LXXXII (2):165–181.
Loayza, Norman, Klaus Schmidt-Hebbel, and Luis Servén. 1999. What Drives Private Savings Across the World? *Review of Economics and Statistics* LXXXII (2):165–181.
Loayza, Norman, Klaus Schmidt-Hebbel, and Luis Servén. 2000. Saving in Developing Countries: An Overview. *The World Bank Economic Review* 14 (3):393–414.
López, Ramón. 2003. The Policy Roots of Socioeconomic Stagnation and Environmemtal Implosion: Latin America. *World Development* 31 (2):259–280.
Lucas, Robert E. 1988. On the Mechanics of Economic Development. *Journal of Monetary Economics* 22:3–42.
MEA, Millennium Ecosystem Assessment. 2003. *Ecosystems and Human Well-Being: A Framework for Assesssment*. Washington, DC: Island Press.
Midlarsky, Manus I. 1998. Democracy and the Environment: An Empirical Assessment. *Journal of Peace Research* 35(3):341-361.
Milesi-Ferretti, Gian Maria, Roberto Perotti and Massimo Rostagno. 2002. Electoral Systems and Public Spending. *Quarterly Journal of Economics* 117(2):609-657.
Milner, Helen. 1999. The Political Economy of International Trade. *Annual Review of Political Science* 2:91–114.
Mueller, Dennis C., and Thomas Stratmann. 2003. The Economic Effects of Democratic Participation. *Journal of Public Economics* 87:2129–2155.
Müller, Wolfgang C., Torbjörn Bergman, and Kaare Strøm. 2004. Parliamentary Democracy: Promise and Problems. In *Delegation and Accountability in Parliamentary Democracies*, edited by K. Strøm, W. C. Müller and T. Bergman. New York: Oxford University Press.
Myers, Norman, and Julian L. Simon. 1994. *Scarcity or Abundance? A Debate on the Environment*. London: W. W. Norton.
Neumayer, Eric. 2003a. Weak versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms. Cheltenham: Edward Elgar.
Neumayer, Eric 2003b. Are Left-Wing Party Strength and Corporatism Good for the Environment? A Panel Analysis of 21 OECD Countries, 1980-1998, *Ecological Economics*, 45 (2):203-220.
North, Douglass C. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.
Ogaki, Masao, Jonathan Ostry, and Carmen Reinhart. 1995. Saving Behaviour in Low- and Middle-Income Developing Countries: A Comparison. Washington, DC: International Monetary Fund.
Olson, Mancur. 1993. Dictatorship, Democracy, and Development. *American Political Science Review* 87 (3):567–575.
Olson, Mancur. 2000. Power and Prosperity: Outgrowing Communist and Capitalist Dictatorships. New York: Basic Books.

Payne, Rodger A. 1995. Freedom and the Environment. *Journal of Democracy* 6(3):41-55.
Pearce, David, and Jeremy Warford. 1993. *World Without End: Economics, Environment, and Sustainable Development*. Oxford: Oxford University Press.
Persson, Torsten, Gérard Roland, and Guido Tabellini. 1997. Seperation of Powers and Political Accountability. *Quarterly Journal of Economics* 112 (4):1163–1202.
Persson, Torsten, Gérard Roland, and Guido Tabellini. 2000. Comparative Politics and Public Finance. *Quarterly Journal of Economics* 108 (6):1121–1161.
Persson, Torsten, Gérard Roland, and Guido Tabellini. 2003. How Do Electoral Rules Shape Party Structures, Government Coalitions, and Economic Policies? Cambridge, MA: National Bureau of Economic Research.
Persson, Torsten, and Guido Tabellini. 1999. The Size and Scope of Government: Comparative Politics with Rational Politicians. *European Economic Review* 43:699-735.
Persson, Torsten. 2004. Forms of Democracy, Policy and Economic Development. Working Paper. Stockholm University: Institute for International Economic Studies.
Powell, Bingham J. 2000. Elections As Instruments of Democracy : Majoritarian and Proportional Visions. New Haven, CT: Yale University Press.
Przeworski, Adam, Michael E. Alvarez, Antonio José Cheibub, and Fernando Limongi. 2000. Democracy and Development: Political Institutions and Well-Being in the World, 1950–1990, Cambridge Studies in the Theory of Democracy. Cambridge: Cambridge University Press.
Przeworski, Adam, and Fernando Limongi. 1993. Political Regimes and Economic Growth. *Journal of Economic Perspectives* 7 (3):51–79.
Przeworski, Adam, Susan C. Stokes, and Bernard Manin, eds. 1999. *Democracy, Accountability, and Representation*. London: Cambridge University Press.
Reuveny, Rafael, and Quan Li. 2004. Democracy and Environmental Degradation: A Formal and Empirical Investigation. Paper read at International Studies Association Annual Meeting (ISA), March 16–21, at Montreal, Canada.
Rockman, Bert A., and Kent R. Weaver. 1993. *Do Institutions Matter? Government Capabilities in the U.S. And Abroad*. Washington, DC: Brookings.
Rodrik, Dani. 1996. Why Do More Open Countries Have Bigger Governments. Cambridge, MA: National Bureau of Economic Research.
Romer, Paul M. 1986. Increasing Returns and Long-Run Growth. *Journal of Political Economy* 94:1002–1037.
Ross, Michael L. 2001. Does Oil Hinder Democracy? *World Politics* 53:325–361.
Roubini, Nouriel, and Jeffrey D. Sachs. 1989. Political and Economic Determinants of Budget Deficits in the Industrial Democracies. *European Economic Review* 33:903–938.
Sachs, Jeffrey D., and Andrew Warner. 2001. Natural Resources and Economic Development: The Curse of Natural Resources. *European Economic Review* 45:827–838.
Sandholtz, W. and W. Koetzle. 2000. Accounting for corruption: economic structure, democracy, and trade. *International Studies Quarterly* 44:31-50.
Shafik, Nemat. 1994. Economic Development and Environmental Quality: An Econometric Analysis. *Oxford Economic Papers* 46:757–773.
Shapiro, Ian, and Casiano Hacker-Cordón, eds. 2002. *Democracy's Value*. New Haven, CT: Yale University Press.
Sirowy, Larry, and Alex Inkeles. 1991. The Effects of Democracy on Economic Growth: A Review. In *On Measuring Democracy: Its Consequences and Concomitants*, edited by L. Sirowy and A. Inkeles. New Brunswick, NJ: Transaction Publishers.
Stata, Corporation. 2003. *Cross-Sectional Time-Series: Reference Manual Release 8*. College Station, TX: Stata Corporation.
Stern, David I., Michael S. Common, and Edward B. Barbier. 1996. Economic Growth and Environmental Degradation: The Environmental Kuznets Curve and Sustainable Development. *World Development* 24 (7):1151–1160.
Strøm, Kaare, Wolfgang C. Müller, and Torbjörn Bergman, eds. 2004. *Delegation and Accountability in Parliamentary Democracies*. New York: Oxford University Press.

Thomas, Vinod, Mansoor Dailami, Ashok Dhareshwar, Daniel Kaufmann, Nalin Kishor, Ramón López, and Yan Wang. 2000. *The Quality of Growth*. New York: Oxford University Press, for the World Bank.

Tomz, Michael, Jason Wittenberg, and Gary King. 2003. Clarify: Software for Interpreting and Presenting Statistical Results. Stanford: Stanford University, Department of Political Science.

Torras, Mariano and James K. Boyce. 1998. Income, Inequality and Pollution: A Reassessment of the Environmental Kuznets Curve. *Ecological Economics* 25 (2):147-160.

Vanhanen, Tatu. 2000. A New Dataset for Measuring Democracy, 1810–1998. *Journal of Peace Research* 37 (2):251–265.

Vogel, David 1993. Representing Diffuse Interests in Environmental Policymaking. In Bert Rockman & Kent Weaver, eds. *Do Institutions Matter? Government Capabilities in the U.S. And Abroad*. Washington, DC: Brookings.

WCED, World Commission on Environment and Development. 1987. *Our Common Future*. Oxford: Oxford University Press.

Wei, Shang-Jin. 2000. Natural Openness and Good Government. Cambridge, MA: National Bureau of Economic Research.

World Bank. 1997. Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development. Washington, DC: World Bank.

World Bank. 2002. World Development Indicators CD Rom. Washington, DC: World Bank.