

## **Political and Economic Freedoms and Prosperity**

by

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### **Abstract**

Across the countries of the world, annual GNI/capita varies by a factor of almost 100, from \$440 in Sierra Leone to \$41,230 in Luxembourg (in 1999.) Past literature has often associated country wealth with culture, geography, history and religion, but nothing can be done about such influences over a short horizon, and probably little can be done over generations. We seek instead to uncover the “deep” determinants of wealth; i.e., those macroeconomic, structural, political and institutional conditions realistically amenable to change. We find surprisingly good news; more than 80% of the international variation in GNI/capita can be explained by mutable determinants. Fourteen candidate determinants are examined over five recent years (1995-99 inclusive.) Property rights (+) and black market activity (-) have the highest levels of significance. Also contributing to the explanation are regulation (-), inflation (-), civil liberties (+), political rights (+), press freedom (+), government expenditures (+) and trade barriers (-) (but not trade levels.). To check that these variables represent causes and are not the effects of high income, we also trace the trajectories of GNI/capita before and after political liberalizations or dictatorial retrenchments over the past half-century. Liberalizations are, on average, followed by dramatic improvement in country income, while substantial reductions in growth typically follow anti-democratic events. We conclude that countries can develop faster by enforcing strong property rights, fostering an independent judiciary, attacking corruption, dismantling burdensome regulation, allowing press freedom, and protecting political rights and civil liberties. These features define a healthy environment for economic activity

## **Political and Economic Freedoms and Prosperity**

### **I. Introduction**

The great disparity in the wealth of nations is common knowledge. For a long time, economists have tried to understand why some countries are rich, while others are poor. Why do some countries have healthy and growing economies, while others stagnate at low levels of output? Why are only a few of the developing countries really developing? There is little variation in human DNA across countries of the world and thus little variation in basic human nature. This suggests that the enormous economic differences are caused, at least to some extent, by politically determined local conditions.

Judging solely by the amount of academic research in this area, it is an issue of obvious fascination to economists. More important, it is critical for our planet. Approximately 80% of the human race lives in poverty. At the very bottom, roughly one billion live on less than \$1 per day, and about half, or three billion, live on less than \$2 per day.

Many studies have attempted to explain country economic growth rates with a variety of factors. Unfortunately, it is very difficult to find meaningful and significant correlations between economic growth rates and candidate explanatory variables. There are a number of reasons. Growth rates within each country vary considerably from year to year, or even within the same year, (Easterly et al. [1993]). This inherent noise masks the correlation of growth with even strong explanatory variables. Moreover, many countries, especially developing countries, do not always report economic statistics timely or accurately. Time slippage between the dependent and independent variables attenuates any correlation that might otherwise be observed. Finally, big, successful, wealthy, developed countries just don't grow that fast in percentage terms. They have more critical mass to move, which makes big exponential growth difficult. In the past, they implemented structural changes that led to successful development; their growth spurts are behind them.

In this study, we use GNI per capita, rather than economic growth, as a measure of economic well-being. GNI per capita is much more stable than growth. And, as noted earlier, there is enormous variation in income per capita across the countries of the world. Robert Hall and Charles Jones [1999] first pointed out the benefits of using levels, rather than growth rates, in studying this issue. Their study achieved significant results, which we will discuss in more detail below.

We would like to answer a very practical question: What can governments do to speed economic development? In seeking an answer, it is senseless to consider physical exogenous variables such as latitude, or to advise reformation of religious beliefs, ethnicity, and culture, or to wring our hands about past events such as colonialism and war. For a similar reason, we will not spend time on obvious correlates with income such as capital investment, human capital, and technology. High levels of physical and human capital, and advanced technology are indeed associated with wealth. But no government bent on improving wealth would be grateful for the advice, “increase capital and technology.” In a sense, explaining wealth by capital and technology is explaining wealth by wealth itself. It provides no guide to action. Instead, we must focus on macroeconomic, structural, political and institutional conditions that can be manipulated by a government to achieve maximum incomes per capita within the constraints of its immutable circumstances. We must try to uncover the deep determinants of development that actually drive more proximate factors.

A helpful analogy is to the forces driving a common stock’s price movement. An amateur day-trader might mention supply and demand as “proximate” determinants. On the other hand, a finance professional might argue that the stock price is determined by deeper influences such as the company’s prospective net cash flow. Although both are correct, the professional’s answer has an added benefit: it guides the company’s executives to focus on improving cash flow and thereby increasing the stock price.

Our primary types and sources of data are the components of The Index of Economic Freedom published by The Heritage Foundation; political, civil and press freedom statistics compiled by Freedom House; income per capita data from The World Bank and Maddison [2001]; and political events from the CIA Factbook. These sources provide fourteen different candidates for deep determinants of GNI/capita. Non-linear transformations of the basic variables are also employed here because we lack an *a priori* opinion about functional form. Substantial cross-correlations among some of these variables is controlled by standard econometric methods.

The results are robust. The adjusted R square is between 81% and 85% for each of the five sample years, and nine of the original 14 explanatory variables are significant in every year, with t-statistics (absolute values) from 2 to 12.

Property Rights (+), Black Market Activity (-) and Regulation (-) have the highest levels of significance. This points to the importance of knowing the rules of the game and being confident that the rules will be enforced. Political Rights (+), Civil Liberties (+) and Freedom of the Press (+) are also highly significant, supporting the view originally promulgated by Milton Friedman [1962]; economic development seems to go hand in hand with political freedom. Three other variables are also significant: Monetary Policy or Inflation (-), Trade Barriers (-) and Government Expenditures (+) as a percentage of GDP.

Surprisingly, though Trade Barriers represent a significant drag on GNI per capita, actual trade levels (exports as a percentage of GDP) are insignificant. This seems to suggest that trade barriers proxy for factors unrelated to trade itself. Corruption comes to mind because trade barriers distort import and export prices, thereby providing an opportunity for enrichment through smuggling. Smugglers who befriend government officials probably find the barriers rather porous.

Government Expenditures are related positively to GNI, suggesting that wealthier countries can afford higher levels of defense, transfer payments to needy citizens, etc.

It appears that the critical ingredient of a successful development policy is a fair and just system that invites profitable economic exchange among participants, with no risk of expropriation or repudiation. Effective good government is essential, as the significant explanatory variables reflect collective actions that no individual entrepreneur can provide alone. Once a developing country government establishes the rules to a fair game and ensures their enforcement, it would be well advised to stand back and enjoy the self-generating growth.

## **II. Review of the Literature.**

The existing literature has investigated a variety of possible determinants of country growth rates or income per capita. These include but are not limited to, democracy, trade barriers, property rights, corruption, monetary policy, political instability, civil liberties, religion, colonization, geographic location, and cultural values. The following summary based on Aron (2000) covers some, but not all, of the academic papers and books on the subject. The list is organized by explanatory factor.

### Democracy

Kormendi and Mequire (1985); Scully (1988); Sachs and Warner (1995); Savvides (1995); Alesina *et al.* (1996); Barro (1996); Ghura *et al.* (1996); Perotti (1996); Isham *et al.* (1997); Easterly and Levine (1997); Temple and Johnson (1998); De Vanssay and Spindler (1992); Helliwell (1994); Goldsmith (1995); Dawson (1998).

### Trade Barriers

Ng and Yeats (1999); Bhagwati (1988); Krueger (1983); Sachs and Warner (1995); Frankel and Romer (1999).

### Property Rights

Knack and Keefer (1995, 1997a, 1997b); Barro (1996); Hassan and Sarna (1996); Knack (1996); Lane and Tornell (1996); Sachs and Warner (1995); Borner, *et al.* (1995); Brunetti *et al.* (1998); Clague *et al.* (1995, 1996); Goldsmith (1995).

### Corruption

Mauro (1995); Clague *et al.* (1996); Helliwell (1996a); Knack and Keefer (1997a).

### Monetary Policy

Green (1986); McKinnon (1973); Van Wijnbergen (1983); Arrieta (1988).

### Political Instability

Clague *et al.* (1996); Alesina and Rodrik (1994); Persson and Tabellini (1994), Alesina *et al.* (1996); Isham *et al.* (1997); Barro (1991); Murphy *et al.* (1991); Ojo and Oshikoya (1994); Sachs and Warner (1995); Caselli *et al.* (1996); Levine *et al.* (1996); Easterly and Levine (1997); Hassan and Sarna (1996); Perotti (1996); Collier (1999).

### Civil Liberties

Collier (1996); Scully (1998); Levine and Renelt (1992); Helliwell (1994); Sachs and Warner (1995); Savvides (1995); Alesina *et al.* (1996); Barro (1996); Ghura *et al.* (1996); Perotti (1996); Isham *et al.* (1997); Spindler (1991); Dawson (1998).

### Culture and Society

Inglehart (1994); Helliwell (1996a, 1996b); Knack and Keefer (1997b); Helliwell and Putnam (1995); Mauro (1995); Perotti (1996); Eaterly and Levine (1997).

Many of these studies begin with a simple theoretical production function format of the form

$$O = f(K, L, P)$$

Where O=Output, K=Investment Capital, L=Human Capital and P=Productivity. Following the work of Solow [1956], Barro [1991] and Mankiw, Romer and Weil [1992], this leads to a typical regression of the form:

$$\text{Growth in Income} = B_0 + B_1(\text{Initial Income}) + B_2(\text{Human Capital}) + B_3(\text{Physical Capital}) + B_4(\text{Population}) + B_5(\text{Variable to be Tested}) + \varepsilon.$$

The first four explanatory variables are standard and have been commonly employed in a number of papers, though some of the operational variables seem fraught with potential measurement error. For example, human capital is typically the percentage of 25+ year

olds who have graduated from high school.<sup>1</sup> The “variable to be tested” is usually one or several of the variables taken from the list above.

There are several difficulties with this approach, in addition to its use of growth rates rather than levels. First, both sides are essentially measuring the same thing. The left side measures a flow from wealth, while the physical and human capital variables on the right side measure the stock of wealth. Obviously, if one regresses wealth on wealth plus some “true” determinant of wealth, the latter doesn’t have much opportunity to be detected as significant.

Moreover, human capital improvements seem likely to be partly the result of increasing technology because workers in more advanced economies will find employment difficult to secure if they are not relatively skilled. This suggests that a technology-adjusted measure of human capital might provide a better predictor of its true influence on wealth. In an effort to test this idea, we conducted a simple experiment. We regressed human capital (average years of schooling of 25+ year olds) on a measure of technological development, the number of R&D researchers per thousand people in the country. There were 72 countries in our sample that reported both items during 1999. The adjusted R-square for the regression was 57.8% and the t-statistic for the technology variable was 9.92. The residuals from that regression were taken as a technology-adjusted indication of human capital and used as the explanatory variable in a second regression with 1999 GNI/capita as the dependent variable. To our surprise, technology-adjusted human capital (i.e., the residuals) had zero explanatory power (Adjusted R square 0.9%).<sup>2</sup>

Admittedly, this conflicts to some extent with Barro [2001], who examines real per capita GDP growth rates in three separate decades and about 100 countries. Among his explanatory variables were some similar to those we use later in this paper such as a “rule-of-law” index, government consumption as a fraction of GDP, a trade openness measure,

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<sup>1</sup> Although this is probably correlated with the true value of aggregate human capital, it obviously misses many important factors such as the quality of education, the age distribution of workers, the level of education beyond high school, etc.

and a measure of inflation. He also includes the initial level of  $\log(\text{GDP})$  and its square plus measures of education, fertility, and investment. His main focus, education, turns out to have mixed effects on growth. For example, educational attainment at higher levels by females is unrelated to growth, which Barro suggests might indicate that “women are not well utilized in the labor markets of many countries,” p. 16. When educational quality is measured by “internationally comparable examinations in science, mathematics and reading...,” Barro finds that science tests in particular are strongly related to growth.

Regardless of whether education causes technology to improve, or whether increased technology requires job applicants to achieve greater schooling, our residual analysis above implies that education has little correlation with country income beyond the correlation between income and technological prowess. Because technological prowess is so closely related to productivity, and output per worker is so highly related to GNI/capita, there can be little probative value from including human capital measures in an explanatory model whose findings are destined to guide practical reforms. The relationship is, at best, proximate and self-evident, and at worst not even causal, but a result of a greater demand in advanced countries for higher-skilled and better-educated workers.

Many previous papers tested only a few variables at a time and, of course, this does not allow for cross-correlations among all candidate independent variables and could conceivably result in spurious inferences. An included variable could be proxying through correlation for the truly causative but omitted factor. Levine and Renelt [1992] recognized this problem and developed a method to test all possible explanatory variables against each other for significance. The sheer number of reasonable candidates, estimated at over 50 by Levine and Renelt, made one large multiple regression impossible, given the number of countries that reported data for all the variables.

They therefore resorted to Leamer’s [1985] extreme-bounds test. They rotated three independent variables at a time into a multiple regression and recorded which were most

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<sup>2</sup> Before removing technology, the education variable has an adjusted R-square of 48.6% with GNI/Capita.

robust in explaining the dependent variable. Unfortunately, they conclude that none of the independent variables tested, including many that had previously been reported as significant, turn out to be robust. In their terminology, all appear extremely fragile for explaining growth.

Xavier Sala-i-Martin took a new approach to this same problem in his wonderfully named paper “I Just Ran Two Million Regressions.” [1997]. Sala-i-Martin exhibited dramatic personal productivity improvements of his own, as his working paper on this subject was titled, “I Just Ran Four Million Regressions.” He recognized that Levine and Renelt’s test was so strong that almost no variable could pass it. Rather than assigning a variable a robust or fragile label based on its ability to pass every regression test, he reports an *ex post* level of confidence for a variable’s significance. Sala-i-Martin examined 60 variables that had previously been reported as significant in explaining growth, and found 21 that really were according to his procedure. These include geographic, political, and religious variables, openness to trade and ideas, and others.

Doppelhofer, Miller and Sala-i-Martin [2000] applied a novel Bayesian approach to the same problem. By 2000, the list of possible explanatory variables had increased “to the hundreds.” They limited testing to variables that (a) did not change during the period examined, thus eliminating corruption, bureaucracy and other potential important factors; (b) fit theoretical models such as Solow’s; and (c) had many data points reported. This reduced the list of examined variables to 32.

After ten million regressions, (a slippage in personal productivity for Sala-i-Martin), the authors found that four variables were strongly and robustly related to growth. They were the initial level of GDP per capita, the percentage of GDP in mining activities, the Sachs and Warner [1995] measure of years of openness, and whether the country’s major religion was Confucianism. They also reported other variables that were robustly related to growth such as regional dummies (for Africa and South America), some measures of human capital, sector variables such as primary exports, and real exchange distortions.

While we applaud the authors' thoroughness and diligence, we have a number of concerns. First, endemic multicollinearity can reduce measured statistical significance even when the examined variables are proxying for something relevant. Second, potentially important variables were omitted by insistence on a constant number of observations over time. Third, the inclusion of clearly exogenous variables such as latitude, continent dummies and religion, masks other potentially meaningful influences yet provides no information to a country's government about which course of action might offer the greatest opportunity for accelerated development. Unless one believes that countries should begin preaching Confucianism to encourage economic growth, such information is quaint but irrelevant. Finally, the authors restricted their analysis to linear relations.

Using variables such as continent dummies or latitude could represent a subtle form of data mining; i.e., it might be based on the researcher's casual and personal world observations. Everyone knows that much of the tropics, whether Asia, Africa or Latin America, lags in development. Consequently, latitude correlates well with wealth, though the counter-example of Singapore suggests that latitude is not truly causative. Besides, even if latitude really is causative, one cannot easily move a country to a cooler climate.

In our opinion, one of the best recent papers on this subject is Hall and Jones [1999]. They focus attention on output levels, rather than growth rates. They devise a composite variable they call "social infrastructure". It is the average of two indices, the first measuring the degree of government anti-diversion policies including such activities as maintaining law and order, preventing corruption, maintaining bureaucratic quality, and avoiding risk of appropriation and government repudiation of contracts. The second index is a measure of a country's openness to international trade. This index, taken from Sachs and Warner [1995], includes components for tariffs, non-tariff barriers, state monopolies, currency convertibility (as indicated by the black market exchange rate premium) and whether the county is socialist.

Hall and Jones achieve admirable statistical significance in explaining levels of output; the coefficient of social infrastructure variable has (absolute) t-statistics from 5 to 8 across various specifications. In an attempt to control for possible feedback from the dependent variable, the authors introduce latitude, predicted trade share and fraction of population speaking English or a European language as exogenous instruments. They conclude that social infrastructure is meaningfully correlated with output, and that social infrastructure is largely “determined historically by location and other factors in part captured by language.”

Hall and Jones’ methods are sophisticated and their results are encouraging. By subsuming many different variables in a single index they avoid the lack of reported significance induced by multicollinearity. But by employing only one composite index, they leave open questions about the relative importance of each component. For example, is corruption more important than trade openness, bureaucracy more critical than property rights?

The measure of trade openness developed by Sachs and Warner [1995] that comprises half of Hall and Jones’ index of social infrastructure, has come under attack recently by Rodriguez and Rodrik (R&R) [2000]. They argue that after further analysis, it is not the components reflecting trade openness, namely trade tariffs and non-tariff barriers that explain the openness index’ ability to predict growth. Instead, the most important index sub-component turns out to be the black market premium on the country’s exchange rate. R&R correctly point out that black market premiums could actually indicate government corruption rather than trade openness. This is because artificially constrained exchange rates provide government leaders the opportunity to reward friends and associates with sweetheart deals on currency conversions at the so-called official rate.

Hall and Jones’ introduction of exogenous variables as instruments is certainly sensible in that it recognizes the endogeneity problem inherent in investigations of country incomes. But the importance of their particular choices of instruments should be interpreted with

caution. These instruments (e.g., latitude, fraction of population speaking a European language) are certainly correlated with the historical development of social infrastructures. But it would be a mistake to think of them as pre-requisites for development. Assuming, as we do, that people are pretty much the same the world over regardless of language, latitude, or religion, just because hundreds of years ago thousands of card-carrying European capitalists settled in more moderate climates does not prevent tropical countries today from benefiting tremendously by adopting feasible policies favorable to development.

Rodrik's [2001] recent working paper asks what are the "deep determinants" of economic performance across countries. He states that "on the empirical front, the search for correlates of growth has gone beyond economic variables (such as physical and human capital, and price distortions)" to examine more fundamental influences. In his view, investment capital, human capital and productivity changes are "proximate" determinants at best. He believes the deeper determinants are three-fold: geography, trade integration and institutions. Although we may disagree as to what the deep determinants are, we admire Rodrik's distinction between proximate and deep determinants and we adopt his terminology henceforth in our analysis.

### **III. Data.**

Our data are described in Table 1. They are all available on the internet at the websites of the individual sources. For ease of interpretation, we reversed the scale of four variables, Property Rights, Political Rights, Civil Liberties and Freedom of the Press, from their original source, so that now a larger value is associated intuitively with a higher degree of rights, liberty, and freedom. A detailed description of the components of each variable appears as Table 2.

We also broke the Heritage Foundation's Fiscal Burden Index into its two constituents, Taxes and Government Expenditures, in order to check their separate influences. Heritage's Fiscal Burden index is the simple average of two of its own sub-indices, the first measuring levels of personal and corporate tax rates, and the second reflecting levels of government expenditures as a percentage of GDP. Heritage's summary tax rating is our Taxes variable, and their raw government expenditures as a percentage of GDP is our Government Expenditures variable. We selected raw percentages for the Government Expenditures variable, because Heritage's summary rating score is based on different scales for developed versus developing countries.

For four countries, GNI/capita data are not reported by the World Bank, but we were able to find them in the CIA World Factbook. Depending on the year, approximately nine countries were missing data on Government Expenditures. Following a procedure employed by Hall and Jones [1999], we regressed government expenditures on all the other explanatory variables, using countries with complete data, and then filled in the missing countries using the regression estimates in each year. We did not use the dependent variable, GNI/capita, in this construction. By filling in this one missing variable, an additional nine countries could be included in the final sample.

For the supplemental investigation of cause and effect in Section VI, we collected country background information from the 2001 CIA Factbook [2001] and historical GNI/capita data from Maddison [2001].

#### **IV. The Cross-Sectional Evidence.**

Table 3 presents regressions between GNI/capita for calendar year 1999 and each of fourteen candidate explanatory variables considered one at a time. For 13 of the 14 variables, there is some explanatory power and in many instances both the linear and quadratic terms are significant. This points to the danger of focusing on just one, or a few,

explanatory variables; different researchers could all claim success in explaining GNI/capita with markedly different variables.

Not surprisingly, many of these independent variables are highly correlated with each other. (Table 4 reports correlations for 1999.) So they must be allowed to compete with each other in a multiple regression, recognizing in advance that multicollinearity has the potential to reduce the separate reported significance levels of each one.

Several of the explanatory variables seem to have a non-linear relation with GNI/capita. This is not surprising in that GNI/capita is highly skewed, some of the explanatory variables are ordinal rankings, others are percentages, and there is no available guiding theory about functional form. In an effort to make the data confess the functional form, we include a quadratic term for each explanatory variable. This allows each variable to assume its own degree of curvature. The only disadvantage is that the original 14 variables are augmented by 14 non-linear terms for a total of 28 regressors; but there still remain adequate degrees of freedom since there are 130 to 150 country observations depending on the year.

To circumvent additional multicollinearity between linear and quadratic terms of each explanatory variable, we implemented an orthogonal polynomial transformation. First, each variable was rescaled to range from -1 to +1. Denoting original observation  $j$  by  $X_j$ , the corresponding transformed linear observation is  $Z_j = a_j + b_j X_j$ , where the constants  $a_j$  and  $b_j$  are given by  $b_j = 2 / (X_{\max,j} - X_{\min,j})$  and  $a_j = (X_{\max,j} + X_{\min,j}) / (X_{\min,j} - X_{\max,j})$  and subscripts “max” and “min” indicate the maximum and minimum sample values, respectively, of variable  $j$ . The quadratic observation is then computed as the approximately orthogonal<sup>3</sup> Legendre second order polynomial,  $(3Z_j^2 - 1) / 2$ .

Given substantial correlations among the original independent variables (Table 4) and now among the quadratic variables, we thought it prudent to adopt a standard procedure for

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<sup>3</sup> The linear and quadratic terms would be exactly orthogonal if  $Z$  varied continuously from -1 to +1.

multicollinearity, regression on principal components (Cf. Judge, et. al. [1985, pp. 909-912]). In the present instance, this procedure can be justified theoretically because the explanatory variables are merely proxies for the underlying, but unobservable, latent conditions that bring higher country incomes. It seems likely that the total number of such conditions is less than the number of proxy variables available. An examination of the eigenvalues from the 28X28 correlation matrix of the explanatory variables, however, indicates the presence of quite a few latent variables. The first principal component explains about 30% of the variance and the percentage explained reaches 90% only around the 14<sup>th</sup> principal component. Consequently, we decided to simply cut the dimensionality in half by employing the first fourteen principal components as regressors.

The fourteen estimated regression coefficients were then transformed back into the original 28-dimensional space, thereby producing a coefficient and a t-statistic for each original variable. This well-known procedure is tantamount to OLS regression subject to a set of linear restrictions corresponding to the eigenvectors of the regressor correlation matrix. Because of these restrictions, the standard errors can often be disentangled precisely even in the presence of multicollinearity.

Table 5 gives the regression results<sup>4</sup> along with the countries included each year. Coefficients significant at a 95% level are bordered. Many variables actually exceed a 99% level of significance, with t-statistics ranging from 5 to 12 in absolute value. Following is a list of the most significant variables and their estimated impact on GNI/capita:

Trade Barriers	Mostly Linear and Negative
Government Expenditures	Mostly Linear and Positive
Monetary Policy (Inflation)	Mostly Linear and Negative
Property Rights	Quadratic and Positive
Regulation	Mostly Linear and Negative
Black Market Activity	Quadratic and Negative

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<sup>4</sup> The standard errors are corrected for heteroscedasticity using White's [1980] method.

Political Rights	Mostly Linear and Positive
Civil Liberties	Quadratic and Positive
Freedom of the Press	Quadratic and Positive

In addition to highly significant t-statistics, one can see that the signs of the coefficients conform quite well to a belief that economic and democratic freedoms provide an environment for healthy and growing economies. Milton Friedman [1962] might have predicted that trade barriers, inflation and overly-burdensome regulation harm development, but he also would have encouraged the expansion of property rights, political rights, civil liberties and freedom of the press. Black market activity's negative coefficient probably reflects attempts by citizens to avoid burdensome regulation, or overcome poorly enforced property rights.

The only mild surprise on the list of significant variables is government expenditures, which has a positive coefficient. A developing government should probably not conclude from this result that it could spend its way to prosperity. Perhaps a more sensible interpretation is that a developing country's ability to collect taxes and provide government services indicates a well-organized state, while developed countries typically spend more on defense and transfer payments.

#### **IV. Interpreting the Cross-Sectional Evidence.**

Weaving a tale around the cold statistics of a regression should be an exercise in caution. Authors have their own biases and the data may simply be inaccurate. Nonetheless, we feel obliged to offer an interpretation, first by discussing each highly significant explanatory variable, and then speaking generally, in the conclusion, about the overall results.

##### Property Rights, Black Market Activity and Regulation

The relations between per capita income and, respectively, Property Rights, Black Market Activity, and Regulation are very strong in the cross section of countries (Table 5.) This

brings up an interesting issue; many researchers have recommended increased capital investment and accelerated human capital development to improve the lot of developing countries. But if the criticisms of world aid programs voiced by Easterly [2001] are well founded, throwing money at the problem may not be the solution.

With strong property rights and a well functioning judicial system, enterprising entrepreneurs could probably find adequate labor and capital. A lack of capital would represent an unusual profit opportunity for an aggressive and clever entrepreneur. With adequate property rights, developing countries might not require much external assistance. Their economies could percolate up from the inside. If the rulebook of capitalism is fixed and fair and enforced, perhaps energetic self-interest will find the path of accelerated development.

Because property rights are weak in many developing countries, foreigners, fearful of expropriation, eschew direct capital investment. Smugglers resort to the black market for imported goods. Multinationals are slow to build factories and plants for fear that they will be nationalized.

There is another explanation of how weak property rights can retard development. Many believe small business is the major engine of economic growth. In the US, for example, more than 2/3 of the new jobs established each year are created in industries dominated by small businesses. To motivate entrepreneurs, the creators of small businesses, their efforts must be protected and rewarded by a strong property rights system. The Peruvian economist, Hernando de Soto [2000], articulates this idea as follows:

The poor inhabitants of these (developing) nations - five-sixths of humanity - do have things, but they lack the process to represent their property and create capital. They have houses but not titles; crops but not deeds; businesses but not statutes of incorporation. It is the unavailability of these essential representations that explains why people who have adopted every other western invention, from the paper clip to the nuclear reactor, have not been able to produce sufficient capital to make domestic capitalism work, (pp. 6-7.)

De Soto goes on to say that these people live in an informal, or black market, economy. Without proper title to their homes and their businesses, they cannot secure a loan, cannot find insurance, cannot hook-up utilities, and have no incentive to improve their property because they cannot realize a fair price from selling their homes or businesses.

It is interesting to note that in addition to Property Rights and Black Market Activity, one of the other statistically relevant variables in our analysis is Regulation. De Soto [1989] explains that excessive regulation forces individuals to conduct business informally. De Soto talks of the 728 bureaucratic steps required in Lima, Peru for someone to acquire legal title to his or her home. It takes 280 days to register a business in Peru, something that takes an afternoon in the US. Such excessive regulation may be a collusive attempt by existing middle class business owners and government employees to restrain the poor from competing in their lines of business.

How large is this informal sector? Worldwide, De Soto [2000] estimates it at \$9.3 trillion. Not only is this number staggeringly large, and outside the national accounting system of the countries, (so it would not appear in official GNI/capita calculations), but because of problems with achieving legal ownership, it is destined to stagnate. Growth cannot come without capital, and capital will not come without formal ownership.

#### Political Rights, Civil Liberties and Freedom of the Press

Perhaps not surprisingly, the above three variables are highly correlated with each other (Table 4), for each is a hallmark of an open, democratic society. They are not, however, all measuring the exact same thing for their t-statistics (Table 5) reveal that each one has an independent strong positive influence on country income.

In his seminal work on the subject, Milton Friedman [1962], argues that political freedoms go hand in hand with economic development. Our empirical results confirm Friedman's views, though again, we cannot be sure from the regression analysis which is the cause and which is the effect. Many, including La Porta et al. (1998), believe higher income makes it

possible for people to become better educated and more involved in their government. In other words, higher incomes can cause democracy.

Why might the reverse actually be true? William Talbott [2001], discussing the universality of human rights, argues that democratic institutions and freedom of the press are important information mechanisms. They allow citizens to provide feedback to government leaders about the effectiveness of policies and their impact on general welfare. Talbott argues that dictators, surrounded by yes men, are cut off from meaningful information about how they are doing. In an autocratic world with no independent news editorials, no street protests and no second party voting, a careless dictator remains blissfully uninformed. You just don't regularly see monarchs walking down the street, like Ed Koch did in New York, asking average citizens the question he made famous, "How'm I doin'?"

Out-of-touch leaders are an ancient and continuing political phenomenon. Feedback is essential to assure that government adopts policies benefiting citizens. To the extent that government policies have a material impact on the economy, such feedback is a significant element driving growth. Nobel Laureate Amartya Sen [1981] [1999], made one of the most startling economic discoveries of our generation when he found that no democracy in history had ever suffered a famine. His first point is that famines are economic events, not natural disasters like droughts. Second, he proposed that even the most horrific economic events could be avoided if the leaders of a country have sufficient, effective and timely feedback from their citizens about real or perceived threats to their well-being. Only open, democratic systems can provide leaders this constant and important feedback.

In addition to information feedback provided by open conditions, democratic institutions also restrain the occasional economically destructive policies concocted by dictatorship. Hall and Jones [1999] describe a power balance in which citizens give government the power to enforce contracts and protect property rights, thus preventing the diversion of productive resources; but they realize also that if government becomes too powerful, it can

become a prime diverter itself, resulting in government expropriation of property and government repudiation of contracts.

In an autocratic world with few democratic rights, a leader is not constrained from multiple forms of diversion. Protecting monopolistic positions in certain industries, doling out foreign currency at artificially determined official exchange rates, imposing limits on domestic agriculture prices, providing overstaffed and overpaid government jobs, and outright bribery, extortion and corruption are all methods used by autocrats to tax average citizens and transfer wealth to friends. Many developing countries have a powerful constituency of government employees, protected industry participants and landed aristocrats, that conspire to keep the existing system in place, to the detriment of democratic reform and economic development.

War is a more immediate and disastrous economic result of maintaining too much power in too few hands. A dictator can send his country to war over the slightest infraction or insult to his ego. The average citizen, the one at risk, has no voice. By contrast, in a democracy, the immediate families at risk decide whether to fight.

A curious, and rather small subset of autocracies have a “benevolent dictator,” one who is not motivated by his, or his friends’ welfare; but who has only his citizen’s interests at heart. Four problems: First, there is no assurance that a benevolent dictator today will be benevolent tomorrow, and once political rights are surrendered, they can be very difficult to reacquire [W. Talbott 2001]; Second, many non-benevolent dictators, who are doing great harm to their economies and their citizenry, hide behind the false label of benevolence; Third, even if a dictator has the best intentions, without the feedback mechanisms of open democracy, he will not have easy access to the information essential for success; Finally, a benevolent dictator may simply be inept, regardless of intentions. Democracy provides a mechanism for the periodic, and peaceful, replacement of ineffective leaders.

### Other Significant Variables

There are three other significant variables in our model. Monetary Policy is the weighted average of a country's inflation rate for the last ten years. Excessive inflation is typically a sign that a country is printing excess currency, usually in an attempt to fund a government deficit. To the extent that a significant budget deficit results from a poorly managed federal government, or reflects either an excessively large government or a corrupt government unable to control spending - then high inflation rates can be a proxy for poor government.

There is another possible explanation of inflation's explanatory power: It might have something to do with measuring costs of living across countries; i.e., it might be acting as a proxy for possible measurement error in translating GNI/capita data across countries.

Trade Barriers is also a statistically significant variable. This is no surprise, as many, (e.g., including Sachs and Warner [1995]) have stressed the importance of openness in achieving the comparative advantages of trade, and exposing a country to new ideas and new technologies. We are not convinced, however, that the impact of trade barriers is actually attributable to trade itself. Using 1999 data, a simple bivariate regression of GNI/capita on trade levels (measured as exports as a percentage of GDP) has an adjusted R-square of 6.5% and a t-statistic of 3.26, (139 countries.) But when the trade variable is added as another regressor in our multivariate model, its t-statistic is -1.03 (134 countries.) The coefficient is negative and insignificant, so it seems doubtful that a country can export its way to growth.

The significance of trade barriers and the insignificance of trade levels suggest that the former is simply an indicator of poor government policies. Trade barriers, such as high tariffs, may reflect an effort to protect monopolistic industries controlled by friends of the country's leaders. Such a variable might proxy for corrupt practices that preclude a level playing field for economic transactions.

Perhaps surprisingly, the linear coefficient for Government Expenditures is positive and significant. At first, this might appear to debunk the view that government spending and taxation are impediments to a free market and growth. In advanced societies with substantial entitlement programs and transfer payments, governments might be a brake on economic activity. But many developing countries have just the opposite problem. They have too little government spending. Until they establish an efficient tax collection process, they cannot generate enough revenue to provide basic services and infrastructure.

The quadratic coefficient for government spending is negative in most years and marginally significant in two years. The overall evidence suggests that government spending at low levels is proxying for efficient government organization (such as in tax collecting and providing basic services), but that it is attenuated at the high end by its drag on the economy.

## **VI. Checking for Possible Mis-specification in the Cross-Country Model.**

The regressions in Table 5 have adjusted R-squares between 81% and 85% and similar patterns of significance across the five sample years. Although pleased with the power and consistency, we recognize that every cross-sectional analysis has shortcomings.

### **VI.A. Cause and Effect.**

First and foremost among the list of possible problems is the issue of endogeneity; i.e., higher country income could conceivably cause larger values of the explanatory variables rather than the reverse. The true direction of causality is not only of scientific interest; it is critical for policy. Unfortunately, there is no sure way to identify cause and effect using cross-sectional data; the issue could be resolved, of course, by a country that actually manipulates one or more “explanatory” variables and observes the effect, if any.

In every case, we have chosen candidate variables amenable to policy control, so a future confirming experiment is possible. But to date, no country has offered itself as the guinea pig for such an experiment. There remain several possible methods such as employment of panel data<sup>5</sup> and instrumental variables<sup>6</sup>. We choose, however, an econometrically simpler but more intuitive alternative: examine what happened in the past to country incomes when they independently made policy changes.

Conditions that might plausibly be effects of higher incomes, rather than causes, include those associated with economic and political freedoms, i.e., those that are characteristics of free markets and democracy. The basic question is whether political and market reforms bring about economic conditions that lead to more rapid economic development; or conversely, whether exogenous improvements in income precede and precipitate better education and more informed citizens yearning for democracy.

In an effort to resolve this issue, we borrowed the events study method used widely in financial economics for isolating the impact of a particular corporate event. The first events study was Fama, Fisher, Jensen and Roll [1969] who examined the impact of splits on the market prices of stocks. Hundreds of other events studies have since been published.

The event of interest here is a material change in a country's economic and/or political freedom for better or worse. The two possible directions of change define distinct event categories. The first category includes events such as free elections being held for the first time, the overthrow of dictators, the addition of second party voting, etc. For want of a better term, we call these "democratic" events. The second category includes events such as military coups, dictatorial takeovers, or the suspension of a constitution, which we term "anti-democratic." In both cases, the countries' background descriptions in the 2001 CIA Factbook [2001] were consulted in determining if there had been an event, ascertaining its date, and assigning it to one of the two defined categories. With the help of Larry

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<sup>5</sup> See, for example, Levine, Loayza, and Beck [2000] or Beck, Levine, and Loayza [2000].

Diamond, we refined the list to include only what we jointly agreed were truly democratic and anti-democratic events. Recognizing the possibility that there could be considerable disagreement about assigning such labels, we opt for full disclosure and report the resulting event sample by type and country in Table 6.

GNI/capita data were taken from Maddison [2001], who has compiled them over at least the last 50 years. All GNI data are reported in 1990 Geary-Khamis constant international dollars, (Cf. Maddison [1995], pp. 164-179.) In collecting the sample of events, we included all identifiable countries without any consideration whatsoever of their historical patterns of income.

The event study approach lines up countries by date relative to the event date, which in our case is denoted as Year 0. GNI/capita for each country was tabulated from ten years before the event to 20 years after, whenever possible. However, three decades of data are not always available, often because the event happened recently, or too soon after GNI data became available. In some instances, the country simply failed to report GNI in one or more years.

Each country's GNI/capita data were used to compute year-to-year percentage changes relative to the event year (Year 0.) This allows us to take cross-country averages of percentage changes each relative year thereby weighting countries equally, regardless of their initial state of prosperity. It also permits the depiction of a typical GNI/capita pattern over all three decades even though some countries are missing data.

Table 7 reports average annual growth rates of GNI/capita for different time periods and event categories. To depict the time path of GNI/capita, we first linked growth rate

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<sup>6</sup> For example, Hall and Jones [1999].

relatives before and after Year 0, then rescaled the resulting numbers so that GNI/capita is the actual cross-country average in Year 0.<sup>7</sup> The result appears as Figure 1.

As the Table and Figure show, political and economic freedom (“democratic”) events have been followed by significant increases in GNI/capita. The average sample country was experiencing little real growth in the decade prior to the event, less than one percent per annum, so there is little evidence of prior prosperity that might have triggered a move to democracy. After the event, these same countries began to grow rapidly. In the first five years, they accelerated to an annual rate of 2.2%. This was followed by a 1.7% annual growth rate in the next five years and then to 2.7% in the subsequent decade. The right panel of Table 7 shows that these differences are generally statistically significant.<sup>8</sup>

To conclude that the event itself was not causative, one would be forced to rely on a truly convoluted story; viz., that the mere anticipation of future prosperity impelled citizens to hector their government into reforming. Moreover, the quantitative impact is enormous. To put it in perspective, a 3.8% annual real growth is sufficient to double per capita real income every 18.6 years. To the extent that such reforms remain effective today, all the countries of the world could be out of poverty within the lifetimes of their youngest children.

Countries in the “anti-democratic” event sample had been experiencing modest growth, about 1.5%, during the decade prior to the event. Afterward, growth declined to less than 1% per annum in the second five-year period (years +6 to +10.) During the second decade after the event, these countries had only about half as much growth on average as they experienced in the decade prior to the event. Moreover, in no sub-period did their growth rate approach the level enjoyed by countries that experienced a democratic event. The

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<sup>7</sup> I.e., if  $g_t$  is the cross-country average growth rate in year  $t$ , the plotted level in Figure 1 for year  $T > 0$  is  $G_0[(1+g_1)\dots(1+g_T)]$  and for  $T < 0$  it is  $G_0/[(1+g_{-1})\dots(1+g_T)]$  where  $G_0$  is the average GNI/Capita in Year 0.

<sup>8</sup> The test comparing the second decade after the democratic event (years +11 to +20) with the decade before the event (years -10 to 0) is strongly significant, a t-statistic of 2.53. The test comparing years +1 to +5 against -5 to -1 is also marginally significant with over 60% of the countries experiencing more rapid growth.

pattern displayed in Figure 1 and the statistical tests in Table 7 constitute compelling evidence that democracy-related changes by a country's government cause changes in per capita income.

For several reasons, the two event categories need not be mirror images. One reason is that countries in the anti-democratic sample had generally lower wealth prior to the event, possibly due to negative prior experiences such as colonization or civil war, which also might have precipitated the accession of dictators. In addition, democratic features such as a free press and civil liberties are not the only causative factors behind rapid development; trade barriers, monetary policy, and government expenditures have some explanatory power. Nor is an anti-democratic event inevitably followed by uniformly poor policy choices. A good example is Chile, whose democratically elected Marxist government was ousted in 1973. Chile thereafter had a dictator, but a rare one who adopted relatively enlightened economic policies including a respect for property rights.

The average sample country experiencing a democratic event had approximately 80% higher income prior to the event than the average sample country experiencing an anti-democratic event. It might be argued that a threshold level of income, and possibly education, must be attained before democratic events are likely. We admit this is a compelling argument, but it does not negate our findings about causality. Whenever such events occur for whatever reason, more rapid economic development follows soon thereafter. True, democratic events might be easier to bring about in richer countries, but wealth is clearly not a theoretically necessary condition and Table 6 shows that many democratic events actually have occurred in poor countries.

## **VI.B. Missing Determinants.**

Another potentially serious problem of cross-sectional analysis is the unintentional omission of important influences. The adjusted R-squares in Table 5 exceed eighty percent in all years, so if anything is left out, it is unlikely to explain very much of the

cross-country variation in GNI/capita. Nonetheless, we provide in the Appendix an investigative search because significant omitted variables could conceivably alter the pattern of significance of the variables already included.

As explained in detail in the appendix, it appears that something has indeed been overlooked. Given the events study just described, one obvious candidate for an omitted variable is the elapsed time since a country has undergone a democratic event. Such events precipitate rapid growth, but it still takes time to achieve a high level of GNI/capita. The appendix confirms that the total time since a democratic event is indeed a significant additional factor in the cross-sectional model.

Inclusion of the elapsed time since a democratic event weakens, but does not eliminate, the statistical significance of the three other democracy-related variables, political rights, civil liberties, and press freedom. Given that all four variables measure democratic conditions, this is not too surprising, and it does not, of course, moderate the basic conclusion that democratic conditions cause high incomes. None of the other significant variables is affected; in particular, trade barriers, property rights, black market activities, regulation, monetary policy, and government spending are all virtually unaltered.

Although we cannot prove it unequivocally, we strongly suspect that another seemingly omitted variable involves measurement error in GNI itself. The GNI/capita data were adjusted in the original sources in an effort to portray true standards of living across countries. This is, of course, an exceedingly difficult task. Fortunately, since pure measurement error is random noise, it is not likely to affect the coefficients or statistical significance of other explanatory variables. In partial confirmation, the appendix shows that proxies for measurement error do not materially influence the significance pattern of our original fourteen determinants.

## VII. Conclusion.

Data for 1995 through 1999 indicate that more than eighty percent of the cross-country variation in wealth (GNI/capita) can be explained by nine separate influences. The most significant and consistent positive influences are strong property rights, political rights, civil liberties, press freedom, and government expenditures. The negative significant influences include excessive regulation, poor monetary policy, black market activity and trade barriers.

When countries undertake a democratic change such as deposing a dictator, they enjoy a dramatic spurt in economic growth, which persists for at least two decades. In contrast, an anti-democratic event is followed by a reduction in growth. This verifies that democratic conditions really are causes of cross-country differences in wealth and not the endogenous effects of wealth. There are indeed crucial local conditions for economic development, conditions that can actually be established by a progressive government on behalf of its citizens.

Each statistically significant variable in our model contributes to the explanation of cross-country differences in per capita income. What do these seemingly disparate variables share in common? How could the absence of salubrious conditions prevent an otherwise healthy country from developing?

Their commonality is twofold. First, these variables represent institutions and policies that promulgate clearly understood and enforced laws and rules. The rules must be applied equitably and consistently. The underlying rulebook principals are fairness and justice. Economic participants cannot save in a world of inflationary government-sponsored counterfeiting. They cannot compete with state-sponsored monopolies. They cannot trade efficiently with the existence of high tariffs and phony official exchange rates. They cannot easily overcome burdensome regulation and corruption. They cannot capitalize

future profits in a world devoid of property rights. And they cannot prosper without economic and personal freedoms.

Second, our explanatory variables measure cooperative solutions to collective action problems. Individuals can do little by themselves to maintain stable currencies, organize property rights systems, or establish fair and independent judiciaries. Cooperative effort is required, which for countries usually comes in the form of government. Governments can enforce contracts. Governments can title property and protect against seizure. Establishing and maintaining a democracy with its system of guaranteed political rights, civil liberties and press freedoms, is itself an eternal collective action effort.

Ours is a happy message. We did not dream of it when beginning this study. Political freedom is highly desired in and of itself by most people on this earth. But there is icing on the cake. Freedom also brings economic prosperity and eventual wealth. What could be better?

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## **Appendix**

### **Searching for Omitted Determinants**

When cross-sections are available in several years as they are here, there is a simple way to test for missing variables. The omission of a significant variable would likely induce correlation across years in the regression's residuals. Panel A of Table A-1 reveals that the residuals from the Table 5 regressions are highly correlated from one year to next; the correlations range from 84% to 92%. Something is indeed missing.

To estimate the number of missing influences implied by the high correlations, we computed the principal components of the 5X5 matrix of residual covariances for the 129 countries with complete data in all five years. As can be seen in the Panel B of Table A-1, the data strongly suggest there is just one major omitted factor or "missing link"; the first eigenvalue is very large relative to the next one. Almost 88% of the covariation among the residuals is explained by the first principal component. This suggests that identifying and including the omitted variable could conceivably raise the total explanatory power of the cross-sectional model to the neighborhood of 95%.

The existence of a "missing link" is not surprising for a number of reasons. Remember that we intentionally omitted some non-mutable or proximate variables that had been linked to country development in previous research. One of them could well be the missing link.

#### **A.1. Measurement Error in GNI.**

GNI and other variables must be converted to a common currency (here, it's the US\$) before making any cross-country comparisons. Several alternative methods are available for making currency translations. We used the purchasing power parity GNI per capita numbers from the World Bank, but the same source also posts numbers based on the so-called Atlas method of adjustment. Given the volatility of exchange rates, it would not be surprising if the missing link were simply a measurement error induced by the effort to

construct comparable measures of living standards. Because the true level of well-being is the objective of cross-country comparisons, it is important that the currency translation captures differences in costs of living. Historically, this has proved a difficult task.

As a rough and ready check on an exchange rate explanation of the missing link, we repeated the cross-sectional regressions from 1996 through 1999<sup>9</sup> using the Atlas-adjusted GNI/capita and then compared the residuals with those obtained earlier using PPP-adjusted GNI/capita. If the currency adjustment method were the missing link, the two sets of residuals might turn out to be only weakly correlated. The results are displayed in the Panel C of Table A-1.

For a given calendar year, the Atlas- and PPP-based residuals are quite correlated but, interestingly, they are less correlated than either the Atlas or PPP residual correlations are with themselves across adjacent years, (Panel A of Table A-1 and the right side of Panel C.) This seems to imply that the GNI adjustment method contributes at least a small part to the missing link. But the remaining correlations are too high for a complete explanation. Perhaps neither the PPP nor the Atlas adjustment adequately captures the true cost of living and their measurement errors are correlated.

Given the large number of non-mutable conditions such as latitude, languages, and religions investigated in previous research, some of them might happen by chance to correlate with measurement error induced by an imperfect standard of living adjustment. To check this, we collected information on a number of such possible proxies and computed their relations with the residuals from the Table 5 regressions. The results are displayed in Table A-2.

In Panel A, just two variables exhibit significant bivariate correlation with the residuals, Absolute latitude in four of five years and the percentage of the population espousing Catholicism in three of five years. Both are positively correlated with residual GNI/Capita.

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<sup>9</sup> We could not easily compile Atlas-adjusted GNI data for 1995.

Other variables, though insignificant, have consistently signed correlations across all years; English, French, Hindu, Muslim, and Protestant are negative while Confucian and Jewish are positive.

Multiple regressions of residuals on these variables are very weak. As reported in Panel B of Table A-2, there is not a single significant t-statistic in any year for any variable and four of the five adjusted R-squares are negative. The lack of individual significance is not attributable to multicollinearity. Most of these variables have low correlations with each other; the highest (.67) is between Spanish language and Catholic and the next highest (.41) is between Protestant and Absolute Latitude. The largest negative correlation is between Muslim and Catholic (-.56.) The number of observations is larger in the simple regressions of Panel A than in the multiple regressions of Panel B. In the latter, all the variables had to be jointly available for each country. This might partly explain why a variable such as absolute latitude is significant in Panel A but not in Panel B.<sup>10</sup>

The multiple regressions almost make it appear that the six allegedly significant correlations in Panel A are spurious and only slightly more than one would expect at the 95% level out of the 55 different coefficients computed. But latitude seems too consistent for such a surmise to be unquestioned and we wondered whether its inclusion would have an impact on our earlier cross-sectional results (in Table 5.) So we repeated the cross-sectional analysis while adding a linear and quadratic term for absolute latitude as an additional explanatory variable. The results are reported as Regression B of Table A-3 for calendar year 1999.<sup>11</sup> Regression A of Table A-3 repeats the 1999 results from Table 5 (i.e., without latitude) for ease of comparison.

The addition of latitude increases the adjusted R-square marginally, from .846 to .856. The linear coefficient for latitude is positive and highly significant, (t-statistic: 6.15), while the quadratic term is insignificant. Most important from our perspective, almost all the

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<sup>10</sup> For example, in 1999 there are 157 country observations available for the Absolute Latitude simple regression in Panel A, but only 97 observations in the multiple regression (Panel B.)

<sup>11</sup> Results for the other years, 1995-98, are similar but are not reported to save space.

other variables retain their levels of significance and the sign patterns are identical. Latitude's strong significance combined with the impressive stability of the other variables suggests that the missing link is not closely related to any of our original fourteen determinants. Measurement error in GNI/capita as an indicator of standard of living would have precisely that feature.

### **A.2. Measurement error in the explanatory variables.**

Measurement error in the explanatory variables is another possible explanation of the correlation amongst the residuals across time. For many of our explanatory variables, a research analyst assigns a country rating each year. It would be only human for the analyst to compare the current proposed rating against those assigned in earlier years. If, as a result, prior mistaken ratings were not fully corrected, measurement error in the explanatory variable would be correlated across time, thereby inducing a corresponding (but spurious) correlation in the regression residuals. Lacking an independent set of ratings, we can think of no method of checking this possibility.

### **A.3. A missing regressor: Time since a democratic event.**

The results of our event study above imply yet a different candidate for the missing influence. A country begins to grow rapidly after a "democratic" event, but it would still take a long time for a poor country to attain a high absolute level of income. The cross-country regression model ignores this fact. Indeed, if one took the model literally, a poor country that adopted strongly democratic conditions overnight would wake up rich the next morning. This is a nonsensical feature of a static cross-sectional model.

The cross-country regression model could be made more dynamic, however, by a simple stratagem: include as another determinant the elapsed time since a country experienced a democratic event. The current level of income obviously depends on the total time passed at rapid growth since a democratic event.

Each country in our sample was therefore assigned to one of three categories: (1) Countries with a democratic event during the past fifty years, as listed in Table 6, and no subsequent non-democratic events (2) Countries with no democratic event listed in Table 6 and no long history of democracy,<sup>12</sup> and (3) Long term democracies. For countries in category 1, we counted the actual elapsed time in years between the event and the year when GNI/capita was measured for the cross-sectional regression. For category 2, we assigned a value of zero and for Category 3 we assigned a value of 50 (years).<sup>13</sup>

In table A-3, the resulting variable, “Years Since Democratic Event,” is included as an additional explanatory variable in Regression C. For calendar year 1999, it is strongly significant and positive (both the linear and quadratic terms.)<sup>14</sup> The R-square improves by more than one percentage point between regressions A and C. Without this variable, there are sixteen coefficients in 1999 significant at the 95% level or better. They are indicated with borders. Most of them remain highly significant and two new coefficients join them, banking restrictions (linear) and government expenditures (quadratic.)

There is, however, a noticeable impact on the democracy-related variables. Political Rights, Civil Liberties, and Freedom of the Press all have smaller t-statistics and the quadratic Political Rights variable falls to insignificance. This might have been anticipated because the elapsed time since a democratic event is also a measure of political freedom, perhaps an even better measure because long tenure is synonymous with stability and strength. Notice that Property Rights and Black Market Activity are virtually unaltered by the inclusion of Years Since a Democratic Event. This points to the fact that even a benevolent dictator could conceivably enforce a strong system of property rights and root out corruption.

Finally, Regression D of Table A-3 present the cross-country results for 1999 with both Absolute Latitude and Years Since a Democratic Event included as extra regressors. We

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<sup>12</sup> For example, eastern block European countries were assigned to this category.

<sup>13</sup> The fifty-year maximum is admittedly somewhat arbitrary, but we did not think it made sense to use the actual number of years elapsed since ancient democratic events; e.g., the U.S. (1776) or Switzerland (1590.)

<sup>14</sup> This is true for every year, 1995-98 as well, though the results are not reported to save space.

report this simply to affirm that most of the original coefficients retain their significance, with the exception of the democracy-related variables as discussed above. The unadjusted R-square between observed and predicted GNI/Capita indicates that the total explanatory power is now over 88%.

**Table 1. Description and Sources of Data.**

Variable	Number of Countries (1999)	Range of Data	Meaning of Low Figure	Source
GNI per Capita	164	\$440 to \$41,230	Low GNI per Capita	World Bank (PPP Adjusted) CIA World Factbook and Maddison [2001]
Black Market Activity	160	1 to 5	Little Black Market Activity	Heritage Foundation (a)
Property Rights	160	1 to 5	Few Property Rights	Heritage Foundation (reversed scale)(a)(b)
Political Rights	162	1 to 7	Few Political Rights	Freedom House (reversed scale)(b)
Civil Liberties	162	1 to 7	Few Civil Liberties	Freedom House (reversed scale)(b)
Freedom of the Press	163	1 to 147	Weak Freedom of the Press	Freedom House (reversed scale)(b)
Regulation	160	1 to 5	Little Burdensome Regulation	Heritage Foundation (a)
Banking Restrictions	160	1 to 5	Few Banking Restrictions	Heritage Foundation (a)
Trade Barriers	160	1 to 5	Little to No Trade Barriers	Heritage Foundation (a)
Monetary Policy	160	1 to 5	Low Inflation	Heritage Foundation (a)
Foreign Inv. Barriers	160	1 to 5	Few Foreign Inv. Barriers	Heritage Foundation (a)
Wages and Prices	160	1 to 5	Few Price Restrictions	Heritage Foundation (a)
Taxes	159	1 to 5	Low Personal and Corp. Taxes	Heritage Foundation (a)
Government Expenditures	151	9% to 74.3%	Low Government Spending/GDP	Heritage Foundation (a)
Government Intervention	160	1 to 5	Little Government Intervention	Heritage Foundation (a)
Democracy-Related Events			CIA World Factbook	

(a) The *2001 Index of Economic Freedom*. This publication provides a narrative description of each variable for every country. It is also available on the internet.

(b) Original scale reversed, so that a larger value now means more.

**Table 2. Components of Variables as Described in Original Sources.**

Trade Barriers

- Average tariff rate.
- Non-tariff barriers.
- Corruption in the customs service.

Taxes

- Top income tax rate.
- Tax rate that the average taxpayer faces.
- Top corporate tax rate.

Government Expenditures

- Government Expenditures as a % of total GDP.
- Government Expenditures include transfer payments.

Government Intervention in the Economy

- Government consumption as a percentage of the economy.
- Government ownership of businesses and industries.
- Share of government revenues from state-owned enterprises and government ownership of property.
- Economic output produced by the government.

Monetary Policy

- Weighted average inflation rate from 1990 to 1999 with more recent data more heavily weighted..

Foreign Investment Restrictions

- Foreign investment code.
- Restrictions on foreign ownership of business.
- Restrictions on the industries and companies open to foreign investors.
- Restrictions and performance requirements on foreign companies.
- Foreign ownership of land.
- Equal treatment under the law for both foreign and domestic companies.
- Restrictions on the repatriation of earnings.
- Availability of local financing for foreign companies.

Banking Restrictions

- Government ownership of banks.
- Restrictions on the ability of foreign banks to open branches and subsidiaries.
- Government influence over the allocation of credit.
- Government regulations.
- Freedom to offer all types of financial services, securities, and insurance policies.

Wages and Prices

- Minimum wage laws.
- Freedom to set prices privately without government influence.
- Government price controls.
- The extent to which government price controls are used.
- Government subsidies to businesses that affect prices.

Property Rights

- Freedom from government influence over the judicial system.
- Commercial code defining contracts.
- Sanctioning of foreign arbitration of contract disputes.
- Government expropriation of property.
- Corruption within the judiciary.
- Delays in receiving judicial decisions.
- Legally granted and protected private property.

Regulation

- Licensing requirements to operate a business.
- Ease of obtaining a business license.
- Corruption within the bureaucracy.
- Labor regulations, such as established work weeks, paid vacations, and parental leave, as well as selected labor regulations.
- Environmental, consumer safety, and worker health regulations.
- Regulations that impose a burden on business.

Black Market Activity

- Smuggling.
- Piracy of intellectual property in the black market.
- Agricultural production supplied on the black market.
- Manufacturing supplied on the black market.
- Services supplied on the black market.
- Transportation supplied on the black market.
- Labor supplied on the black market.

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**Table 2 (continued)**

Political Rights

- Free elections.
- Right to vote.
- Self-determination.
- Freedom from military and totalitarianism

Civil Liberties

- Equality of opportunity.
- Rule of law, with people treated fairly under the law, without fear of unjust imprisonment or torture.
- Freedom of press, association, religion, assembly, demonstration, discussion and organization.

Freedom of the Press

- System of mass communication and its ability to permit free flow of communication.
- Government laws and decisions that influence content of the media.
- Political or financial influence over the media.
- Oppression of the media.
- Censure of the media.

GNI/capita

- 1995 to 1999 GNI per capita
- Compiled by World Bank
- GNI adjusted for Purchasing Power Parity (PPP)

**Table 3. Cross-Country Regressions of GNI/Capita on Single Explanatory Variables.**

For calendar year 1999, cross-country regressions were estimated between GNI/Capita and fourteen different explanatory variables. Each regression has the form

$$\text{GNI/Capita}_j = a + bX_j + cQ_j, \quad j=1, \dots, N^{15}$$

where a, b and c are estimated coefficients,  $X_j$  is the original explanatory variable scaled to range between -1 and +1 and  $Q_j = (3X_j^2 - 1)/2$  is an approximately orthogonal Legendre second order (quadratic) polynomial transformation. The number of countries varies slightly with the availability of data.

Explanatory Variable	Adjusted R-Square	b	c	N <sup>9</sup>
		t-statistic		
Property Rights	.724	15.9	8.84	162
Black Market	.723	-19.9	7.53	160
Freedom of the Press	.584	12.1	8.40	162
Civil Liberties	.534	9.52	7.92	162
Regulation	.442	-10.8	1.62	160
Monetary Policy	.441	-10.0	5.33	160
Political Rights	.425	7.57	6.30	162
Trade Barriers	.393	-8.81	1.04	160
Banking Restrictions	.282	-8.02	2.04	160
Wages and Prices	.200	-6.45	1.71	160
Foreign Inv. Barriers	.173	-5.72	1.08	160
Gov't Expenditures	.114	4.30	0.48	151
Taxes	.040	1.10	2.45	159
Gov't Intervention	.010	-1.61	-1.02	160

<sup>15</sup>N=Number of available countries=number of observations in regression.

**Table 4. Cross-Country Correlations of Explanatory Variables, 1999.**

	Trade Barriers												
Taxes	0.029 0.713												
Government Expenditures	-0.365 0.000	Taxes 0.209 0.009											
Government Intervention	0.309 0.000		Government Expenditures 0.190 0.018										
Monetary Policy	0.335 0.000			Government Intervention 0.107 0.178									
Foreign Investment	0.575 0.000				Monetary Policy 0.344 0.000								
Banking Restrictions	0.622 0.000					Foreign Investment 0.694 0.000							
Prices	0.537 0.000						Banking Restrictions 0.731 0.000						
Property Rights	-0.657 0.000	Prices 0.100 0.209						Prices 0.732 0.000	Property Rights -0.675 0.000				
Regulation	0.587 0.000									Regulation 0.814 0.000			
Black Market Activity	0.650 0.000										Regulation 0.696 0.000		
Political Rights	-0.562 0.000											Black Market Activity -0.529 0.000	
Civil Liberties	-0.559 0.000												Political Rights 0.933 0.000
Press Freedom	-0.576 0.000												Civil Liberties 0.919 0.000

Cell Contents: 

Pearson Correlation p-value against a null hypothesis of zero
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**Table 5. Cross-Country Multiple Regressions of GNI/Capita on Fourteen Determinants.**

For each calendar year, 1995-1999 inclusive, the cross-country model is

$$\text{GNI/Capita}_j = a + \sum_{i=1}^{14} b_i X_{i,j} + \sum_{i=1}^{14} c_i Q_{i,j}, j=1, \dots, N^{16}$$

where  $a$ ,  $b_i$  and  $c_i$  are estimated coefficients,  $X_{i,j}$  is the original explanatory variable  $i$  for country  $j$  scaled to range between  $-1$  and  $+1$ , and  $Q_{i,j} = (3X_{i,j}^2 - 1)/2$  is an approximately orthogonal Legendre second order (quadratic) polynomial transformation. To mitigate multicollinearity, the model was estimated using the method of principal components regression with a 50% reduction in dimensionality; i.e., the first 14 principal components of the covariance matrix of the  $X$ 's and  $Q$ 's (combined) were the regressors. Those results were then transformed back into the space of the 28 original variables. The coefficient is underlined and its t-statistic is italicized. Bordered entries indicate at least a 95% level of significance.

	b c		b c		b c		b c		b c	
	1999		1998		1997		1996		1995	
Trade Barriers	<u>-1235</u> <i>-6.26</i>	<u>-857</u> <i>-2.61</i>	<u>-155</u> <i>-6.46</i>	<u>-570</u> <i>-1.73</i>	<u>-1632</u> <i>-8.73</i>	<u>-665</u> <i>-1.93</i>	<u>-1234</u> <i>-4.79</i>	<u>-337</u> <i>-0.88</i>	<u>-1757</u> <i>-7.24</i>	<u>-629</u> <i>-2.15</i>
Taxes	<u>420</u> <i>0.74</i>	<u>375</u> <i>0.50</i>	<u>-383</u> <i>-0.74</i>	<u>1004</u> <i>2.77</i>	<u>292</u> <i>0.43</i>	<u>437</u> <i>0.59</i>	<u>319</u> <i>0.68</i>	<u>1074</u> <i>1.81</i>	<u>86</u> <i>0.19</i>	<u>817</u> <i>1.49</i>
Government Expenditures	<u>2476</u> <i>5.49</i>	<u>-394</u> <i>-1.01</i>	<u>2111</u> <i>5.32</i>	<u>468</u> <i>0.73</i>	<u>1888</u> <i>5.36</i>	<u>-932</u> <i>-2.48</i>	<u>1102</u> <i>2.98</i>	<u>-659</u> <i>-1.54</i>	<u>980</u> <i>1.13</i>	<u>-1111</u> <i>-1.92</i>
Government Intervention	<u>478.5</u> <i>1.17</i>	<u>-235</u> <i>-0.41</i>	<u>574</u> <i>1.32</i>	<u>-130.4</u> <i>-0.26</i>	<u>155</u> <i>0.34</i>	<u>-550</u> <i>-1.16</i>	<u>149</u> <i>0.51</i>	<u>-524</u> <i>-0.93</i>	<u>728</u> <i>1.63</i>	<u>-219</u> <i>-0.48</i>
Monetary Policy	<u>-1497</u> <i>-7.89</i>	<u>1423</u> <i>4.37</i>	<u>-1530</u> <i>-8.00</i>	<u>1217</u> <i>3.30</i>	<u>-1535</u> <i>-7.84</i>	<u>545</u> <i>1.58</i>	<u>-1490</u> <i>-8.49</i>	<u>600</u> <i>1.86</i>	<u>-1273</u> <i>-7.04</i>	<u>101</u> <i>0.30</i>
Foreign Inv. Barriers	<u>-145</u> <i>-0.48</i>	<u>-164</u> <i>-0.23</i>	<u>-168</u> <i>-0.49</i>	<u>135</u> <i>0.17</i>	<u>-463</u> <i>-1.29</i>	<u>1152</u> <i>1.31</i>	<u>-476</u> <i>-1.29</i>	<u>1103</u> <i>1.54</i>	<u>-711</u> <i>-1.80</i>	<u>209</u> <i>0.39</i>
Banking Restrictions	<u>-437</u> <i>-1.66</i>	<u>-1120</u> <i>-1.92</i>	<u>-361</u> <i>-1.10</i>	<u>-397</u> <i>-0.70</i>	<u>-293</u> <i>-1.02</i>	<u>-1095</u> <i>-1.79</i>	<u>-282</u> <i>-1.07</i>	<u>34</u> <i>0.05</i>	<u>-660</u> <i>-2.77</i>	<u>-345</u> <i>-0.62</i>
Wages and Prices	<u>-294</u> <i>-1.04</i>	<u>-716</u> <i>-1.33</i>	<u>-222</u> <i>-0.66</i>	<u>-948</u> <i>-1.58</i>	<u>210</u> <i>0.63</i>	<u>-1208</u> <i>-1.61</i>	<u>449</u> <i>1.06</i>	<u>-1282</u> <i>-2.28</i>	<u>-344</u> <i>-0.86</i>	<u>-131</u> <i>-0.17</i>
Property Rights	<u>1778</u> <i>12.61</i>	<u>2205</u> <i>8.92</i>	<u>1849</u> <i>12.34</i>	<u>1940</u> <i>7.31</i>	<u>1958</u> <i>9.75</i>	<u>2536</u> <i>9.80</i>	<u>2102</u> <i>10.00</i>	<u>2211</u> <i>10.10</i>	<u>1665</u> <i>9.46</i>	<u>1720</u> <i>6.86</i>
Regulation	<u>-1495</u> <i>-5.08</i>	<u>783</u> <i>1.59</i>	<u>-1982</u> <i>-6.77</i>	<u>-97</u> <i>-0.19</i>	<u>-1507</u> <i>-3.77</i>	<u>904</u> <i>2.18</i>	<u>-2093</u> <i>-6.03</i>	<u>-204</u> <i>-0.37</i>	<u>-1905</u> <i>-4.89</i>	<u>581</u> <i>1.85</i>
Black Market Activity	<u>-1607</u> <i>-11.08</i>	<u>1981</u> <i>5.99</i>	<u>-1465</u> <i>-7.34</i>	<u>1802</u> <i>5.74</i>	<u>-1667</u> <i>-7.90</i>	<u>1611</u> <i>5.12</i>	<u>-1511</u> <i>-9.42</i>	<u>1572</u> <i>3.85</i>	<u>-1264</u> <i>-9.51</i>	<u>2052</u> <i>5.21</i>
Political Rights	<u>533</u> <i>3.84</i>	<u>427</u> <i>1.99</i>	<u>506</u> <i>2.05</i>	<u>487</u> <i>1.78</i>	<u>629</u> <i>2.69</i>	<u>490</u> <i>1.67</i>	<u>792</u> <i>3.47</i>	<u>431</u> <i>1.26</i>	<u>877</u> <i>3.99</i>	<u>775</u> <i>2.80</i>
Civil Liberties	<u>863</u> <i>5.28</i>	<u>1343</u> <i>6.66</i>	<u>909</u> <i>2.96</i>	<u>836</u> <i>2.48</i>	<u>1063</u> <i>3.77</i>	<u>809</u> <i>2.72</i>	<u>1160</u> <i>4.65</i>	<u>778</u> <i>3.14</i>	<u>1240</u> <i>5.29</i>	<u>857</u> <i>4.08</i>
Freedom of the Press	<u>1074</u> <i>7.16</i>	<u>1696</u> <i>6.22</i>	<u>1125</u> <i>4.69</i>	<u>1710</u> <i>3.42</i>	<u>992</u> <i>4.47</i>	<u>1581</u> <i>3.74</i>	<u>1212</u> <i>5.94</i>	<u>1719</u> <i>4.36</i>	<u>1178</u> <i>5.84</i>	<u>1514</u> <i>3.67</i>
Intercept	<u>7878</u> <i>16.50</i>		<u>7916</u> <i>23.77</i>		<u>8378</u> <i>22.29</i>		<u>8105</u> <i>21.64</i>		<u>9220</u> <i>11.33</i>	
Adjusted R-square	.846		.819		.818		.829		.819	
N	157		156		148		142		134	

<sup>16</sup> N=Number of available countries=number of observations in regression.

**Table 5, (Continued).**  
**Countries in the Regressions by Calendar Year**  
 (\* indicates the country was included)

	1999	1998	1997	1996	1995		1999	1998	1997	1996	1995		1999	1998	1997	1996	1995
Albania	*	*	*	*	*	Germany	*	*	*	*	*	Niger	*	*	*	*	*
Algeria	*	*	*	*	*	Ghana	*	*	*	*	*	Nigeria	*	*	*	*	*
Angola	*	*	*	*	*	Greece	*	*	*	*	*	Norway	*	*	*	*	*
Argentina	*	*	*	*	*	Guatemala	*	*	*	*	*	Oman	*	*	*	*	*
Armenia	*	*	*	*	*	Guinea	*	*	*	*	*	Pakistan	*	*	*	*	*
Australia	*	*	*	*	*	Guinea Bissau	*	*				Panama	*	*	*	*	*
Austria	*	*	*	*	*	Guyana	*	*	*	*	*	Papua New Guinea	*	*	*	*	*
Azerbaijan	*	*	*	*	*	Haiti	*	*	*	*	*	Paraguay	*	*	*	*	*
Bahamas	*	*	*	*	*	Honduras	*	*	*	*	*	Peru	*	*	*	*	*
Bahrain	*	*	*	*	*	Hong Kong				*	*	Philippines, The	*	*	*	*	*
Bangladesh	*	*	*	*	*	Hungary	*	*	*	*	*	Poland	*	*	*	*	*
Barbados	*	*	*	*	*	Iceland	*	*	*	*	*	Portugal	*	*	*	*	*
Belarus	*	*	*	*	*	India	*	*	*	*	*	Qatar	*	*			
Belgium	*	*	*	*	*	Indonesia	*	*	*	*	*	Romania	*	*	*	*	*
Belize	*	*	*	*	*	Iran	*	*	*	*	*	Russia	*	*	*	*	*
Benin	*	*	*	*	*	Iraq	*	*	*	*	*	Rwanda	*	*	*	*	
Bolivia	*	*	*	*	*	Ireland	*	*	*	*	*	Samoa	*	*			
Bosnia	*	*	*			Israel	*	*	*	*	*	Saudi Arabia	*	*	*	*	*
Botswana	*	*	*	*	*	Italy	*	*	*	*	*	Senegal	*	*	*	*	*
Brazil	*	*	*	*	*	Jamaica	*	*	*	*	*	Sierra Leone	*	*	*	*	*
Bulgaria	*	*	*	*	*	Japan	*	*	*	*	*	Singapore	*	*	*	*	*
Burkina Faso	*	*	*	*	*	Jordan	*	*	*	*	*	Slovak Republic	*	*			
Burundi	*	*	*	*		Kazakhstan	*	*	*			Slovenia	*	*	*	*	*
Cambodia	*	*	*	*		Kenya	*	*	*	*	*	Somalia	*	*	*	*	*
Cameroon	*	*	*	*	*	Korea, North	*	*	*	*	*	South Africa	*	*	*	*	*
Canada	*	*	*	*	*	Korea, South	*	*	*	*	*	Spain	*	*	*	*	*
Cape Verde	*					Kuwait	*	*	*	*	*	Sri Lanka	*	*	*	*	*
Chad	*	*	*	*		Kyrgyz Republic	*	*	*			Sudan	*	*	*	*	*
Chile	*	*	*	*	*	Laos	*	*	*	*	*	Suriname	*	*	*	*	*
China	*	*	*	*	*	Latvia	*	*	*	*	*	Swaziland	*	*	*	*	*
Colombia	*	*	*	*	*	Lebanon	*	*	*	*	*	Sweden	*	*	*	*	*
Congo, Dem. Rep.	*					Lesotho	*	*	*	*	*	Switzerland	*	*	*	*	*
Congo, Rep. of	*	*	*	*	*	Libya	*	*	*	*	*	Syria	*	*	*	*	*
Costa Rica	*	*	*	*	*	Lithuania	*	*	*	*	*	Taiwan	*	*	*	*	*
Croatia	*	*	*	*	*	Luxembourg	*	*	*	*	*	Tajikistan	*	*	*		
Cuba	*	*	*	*	*	Madagascar	*	*	*	*	*	Tanzania	*	*	*	*	*
Cyprus	*	*	*	*	*	Malawi	*	*	*	*	*	Thailand	*	*	*	*	*
Czech Republic	*					Malaysia	*	*	*	*	*	Togo	*	*			
Denmark	*	*	*	*	*	Mali	*	*	*	*	*	Trinidad and Tobago	*	*	*	*	*
Djibouti	*	*	*	*		Malta	*	*	*	*	*	Tunisia	*	*	*	*	*
Dominican Republic	*	*	*	*	*	Mauritania	*	*	*	*	*	Turkey	*	*	*	*	*
Ecuador	*	*	*	*	*	Mauritius	*	*	*	*	*	Turkmenistan	*	*	*	*	
Egypt	*	*	*	*	*	Mexico	*	*	*	*	*	Uganda	*	*	*	*	
El Salvador	*	*	*	*	*	Moldova	*	*	*	*	*	Ukraine	*	*	*	*	*
Equatorial Guinea	*	*				Mongolia	*	*	*	*	*	United Arab Emirates	*	*	*	*	*
Estonia	*	*	*	*	*	Morocco	*	*	*	*	*	United Kingdom	*	*	*	*	*
Ethiopia	*	*	*	*	*	Mozambique	*	*	*	*	*	United States	*	*	*	*	*
Fiji	*	*	*	*	*	Myanmar	*	*	*	*	*	Uruguay	*	*	*	*	*
Finland	*	*	*	*	*	Namibia	*	*	*	*	*	Uzbekistan	*	*	*		
France	*	*	*	*	*	Nepal	*	*	*	*	*	Venezuela	*	*	*	*	*
Gabon	*	*	*	*	*	Netherlands	*	*	*	*	*	Vietnam	*	*	*	*	*
Gambia, The	*	*	*	*		New Zealand	*	*	*	*	*	Yemen	*	*	*	*	*
Georgia	*	*	*	*	*	Nicaragua	*	*	*	*	*	Zambia	*	*	*	*	*
												Zimbabwe	*	*	*	*	*

Total number of countries included by year: 157 156 148 142 134

**Table 6. Democracy-Related Events.**

<b>Country</b>	<b>Year</b>	<b>Democratic Event</b>	<b>Year</b>	<b>Anti-democratic Event</b>
Algeria			1991	Army suspends elections.
Angola			1974	Independence and civil war.
Bangladesh	1991	Transition to democracy.	1971	Creation and one party rule established.
Benin	1991	Free elections held.	1974	Socialist state established.
Bolivia	1981	Democratic civilian rule established.		
Botswana	1966	Independence.		
Cape Verde	1991	Democratic reform.	1975	Marxist, one-party rule established.
Central African Republic	1993	Civilian government installed.	1960	Independence and rule by military dictatorship.
Chad			1960	Independence and ethnic warfare.
Chile	1990	Freely-elected presidency	1973	Pinochet dictatorship.
Cuba	-		1959	Castro's repressive revolution.
Dominican Republic	1996	Free and open elections.		
Egypt	-		1947	Full sovereignty and one party rule.
El Salvador	1992	Treaty signed for military and political reforms.		
Gabon			1960	Autocratic presidents after independence.
Ghana	1992	New constitution and multiparty elections.	1957	Independence and series of military coups.
Greece	1974	End of military rule and king - free elections.		
Guatemala	1986	Civilian multi-party rule established.		
Haiti	1994	Aristide ends military rule.		
Honduras	1980	Transition to democracy		
Indonesia	1999	First free elections in decades.	1949	Independence and one party rule.
Ivory Coast	-		1999	Military coup.
Kenya	-		1969	One party rule established.
Korea, South	1987	Democracy established.	1961	Authoritarian coup by Park Chung Hee.
Lebanon	1991	Ends civil war and regains sovereignty.	-	
Madagascar	1992	Free presidential and Assembly elections.	1975	Single-party rule.
Malaysia	1963	Malaysia created independently.	1969	Suspension of democracy.
Mali	1992	First democratic elections and end of dictatorship.	1960	Independence and dictatorship.
Mauritania	-		1960	Independence and one party rule.
Mauritius	1968	Independence.	-	
Mongolia	1993	Ex-Communists yield monopoly power.	-	
Morocco			1956	Establishment of authoritarian regime.
Mozambique	1990	Elections and end of communism.	1975	Independence and communist rule.
Myanmar	-		1962	Military junta established.
Namibia	1990	Independence.	-	
Nepal	1990	Multiparty democracy established.	-	
Nicaragua	1990	Transition to democracy.		

Niger	1999	Civilian rule established.		1960	Independence, but no free elections.
Nigeria II	1960	Independence under democracy.		1966	Military coup.
Nigeria	1999	New constitution and civilian rule established.		1983	Military rule commences.
Pakistan	1988	Democratic transition.		1999	Military takeover.
Panama	1989	Dictator Noriega deposed.		1968	Dictatorship established.
Paraguay	1989	Free and regular presidential elections begin.		1954	Stroessner dictatorship established
Peru	1980	Democracy returns.		1968	Military rule commences.
Philippines, The	1986	Dictator Marcos forced into exile.		1972	Marcos declares martial law.
Portugal	1974	Broad democratic reforms installed.		-	
Rwanda	1999	First local elections.		1956	Ethnic warfare and removal of king.
Singapore	1965	Independence.		-	
Somalia	-			1969	Military dictatorship established.
South Africa	1994	End to apartheid.		-	
Sudan	-			1956	Independence and military dictatorships.
Sudan II				1989	Military coup.
Syria	-			1949	Series of military coups commences.
Taiwan	1992	Multi-party rule established.		1949	KMT establishes one-party rule
Tanzania	1995	First democratic elections since 70's.		1972	One party rule established.
Togo	-			1967	Military ruler established.
Trinidad and Tobago	1962	Independence.		-	
Tunisia	-			1956	Independence and one-party state established.
Uganda	-			1966	Dictatorial regime established
Uruguay	1985	Civilian rule restored.		1973	Military rule established.
Venezuela	1959	Democratically elected government ends military rule.		-	
Zambia	1991	Elections and end of one party rule.		1964	Independence and one party rule.

**Table 7. Real GNI/Capita Before and After Democracy-Related Events.**

Real GNI/Capita is traced for ten years prior to a democracy-related event and twenty years thereafter. Events occurred on various dates within the past half-century and are listed in Table 6. Mean growth refers to the arithmetic average percentage change in annual GNI/capita over all countries with available data during the indicated sub-period. Compound growth first averages yearly GNI/capita growth rates across available countries then compounds the average over the sub-period. The event year is denoted Year zero. Statistical tests compare sub-periods after and before the event; %>0 gives the percentage of countries whose GNI/capita growth rate increased after the event. The accompanying number in parenthesis is the p-value for a one-sided test that the true percentage is 50%. The t-statistic is based on the cross-country mean difference in annual percentage growth rates between selected sub-periods (after the event less before.) The standard error of the mean is computed from the cross-section of differences.

	Sub-Period (Years relative to Event)					Tests for Change in Growth Rate After Event			
	-10 to -1	-5 to -1	+1 to +5	+6 to 10	+11 to +20	+1 to +5 vs. -5 to -1	+6 to +10 vs. -5 to -1	+11 to +20 vs. -10 to -1	
<b>Democratic Events</b>									
Mean Growth (%/annum)	0.821	0.670	2.164	1.673	2.733	%>0	62.2 (.051)	41.2 (.685)	80.0 (.031)
Compound Growth (%/annum)	0.818	0.668	2.160	1.667	2.723	t-statistic	1.636	-0.079	2.526
Average Number of Countries	38.5	43.0	38.8	25.2	9.7	N <sup>17</sup>	37.0	17.0	5.0
<b>Anti-Democratic Events</b>									
Mean Growth (%/annum)	1.562	1.349	1.733	0.864	0.850	%>0	39.4 (.148)	34.4 (.055)	26.3 (.032)
Compound Growth (%/annum)	1.557	1.346	1.722	0.858	0.845	t-statistic	-0.129	-1.056	-3.270
Average Number of Countries	30.8	37.4	40.4	40.2	34.2	N	33.0	32.0	19.0

<sup>17</sup> N is the number of countries available in both of the sub-periods being compared.

**Table A-1. Properties of Residuals from Cross-Country GNI/Capita Regressions.**

Residuals are from the five annual cross-country regressions reported in Table 5. The dependent variable is GNI/Capita (PPP adjusted.) The 28 explanatory variables included 14 linear and 14 orthogonal quadratic functions of various candidate determinants of GNI/Capita. Principal components regression was employed to alleviate multicollinearity.

Panel A

Residuals from Regressions in Adjacent Years	
Years	Correlation
1995-1996	.904
1996-1997	.890
1997-1998	.922
1998-1999	.838

Panel B

Principal Components from (5 X 5) Covariance Matrix of Residuals <sup>18</sup>		
Principal Component	Eigenvalue	Cumulative % of Variance Explained
1	4.386	87.7%
2	0.274	93.2%
3	0.200	97.2%
4	0.075	98.7%
5	0.065	100%

Panel C

Year	Correlation, PPP and Atlas Residuals	Number of Countries	Atlas Residuals in Adjacent Years	
			Years	Correlation
1996	0.829	131		
1997	0.793	140	1996-1997	0.873
1998	0.781	145	1997-1998	0.880
1999	0.779	146	1998-1999	0.864

<sup>18</sup> Number of countries present in all years: 129

**Table A-2. Exogenous Income Correlates vs. Residuals  
from Cross-Country Regressions of GNI/Capita on Mutable Determinants**

Residuals from the cross-country regressions in Table 5 are related to geographic, linguistic, and religious variables. Simple bivariate correlations are underlined in Panel A. Their t-statistics are italicized. Correlations significant at the 95% level or higher are bordered. Panel B gives summary statistics for multiple regressions of the residuals against all the exogenous correlates.

		Panel A											
Year	Absolute Latitude	% of population speaking			% of population who avow they are							N <sup>19</sup>	
		English	French	Spanish	Buddhist	Catholic	Confucian	Hindu	Jewish	Muslim	Protestant		
1995	<u>0.170</u>	<u>-0.125</u>	<u>-0.060</u>	<u>0.027</u>	<u>-0.066</u>	<u>0.227</u>	<u>0.021</u>	<u>-0.116</u>	<u>0.145</u>	<u>-0.156</u>	<u>-0.112</u>	110	
	<i>1.977</i>	<i>-1.311</i>	<i>-0.619</i>	<i>0.280</i>	<i>-0.683</i>	<i>2.425</i>	<i>0.215</i>	<i>-1.212</i>	<i>1.527</i>	<i>-1.643</i>	<i>-1.174</i>		
1996	<u>0.131</u>	<u>-0.081</u>	<u>-0.078</u>	<u>0.038</u>	<u>0.027</u>	<u>0.227</u>	<u>0.090</u>	<u>-0.060</u>	<u>0.141</u>	<u>-0.174</u>	<u>-0.128</u>	115	
	<i>1.568</i>	<i>-0.862</i>	<i>-0.836</i>	<i>0.405</i>	<i>0.288</i>	<i>2.481</i>	<i>0.957</i>	<i>-0.640</i>	<i>1.510</i>	<i>-1.875</i>	<i>-1.374</i>		
1997	<u>0.166</u>	<u>-0.114</u>	<u>-0.002</u>	<u>0.022</u>	<u>0.023</u>	<u>0.174</u>	<u>0.053</u>	<u>-0.061</u>	<u>0.109</u>	<u>-0.106</u>	<u>-0.100</u>	115	
	<i>2.029</i>	<i>-1.222</i>	<i>-0.022</i>	<i>0.229</i>	<i>0.239</i>	<i>1.875</i>	<i>0.564</i>	<i>-0.648</i>	<i>1.170</i>	<i>-1.131</i>	<i>-1.063</i>		
1998	<u>0.198</u>	<u>-0.085</u>	<u>-0.045</u>	<u>0.020</u>	<u>0.025</u>	<u>0.193</u>	<u>0.077</u>	<u>-0.055</u>	<u>0.164</u>	<u>-0.144</u>	<u>-0.099</u>	119	
	<i>2.505</i>	<i>-0.917</i>	<i>-0.483</i>	<i>0.217</i>	<i>0.267</i>	<i>2.132</i>	<i>0.838</i>	<i>-0.592</i>	<i>1.798</i>	<i>-1.569</i>	<i>-1.079</i>		
1999	<u>0.187</u>	<u>-0.134</u>	<u>-0.034</u>	<u>-0.002</u>	<u>0.024</u>	<u>0.149</u>	<u>0.057</u>	<u>-0.006</u>	<u>0.146</u>	<u>-0.086</u>	<u>-0.102</u>	118	
	<i>2.372</i>	<i>-1.458</i>	<i>-0.365</i>	<i>-0.026</i>	<i>0.262</i>	<i>1.622</i>	<i>0.614</i>	<i>-0.062</i>	<i>1.590</i>	<i>-0.934</i>	<i>-1.100</i>		

Panel B					
Year	1995	1996	1997	1998	1999
t-statistics > 1.96	0	0	0	0	0
Adjusted R-Square	0.22	-.022	-.056	-.013	-.031

<sup>19</sup> N=Number of countries with available language and religion data. For absolute latitude, the number of observations is the same as the number of countries in Table 5.

**Table A-3. Alternate Specifications: Cross-Country Multiple Regressions of GNI/Capita.**

For calendar year 1999, the cross-country model is

$$\text{GNI/Capita}_j = a + \sum_{i=1}^K b_i X_{i,j} + \sum_{i=1}^K c_i Q_{i,j}$$

where  $a$ ,  $b_i$  and  $c_i$  are estimated coefficients,  $X_{i,j}$  is the original explanatory variable  $i$  for country  $j$  scaled to range between  $-1$  and  $+1$ , and  $Q_{i,j} = (3X_{i,j}^2 - 1)/2$  is an approximately orthogonal Legendre second order (quadratic) polynomial transformation. To mitigate multicollinearity, the model was estimated using the method of principal components regression with a 50% reduction in dimensionality; i.e., the first  $K$  principal components of the covariance matrix of the  $X$ 's and  $Q$ 's (combined) were the regressors. Those results were then transformed back into the space of the  $2K$  original variables. The coefficient is underlined and its  $t$ -statistic is italicized. Boxed entries indicate at least a 95% level of significance. The number of observations (countries) is 157 in all regressions.

Regression:	A		B		C		D	
Coefficient:	b	c	b	c	b	c	b	c
Trade Barriers	<u>-1235</u> <i>-6.26</i>	<u>-857</u> <i>-2.61</i>	<u>-1209</u> <i>-6.41</i>	<u>-580</u> <i>-1.71</i>	<u>-1147</u> <i>-5.95</i>	<u>-902</u> <i>-2.85</i>	<u>-1111</u> <i>-5.66</i>	<u>-659</u> <i>-2.09</i>
Taxes	<u>420</u> <i>0.74</i>	<u>375</u> <i>0.50</i>	<u>330</u> <i>0.61</i>	<u>282</u> <i>0.41</i>	<u>224</u> <i>0.42</i>	<u>108</u> <i>0.14</i>	<u>266</u> <i>0.52</i>	<u>-64</u> <i>-0.09</i>
Government Expenditures	<u>2476</u> <i>5.49</i>	<u>-394</u> <i>-1.01</i>	<u>2071</u> <i>4.88</i>	<u>124</u> <i>0.321</i>	<u>2500</u> <i>6.21</i>	<u>-751</u> <i>-2.10</i>	<u>2134</u> <i>5.46</i>	<u>-300</u> <i>-0.86</i>
Government Intervention	<u>478.5</u> <i>1.17</i>	<u>-235</u> <i>-0.41</i>	<u>281.5</u> <i>0.689</i>	<u>-40.4</u> <i>-0.726</i>	<u>522</u> <i>1.30</i>	<u>183</u> <i>0.33</i>	<u>300</u> <i>0.77</i>	<u>312</u> <i>0.60</i>
Monetary Policy	<u>-1497</u> <i>-7.89</i>	<u>1423</u> <i>4.37</i>	<u>-1550</u> <i>-8.21</i>	<u>1239</u> <i>3.91</i>	<u>-1348</u> <i>-8.89</i>	<u>1005</u> <i>3.37</i>	<u>-1423</u> <i>-9.46</i>	<u>904</u> <i>3.14</i>
Foreign Inv. Barriers	<u>-145</u> <i>-0.48</i>	<u>-164</u> <i>-0.23</i>	<u>-122</u> <i>-0.40</i>	<u>-222</u> <i>-0.32</i>	<u>-120</u> <i>-0.40</i>	<u>-466</u> <i>-0.78</i>	<u>-68</u> <i>-0.23</i>	<u>-460</u> <i>-0.78</i>
Banking Restrictions	<u>-437</u> <i>-1.66</i>	<u>-1120</u> <i>-1.92</i>	<u>-386</u> <i>-1.56</i>	<u>-1093</u> <i>-2.13</i>	<u>-607</u> <i>-3.22</i>	<u>-690</u> <i>-1.61</i>	<u>-542</u> <i>-3.07</i>	<u>-826</u> <i>-1.97</i>
Wages and Prices	<u>-294</u> <i>-1.04</i>	<u>-716</u> <i>-1.33</i>	<u>-147</u> <i>-0.54</i>	<u>-828</u> <i>-1.65</i>	<u>-399</u> <i>-1.60</i>	<u>-68</u> <i>-0.13</i>	<u>-272</u> <i>-1.19</i>	<u>-209</u> <i>-0.41</i>
Property Rights	<u>1778</u> <i>12.6</i>	<u>2205</u> <i>8.92</i>	<u>1778</u> <i>11.9</i>	<u>2277</u> <i>8.79</i>	<u>1728</u> <i>12.5</i>	<u>2067</u> <i>8.56</i>	<u>1735</u> <i>12.1</i>	<u>2146</u> <i>8.45</i>
Regulation	<u>-1495</u> <i>-5.08</i>	<u>783</u> <i>1.59</i>	<u>-1587</u> <i>-5.49</i>	<u>893</u> <i>1.89</i>	<u>-1579</u> <i>-5.74</i>	<u>584</u> <i>1.17</i>	<u>-1636</u> <i>-6.04</i>	<u>681</u> <i>1.41</i>
Black Market Activity	<u>-1607</u> <i>-11.1</i>	<u>1981</u> <i>5.99</i>	<u>-1652</u> <i>-10.4</i>	<u>1810</u> <i>5.98</i>	<u>-1626</u> <i>-11.5</i>	<u>1805</u> <i>5.97</i>	<u>-1643</u> <i>-11.2</i>	<u>1736</u> <i>6.10</i>
Political Rights	<u>533</u> <i>3.84</i>	<u>427</u> <i>1.99</i>	<u>428</u> <i>3.05</i>	<u>437</u> <i>2.02</i>	<u>292</u> <i>2.02</i>	<u>156</u> <i>0.67</i>	<u>191</u> <i>1.37</i>	<u>188</u> <i>0.81</i>
Civil Liberties	<u>863</u> <i>5.28</i>	<u>1343</u> <i>6.66</i>	<u>715</u> <i>4.34</i>	<u>1216</u> <i>6.02</i>	<u>498</u> <i>3.10</i>	<u>1082</u> <i>5.43</i>	<u>384</u> <i>2.45</i>	<u>984</u> <i>5.07</i>
Freedom of the Press	<u>1074</u> <i>7.16</i>	<u>1696</u> <i>6.22</i>	<u>993</u> <i>6.62</i>	<u>1499</u> <i>6.48</i>	<u>719</u> <i>4.58</i>	<u>1402</u> <i>5.16</i>	<u>648</u> <i>4.39</i>	<u>1304</u> <i>5.57</i>
Absolute Latitude			<u>1723</u> <i>6.15</i>	<u>-379</u> <i>-0.92</i>			<u>1526</u> <i>6.32</i>	<u>-506</u> <i>-1.28</i>
Years Since Democratic Event					<u>1321</u> <i>6.42</i>	<u>1559</u> <i>3.08</i>	<u>1275</u> <i>6.03</i>	<u>1248</u> <i>2.57</i>
Intercept	<u>7878</u> <i>16.5</i>		<u>8168</u> <i>18.1</i>		<u>7754</u> <i>14.51</i>		<u>8082</u> <i>15.87</i>	
R-square, observed vs. Predicted	.860		.870		.872		.882	
Adjusted R-square	.846		.856		.859		.868	

**Figure 1**

