

ECONOMIC INSTITUTIONS AND HUMAN WELL-BEING: A CROSS-NATIONAL ANALYSIS

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The effect of economic institutions—well-specified property rights, the rule of law, economic freedom, and the quality of government—on economic performance is an important research stream in recent years [Barro and Sala-i-Martin, 1995; Dawson, 1998; Easton and Walker, 1997; Knack, 1996]. Scully [1988,1997] and Grubel [1998] document a strong relationship between various measures of human well-being and economic institutions. In the present paper, I build on their findings by examining human well-being using standard measures developed by the United Nations. In the process, I extend their analyses by including a variety of institutional measures and measures of well-being. I also build on Norton [1998] and Scully and Grubel's analyses by examining the effect of important geographic variables that Sowell [1994], Sachs [1997] and Sachs and Warner [1997] argue are important determinants of well-being.

THE INSTITUTIONS/GROWTH NEXUS

Background

Property rights are a focal point in contemporary economics. There are three identifiable views regarding property rights. The first is that property rights are harmful for human well-being. This proposition achieved wide dissemination in the eighteenth and nineteenth centuries [Bethell, 1998]. Rousseau is an early and prominent proponent of the malignant view of property rights and numerous subsequent thinkers including Marx and his disciples averred property rights as perverse institutions. The perspective is still common among intellectuals today [ibid., 1998].

The second view is that property rights and supporting institutions are irrelevant. North [1981,1987,1990] argues that this view dominates neoclassical economic analysis. Examination of Hicks [1946] or Samuelson [1976] provides little basis to refute North's assertion. However, the perspective antedates Hicks and Samuelson. Marshall [1920, 40] notes that the leading luminaries of economics ignored and failed to appreciate the role of property rights, and Marshall urged caution regarding the abrogation of private property. However, Marshall's support for the institution of private property was not so strong or persuasive to stop the evolution from marginal

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analysis to the conclusion that private property was not a crucial institution for economic well-being [Bethell, 1998]. Solow [1983] is a prominent contemporary economist who ignores the institutions of capitalism. In short, much of mainstream economics ignores property rights.

The third view of property rights and supporting institutions is that these institutions are the *sine qua non* of economic growth and human well-being. In Coase's [1960] famous paper on social cost, the primacy of property rights is strongly affirmed as a prerequisite for market exchange and maximum value of resources. North [1981,1987,1990] extends Coase's insight and offers an institutions-based explanation of economic development. This perspective seems to be growing to the point where many economists affirm Eggertsson's [1990] contention that small changes in the institutional milieu can result in large increases in growth and thus wealth accumulation and general well-being. In a related vein, De Soto [2000] underscores property rights by identifying the absence of property rights as foundational to persistent poverty. He stresses the ability to collateralize property and to obtain strong, impartial enforcement of property rights.

Besides property rights, other economic institutions are widely thought to enhance human well-being. Some of these are closer to the existence of property rights than others. For example, Porter and Scully [1995] identify a constitutional milieu as a foundation for economic growth and well-being. Similarly, Riggs [1964] and Todaro [1997] stress the quality of government and the absence of political corruption as essential prerequisites for growth and poverty elimination.¹ Finally, Barro and Sala-i-Martin [1995] and Knack and Keefer [1997] stress the rule of law as the dominant determinant of economic growth and, in turn, well-being.

Analytic Framework

Locke [(1690)1942] argued that governments are instituted to establish the protection of property and its attendant benefits—social gains associated with the establishment of private property.² Epstein [1985] shows that the social gains from establishing property rights can be represented as a circle

$$(1) \quad W_{ij} = \lambda_j A_i = \lambda_j r_i + \tilde{\mu}_{ij}$$

where W_{ij} is a measure of well-being of people in country i on measure j and A_i is the total value of productive activity in a country. λ_j is a parameter representing the sensitivity of well-being to the polity's productive activity, r_i is the degree to which property rights are specified compared to the state of nature and supported by other economic institutions, and $\tilde{\mu}$ is a random error term. Clearly, for any two countries, if $r_1 > r_2$, then $A_1 > A_2$. If the λ_j 's are the same across countries, well-being in the first country should likewise exceed well-being in the second country. Moreover, the facts clearly indicate that well-being enhancing institutions vary across countries [La Porta et al.,1999].

An important consideration is the meaning of r . The extent of welfare enhancing institutional development, r , is represented in two concepts—the existence and enforcement of property rights and the extent to which these rights are permitted un-

fettered application in markets. Scully [1997] describes two concepts—the “rule space” and the “policy space,” that fit well with the meaning of r . These concepts provide a framework that includes a wide range of institutional features—from constitutions to the quality of bureaucracy.

The rule space deals with the an institutional infrastructure that entails the ownership of private property as opposed to ill-defined, or undefined, open access resources and/or resources protected only by the deterrence of self-proclaimed “owners.” Anderson and Hill [1975] note that entrepreneurs have an incentive to engage in defining rules that lead to mutually beneficial arrangements among parties with potential access to unowned resources. Smith [1992] asserts that the human proclivity to set up welfare-enhancing rules is nearly innate. The rules can be as narrowly defined as bilateral contracts or agreements as broadly defined as the structure of constitutions and legal systems for large human aggregations such as nation-states or supranational alliances. It merits noting that the rise of industrialized, relatively wealthy nation-states is largely attributed to the existence of enabling legal systems and governments [North, 1987].

The policy space deals with government action that attenuates the full use and alienation of property in the widest meaning of the term. Government policies can enhance or retard the value of well-specified and enforced property rights if the value of the assets is subject to restrictions that render the resources unproductive or less productive (reduced value in use) or if the benefits from selling the resources is circumscribed or prohibited (reduced value in exchange). Replacement of privately managed production with state-owned enterprises is one example. Prohibitions on exchange—restrictions on the use of foreign currency, trade protection, price controls, and unstable monetary policy that reduces the value of assets denominated in that currency—are also examples of possible well-being retarding policies.

Both rules and policies are subsumed in the variable, r . Understanding the determinants of r is surely an important endeavor. However, the purposes at hand are less ambitious. Various measures of the r variable are used to examine the link between r and nonpecuniary measures of well-being that are thought be especially important for the relatively poor countries of the world.

The transmission mechanism from institutions to well-being is somewhat unclear. Institutional structure may be linked with the neoclassical theory of production—as in Scully [1988] where property rights are seen as enhancing wealth by moving productive units from some less-than-ideal state toward the technically efficient frontier of the aggregate production function. Alternatively, economic institutions can be seen as enhancing the value of investment by assuring the returns to productive activity over time are not diminished by government policies that attenuate the rights to use and alienate resources.

The latter point is well stated by Hirshleifer:

. . . economic progress in an economy in which private enterprise plays an important role requires assurance that property rights will be protected. No one will be motivated to save, invest, or perform on contracts unless he has reasonable confidence that he will not be deprived of his right to the yield of his activities. [1987, 53]

Economic institutions can affect investment by guaranteeing the rights to the returns of investment in private property and the rights not weakened by restrictions on production and exchange. The argument should apply to physical and human capital, and to real as well as financial capital.

MEASUREMENT ISSUES

Economic Institutions

In recent years, empirical research on the role of economic institutions has relied on a variety of measures [Barro and Sala-i-Martin, 1995; Easton and Walker, 1997; Hall and Jones, 1999; Knack and Keefer, 1995; Knack, 1996; La Porta et al., 1999; Scully 1988, 1997]. Several of these are used in the analysis below.

Three measures used in the present study are derived from the *International Country Risk Guide*; published by Political Risk Services.³ The numbers are ratings of a broad sample of countries on several dimensions. Data are available as early as 1982. The data used in the estimate are from the first available year, usually 1982, through 1995. The data are described in detail in Barro and Sala-i-Martin [1995] and Knack and Keefer [1995]. One rating is the quality of bureaucracy. Higher scores of this measure indicate increasing isolation of the bureaucracy from political pressure and drastic policy changes and indicate increasing independence in recruiting and training government employees. A second rating is corruption in government. Higher scores indicate decreasing likelihood that high-level officials will demand bribes. The two measures are combined with equal weight and normalized between zero and one to constitute the quality of government variable in the empirical tests. The measure relates to the hypothesis that the quality of government administration is a determinant of human well-being. Examples of the lowest measures are Liberia, Haiti and Bangladesh. Examples of the highest measures are Switzerland, New Zealand, and Luxembourg. Argentina is close to the mean value.

A third *International Country Risk Guide* measure is expropriation risk, where increasing scores indicate a lower probability that private property will be confiscated by the government. A fourth measure is entitled repudiation of contracts. Increasing scores indicate a lower probability that the government will renege on contracts. These two measures are combined with equal weight and normalized between zero and one to constitute the property rights measure in the empirical tests. Examples of the lowest measures are Iraq, Somalia, and Liberia. Examples of the highest measures are Germany, Switzerland, and Luxembourg. Poland is close to the mean value.⁴

A fifth *International Country Risk Guide* measure is the rule of law.⁵ Increasing scores indicate orderly transitions of power and authoritative adjudication of disputes. Knack and Keefer describe the measures in terms of accepting "... established institutions to make and implement laws and adjudicate disputes" [1995,225]. The rule of law measure, as well as the property rights measure, seems to fit well with the "rule space" concept. Examples of countries with lowest measures on the rule of law are Zaire (Democratic Republic of the Congo), Guinea-Bissau and Haiti. Fifteen countries tie for the maximum value, including Canada, Iceland, and Norway. Côte-d'

TABLE 1
Correlation Matrix Institutional Variables

Variable	Government	Property Rights	Rule of Law	Economic Freedom
Government	1.00			
Property Rights	0.88	1.00		
Rule of Law	0.86	0.88	1.00	
Economic Freedom	0.69	0.79	0.72	1.00

See appendix, N=99.

Ivoire is close to the mean for the rule of law measure. The variable is normalized between zero and one.

Gwartney and Lawson [2001] provide systematic rankings of nation-states based on economic freedom. Their measures are useful because they quantify not only the existence of property rights, but also the attenuation of property rights through policies such as price controls or the costs of inflationary public policies. In short, the economic freedom measure seems to fit well with the “policy” space concept.

The economic freedom data are a simple average of the measures for 1985, 1990, and 1995. The numbers are normalized between zero and one. Myanmar and the Russian Federation have the lowest levels of economic freedom while Hong Kong, Singapore, and the United States have the highest levels. Botswana is close to the mean.

Some insight may be gained by examining the relationship between the institutional variables. Table 1 contains the correlation matrix for the variables. The data reveal that there are strong relationships among the variables: the correlations are positive, high, and almost uniform across measures, with values ranging from .86 to .88. In contrast, the correlations between economic freedom and the *International Country Risk Guide* variables are somewhat lower. The highest value is .79 for property rights and economic freedom. More generally, the positive correlations indicate that the quality of government, property rights, the rule of law and economic freedom do tend to cluster across countries. Good government tends to coincide with well-specified property rights and economic freedom.

Economic Well-Being

Conventional economic theory emphasizes wealth and output (indirectly through consumer and producer surplus) as the foundations for economic well-being as well as concepts such as Pareto optimality that can be easily related to income and wealth. However, when human well-being is compared across countries, measurement of income and wealth can be misleading. A standard argument against such comparisons is that the measured incomes of citizens of poor countries are lower than their true well-being [Usher, 1968; 1978; 1980]. Moreover, it may be that other features of life generate more value than income or wealth. For these reasons, some scholars have devised measures of economic well-being that are alternatives to income and wealth.

One approach is the basic needs concept described by Todaro [1997] and illustrated by Dasgupta [1995]. In recent years, the United Nations organization has

constructed alternative measures in the spirit of the basic needs approach. These measures are the Human Poverty Index and the Human Development Index.

The Human Poverty Index is designed to measure human deprivation, a concept associated with Sen [1981]. The index presumes that an appropriate perspective on poverty reflects the well-being of “the most deprived people in the community” [United Nations, 1997, 20]. The index also attempts to reflect the denial of basic opportunities and choices that permit human development.

The Human Poverty Index is constructed by combining several measures of the absence of well-being. The first measure is the proportion of people not expected to survive to age 40. The second measure is the proportion of adults who are illiterate and therefore excluded from the benefits and privileges of reading and communication. The third measure is itself a composite consisting of the proportion of people without access to health services, the proportion of people without access to safe water, and the percentage of malnourished (underweight) children under the age of five. The components are combined into a measure scaled from zero to 100.

The Human Development Index measures human capability by focusing on the “progress in a community as a whole” [United Nations, 1997, 20]. The Human Development Index consists of three dimensions—a healthy standard of living, a long and healthy life, and knowledge. The composite index is originally scaled between zero and one but it is rescaled between zero and 100 in this paper for comparability with the Human Poverty Index. The component measures, designed to reflect these dimensions, are per capita GDP, life expectancy at birth, education (combined first-, second- and third-level gross enrollment ratio), and adult literacy rates.

Clearly, there are alternative measures of well-being and the specific content and weighting of these measures are certainly open to debate. However, it seems difficult to deny that these measures reflect important features of well-being. Presumably, the data quality objections raised by Brodsky and Rodrik [1981] do not apply to these more recent data.

One point of contrast merits attention. The United Nations organization calculates the Human Development Index only for a sample of nations that include primarily the poorer nations of the world. Consequently, the dispersion of the measure may be smaller than if it included the industrialized and relatively affluent countries. As a result, the measure may fail to capture important differences across countries that reflect differences between the relatively affluent and poor countries. In contrast, the Human Development Index is calculated for a larger and broader sample of countries and therefore reflects the systematic effects of differences between the relatively rich and poor countries, some of which may be unrelated to institutional differences.

EMPIRICAL ANALYSIS

The Model

The empirical model used in the tests below is:

$$(2) \quad W_i = \beta_0 + \beta_1 \text{Tropics}_i + \beta_2 \text{Landlocked}_i + \beta_3 \text{Urban}_i + \beta_4 \text{Ethnic Group}_i + \beta_5 \text{Economic Institution}_i + \tilde{\mu}_i$$

where W_i is a measure of human well-being in country i , $Tropics_i$ is the proportion of the country's area that has a tropical climate, $Landlocked_i$ equals 1 if the country has no port to the outside world and 0 otherwise, $Urban_i$ is the proportion of the population that lives in urban areas, $Ethnic\ Group_i$ is the proportion of the largest ethnolinguistic group to the total population in a country, $Economic\ Institution_i$ is a measure of government quality, property rights, the rule of law, or economic freedom in country i , and $\tilde{\mu}_i$ is an error term.

The tropics variable is included in light of assertions and evidence provided by Sachs [1997] and Sachs and Warner [1997], arguing that the costs of survival are raised and in turn nearly all productive economic activity is retarded by tropical climates. Whether a country is landlocked is included because the costs of the diffusion of well-being enhancing ideas and trading with the rest of the world are allegedly greater for landlocked countries [Sowell, 1994]. Sachs and Warner [1997] and Sachs [1997] also argue and provide some evidence that being landlocked retards growth (Data are from Munro [1996]).

The case for including the urbanization variable rests on several observations. First, the development economics literature stresses that the existence of poverty is most serious in rural areas [Todaro, 1997] and that inertia and stagnation in rural areas retard growth [Kelley and McGreevey, 1994]. Moreover, Lucas [1988] emphasizes the role of cities as sources of ideas and knowledge that lead to "external effects" of human capital. Cities enhance the impact people have on other people's productivity. Thus, Jacobs' [1969] contention that cities are a key to growth and development receives some theoretical support and merits inclusion in equation (2).

It is well known that if geographic isolation, tropics, and urbanization are correlated with economic institutions, then the omission of such variables in regression estimates would lead to biased estimates of the economic institution parameters [Gujarati, 1995]. Interestingly, Sachs [1997] argues that geographic isolation retards the formation of market-enhancing institutions while Sowell [1994] notes that geographic isolation limits the size of the cultural universe and thus inhibits the adoption of well-being enhancing institutions. Accordingly, there is a strong case for inclusion of geographic variables in estimates of the relationship between economic institutions and human well-being.

The final control variable is ethnolinguistic group size. In a number of recent studies, ethnolinguistic homogeneity or fractionalization has proved to be an important determinant of human well-being [Collier, 1998; Easterly and Levine, 1997, Knack and Keefer, 1997; Norton, 2000]. The studies provide evidence that in more homogeneous countries, the costs of cooperation in the collective polity or in simple bilateral contracts are reduced compared to more diverse polities.

The most relevant testable hypotheses for the subject at hand are that institutional variables in equation (2), representing better quality of government, stronger property rights, stronger rule of law, and increasing economic freedom should have negative coefficients for poverty-dependent variables and should have positive coefficients for human development-dependent variables. The tropics, landlocked, urbanization, and ethnic group size measures provide a set of alternative explanations for the cross-national dispersion of human-well being and accordingly provide additional

TABLE 2
Determinants of Human Poverty and Development

Independent Variable	Regression Coefficient/(t-statistic)							
	Human Poverty Index				Human Development Index			
Constant	1.28 ^a (3.18)	2.08 ^a (4.34)	1.27 ^a (3.41)	1.25 ^a (3.22)	-1.98 ^a (-6.36)	-2.77 ^a (-8.38)	-1.86 ^a (-6.39)	-2.29 ^a (-5.88)
Tropics	-0.33 ^a (-1.73)	-0.29 (-1.57)	-0.31 (-1.64)	0.02 (0.10)	-0.10 (-0.59)	-0.09 (-0.59)	-0.14 (-0.87)	-0.36 ^a (-1.99)
Landlocked	0.08 (0.48)	0.08 (0.48)	0.07 (0.37)	0.17 (0.90)	-0.18 (-1.14)	-0.20 (-1.61)	-0.20 (-1.29)	-0.25 (-1.61)
Urbanization	-2.51 ^a (-6.55)	-2.39 ^a (-6.81)	-2.61 ^a (-7.25)	-1.98 ^a (-4.69)	2.62 ^a (9.10)	2.40 ^a (10.02)	2.74 ^a (9.44)	2.35 ^a (7.61)
Ethnic Group	-0.64 ^a (-1.99)	-0.70 ^a (-2.40)	-0.64 ^a (-2.02)	-0.41 (-1.41)	0.90 ^a (3.18)	0.85 ^a (3.21)	0.82 ^a (2.89)	.87 ^a (2.94)
Government	-1.45 ^a (-2.54)	—	—	—	1.94 ^a (6.01)	—	—	—
Property Rights	—	-2.62 ^a (-5.22)	—	—	—	3.08 ^a (10.41)	—	—
Rule of Law	—	—	-1.32 ^a (-3.16)	—	—	—	1.73 ^a (5.97)	—
Economic Freedom	—	—	—	-2.37 ^a (-3.97)	—	—	—	2.87 ^a (6.25)
Adjusted R^2	0.534	0.619	0.543	0.563	0.785	0.838	0.783	0.796
S.E.R	0.574	0.522	0.571	0.563	0.575	0.502	0.579	0.570
N	65	65	66	59	112	112	113	104

a. Significant at the 5 percent level or lower (one-tailed test). The dependent variables are the log-odds of the human poverty index and the human development index.

testable hypotheses. However, the main testable hypothesis is that institutional variables exhibit a significant effect after controlling for other variables.

RESULTS

Table 2 contains the results of regressions of equation (2), using the log-odds of the Human Poverty Index and Human Development Index as dependent variables.⁶ The data indicate that geography plays a limited role in determining human well-being.⁷ Landlocked and tropics appear to have little effect on human poverty or development. Only one estimate has both the predicted sign (positive for poverty and negative for development) and statistical significance—the tropics variable in the Human Development Index (column 4).

The only robust results for the geographic variables are for urbanization. The signs are uniformly consistent with Jacob's [1969] and Lucas' [1988] conjectures that economic development is favorably affected by urbanization. The estimates indicate that urbanization reduces poverty and enhances economic development. Thus, the data are consistent with ubiquitous assertions that the world's poor are disproportionately located in rural areas.

Ethnic group size is also robust in that it is statistically insignificant in only one estimate. Ethnic homogeneity is generally linked with lower poverty and always linked

with greater human development. Whatever ethnic homogeneity represents—political stability, lower contracting costs, trust, and so on, the data show that it benefits the poor and the rich. The results are clearly consistent with Easterly and Levine [1997], Knack and Keefer [1997], and Norton [2000].

The institutional variables uniformly support the hypothesis that institutions favorably affect human well-being. The estimates are always statistically significant. The weakest results are the estimates using the quality of government and the rule of law measures, while the strongest results are for the property rights and economic freedom measures.

The relationship between economic institutions and human poverty and human development is clearly statistically significant, but interpreting the economic or practical significance is difficult. The meaning of the coefficients is unclear without reference to other countries and even then the direct link to human deprivation is missing. In essence, the convenience of the UN's standardized scales of poverty and development obscure the meaning of the institutions and economic well-being nexus. Accordingly, examination of the components of human poverty and human development indexes is warranted.

Table 3 contains the results of estimates of the components of the Human Poverty Index. The data reveal that having tropical climates and being landlocked generally are unimportant in the determinants of the human poverty index components. The tropics variable is significant at conventional levels in only six of the twenty estimates and landlocked is significant in only five of the twenty estimates. Moreover, the coefficients have negative signs in three of the four adult illiteracy cases for the tropics variable and four of the four of the underweight children estimates for the landlocked variables. These results are contrary to the hypothesis that well-being is retarded by tropical climates and landlocked status. The negative signs may reflect correlation among independent variables (see Table A-3 in the appendix), but the dominant pattern is general irrelevance. In sharp contrast, urbanization reduces poverty considerably. The estimates have the predicted negative sign and are significant in nineteen out of twenty cases. The estimates are often remarkably robust. Thus, there is further evidence indicating that rural residents are typically more materially deprived.

Ethnic homogeneity is generally not a strong determinant of human poverty. It has a strong negative effect on the Death by Age 40 variable, but it is not robust in all other estimates. Thus, within the classes of comparatively poorer countries of the world, the benefits of homogeneity are limited to only one category of human deprivation, albeit a notable one.

The institutional variables reveal a somewhat mixed pattern. Fourteen of the twenty estimates are statistically significant. For most poverty measures, at least one institutional variable is statistically significant by conventional standards. In the case of undernourished children, none of the institutional variables seems important, (although property rights and economic freedom are significant at the 10 percent level for a one-tailed test). Unlike studies using pecuniary measures of well-being such as GDP, the rule of law does not dominate the other institutional variables as Knack and Keefer [1995] found. Instead, the most robust results are found with simple property rights and economic freedom. Thus, we cannot reject the hypothesis that these institutions play an important role in reducing poverty.

TABLE 3
Determinants of Human Poverty Measures

Dependent Variable	Regression Coefficient/ (t-statistic)									Econ R^2	Adj. S.E.R.	N
	Con	Trop	Land	Urban Group	Ethnic	Gov't Rights	Property Law	Rule of Freedom				
Death by Age 40	0.71 ^a (2.08)	-0.27 (-1.58)	0.19 (1.33)	-2.49 ^a (-6.71)	-1.15 ^a (-3.44)	-1.03 ^a (-2.10)	—	—	—	0.589	0.541	64
	1.42 ^a (3.42)	-0.22 (-1.35)	0.21 (1.58)	-2.26 ^a (-6.74)	-1.14 ^a (-4.03)	—	-2.33 ^a (-4.95)	—	—	0.659	0.478	64
	0.67 ^a (2.13)	-0.26 (-1.52)	0.189 (1.41)	-2.59 ^a (-7.25)	-1.13 ^a (-3.50)	—	—	-0.86 ^a (-2.11)	—	0.591	0.538	65
	0.75 ^a (2.24)	0.19 (1.01)	0.32 ^a (2.38)	-1.94 ^a (-4.61)	-0.82 ^a (-2.45)	—	—	—	-2.45 ^a (-4.69)	0.697	0.458	58
No Health Service	1.17 (1.22)	0.76 ^a (1.73)	-0.21 (-0.55)	-2.29 ^a (-2.51)	-0.68 (-1.14)	-3.98 ^a (-3.40)	—	—	—	0.405	1.087	55
	0.90 (0.76)	1.08 ^a (2.58)	-0.11 (-0.22)	-1.84 ^a (-2.02)	-0.32 (-0.54)	—	-3.72 ^a (-2.99)	—	—	0.351	1.103	55
	1.45 (1.62)	0.61 (1.50)	-0.29 (-0.66)	-2.98 ^a (-3.96)	-0.40 (-0.68)	—	—	-4.20 ^a (-4.54)	—	0.458	1.032	56
	-0.50 (-0.57)	1.69 [*] (3.57)	0.10 (0.19)	-1.17 (-1.07)	0.03 (0.05)	—	—	—	-2.93 ^a (-2.50)	0.305	1.210	49
No Safe Water	1.84 ^a (2.80)	0.02 (0.04)	0.20 (0.64)	-3.15 ^a (-4.30)	-1.02 (-1.02)	-2.11 ^a (-1.98)	—	—	—	0.391	1.018	63
	2.29 ^a (2.85)	0.12 (0.30)	0.20 (0.53)	-3.09 ^a (-3.95)	-1.02 (-1.51)	—	-2.62 ^a (-2.52)	—	—	0.380	1.012	63
	1.56 ^a (2.33)	0.06 (0.16)	0.19 (0.54)	-3.41 ^a (-4.41)	-0.99 (-1.42)	—	—	-1.32 (-1.29)	—	0.369	1.031	64
	1.68 ^a (2.44)	0.62 (1.17)	0.38 (0.93)	-2.28 ^a (-2.19)	-0.94 (-1.36)	—	—	—	-3.14 ^a (-2.31)	0.356	1.082	57
Adult Illiteracy	1.83 ^a (2.63)	-0.84 ^a (-2.68)	0.15 (0.41)	-2.82 ^a (-3.72)	-0.97 (-1.62)	-1.13 (-1.10)	—	—	—	0.277	1.001	63
	3.19 ^a (3.58)	-0.84 ^a (-2.78)	0.10 (0.35)	-2.82 ^a (-3.90)	-1.06 ^a (-1.88)	—	-3.21 ^a (-3.36)	—	—	0.379	0.947	63
	2.09 ^a (3.03)	-0.85 ^a (-2.81)	0.11 (0.32)	-2.89 ^a (-4.09)	-1.01 ^a (-1.77)	—	—	-1.54 ^a (-2.07)	—	0.302	.997	64
	2.09 ^a (3.18)	-0.36 (-1.12)	0.01 (0.04)	-2.55 ^a (-2.90)	-0.27 (-0.56)	—	—	—	-3.23 ^a (-3.27)	0.411	0.900	55
Under Weight Children	0.51 (0.72)	0.14 (0.55)	-0.36 ^a (-1.83)	-3.51 ^a (-6.00)	-0.60 (-1.41)	-0.90 (-1.07)	—	—	—	0.555	0.633	64
	0.79 (1.00)	0.18 (0.69)	-0.34 ^a (-1.94)	-2.96 ^a (-5.43)	-0.57 (-1.36)	—	-1.36 (-1.64)	—	—	0.555	0.624	64
	0.42 (0.66)	0.15 (0.58)	-0.35 ^a (-1.88)	-3.12 ^a (-5.87)	-0.73 (-1.12)	—	—	-0.73 (-1.12)	—	0.554	0.629	65
	0.48 (0.71)	0.38 (1.60)	-0.36 ^a (-1.87)	-2.85 ^a (-5.33)	-0.56 (-1.41)	—	—	—	-1.29 (-1.66)	0.550	0.617	58

a. Significant at the 5 percent level or lower (one-tailed test). The estimates use OLS with the dependent variables in log-odds form. The dependent variable for safe water and health service are the observed value plus 1.

TABLE 4
Determinants of Human Development Measures

Dependent Variable	Regression Coefficient/ (t-statistic)									Adj. R ²	S.E.R.	N
	Trop	Land	Urban	Ethnic Group	Gov't	Property Rights	Rule of Law	Econ Freedom				
GDP Per Capita	3.54 ^a	-0.08	-0.02	3.32 ^a	1.16 ^a	3.01 ^a	—	—	—	0.802	0.731	107
	(8.34)	(0.36)	(-0.07)	(7.25)	(3.31)	(7.70)						
	2.34 ^a	-0.03	-0.05	2.80 ^a	0.94 ^a	—	5.07 ^a	—	—	0.863	0.604	107
	(5.68)	(-0.27)	(-0.21)	(7.09)	(3.36)		(11.77)					
	3.78 ^a	-0.12	-0.08	3.47 ^a	0.94 ^a	—	—	2.74 ^a	—	0.807	0.721	108
(9.61)	(-0.56)	(-0.35)	(7.60)	(2.83)			(7.94)					
	3.06 ^a	-0.57 ^a	-0.07	2.67 ^a	0.87 ^a	—	—	—	4.93 ^a	0.856	0.613	103
	(8.26)	(-3.45)	(-0.34)	(7.80)	(3.21)				(10.13)			
Life Expectancy	3.76 ^a	-0.02	-0.07 ^a	0.36 ^a	0.22 ^a	0.13 ^a	—	—	—	0.644	0.113	115
	(60.52)	(-0.72)	(-2.16)	(6.68)	(3.40)	(2.43)						
	3.64 ^a	-0.01	-0.08 ^a	0.31 ^a	0.22 ^a	—	0.34 ^a	—	—	0.701	0.104	115
	(62.59)	(-0.36)	(-2.94)	(6.50)	(3.63)		(6.14)					
	3.76 ^a	-0.02	-0.07 ^a	0.37 ^a	0.22 ^a	—	—	0.13 ^a	—	0.649	0.113	116
(62.56)	(-0.74)	(-2.25)	(7.11)	(3.30)			(2.60)					
	3.75 ^a	-0.06 ^a	-0.11 ^a	0.25 ^a	0.17 ^a	—	—	—	0.35 ^a	0.721	0.10	105
	(61.80)	(-2.23)	(-3.75)	(5.54)	(3.21)				(4.94)			
Education	22.19 ^a	-1.88	-0.50	37.89 ^a	10.25 ^a	27.74 ^a	—	—	—	0.610	12.11	113
	(3.27)	(-0.54)	(-0.14)	(6.41)	(1.79)	(4.39)						
	14.82 ^a	-3.04	-0.42	35.78 ^a	9.62 ^a	—	37.40 ^a	—	—	0.623	12.01	112
	(2.00)	(-0.89)	(-0.43)	(5.98)	(1.69)		(4.87)					
	26.89 ^a	-3.96	-0.09	41.56 ^a	10.04	—	—	17.13 ^a	—	0.575	12.74	113
(3.88)	(-1.11)	(-0.02)	(6.82)	(1.66)			(2.87)					
	26.10 ^a	-7.66 ^a	-0.60	31.20 ^a	7.10	—	—	—	34.38 ^a	0.602	11.59	104
	(3.89)	(-2.55)	(-0.17)	(5.02)	(1.31)				(3.87)			
Literacy	19.11 ^a	8.94 ^a	-2.52	42.31 ^a	19.02 ^a	33.11 ^a	—	—	—	0.378	17.11	92
	(1.98)	(1.95)	(-0.43)	(5.11)	(2.10)	(2.72)						
	0.77	10.26 ^a	-3.40	39.92 ^a	17.58 ^a	—	59.14 ^a	—	—	0.482	15.92	92
	(0.08)	(2.41)	(-0.63)	(5.15)	(2.19)		(5.20)					
	17.87 ^a	9.07 ^a	-2.35	44.38 ^a	17.47 ^a	—	—	34.16 ^a	—	0.404	16.98	93
(1.93)	(1.98)	(-0.41)	(5.37)	(2.03)			(2.03)					
	22.33 ^a	2.00	-3.48	46.85 ^a	13.79	—	—	—	33.37 ^a	0.460	16.13	86
	(1.75)	(0.43)	(-0.47)	(5.58)	(1.31)				(1.94)			

a. Significant at the 5 percent level or lower (one-tailed test). GDP and life expectancy are in logs and use OLS. Education and literary are in levels and use Tobit estimates. The numbers in parentheses are t-statistics for OLS estimates and z-statistics for Tobit estimates.

The economic significance is also evident. For example, a one standard deviation increase in the property rights measure would lower the proportion of people not surviving to the age of 40 by about 7 percent. Enhancing the protection of private property has clear practical significance. Similarly, the effects of the corresponding changes in economic freedom would lead to an approximate reduction of 6 percent in the proportion of people not surviving to age 40. Comparable effects on the other

poverty measures are also evident. However, given the high correlation between economic freedom and property rights documented in Table 1, the separate estimates are likely to be biased and hence overstate the effects of reforming only one of the institutional variables.

Table 4 contains the results for estimates of the components of the human development index on geographic and institutional variables.⁸ The tropics variable does not provide a consistent picture. The coefficients are negative for GDP, but they are only statistically significant for the estimate with economic freedom as the institutional variable and the estimates for the literacy variable are positive and significant—a result contrary to the Sachs and Warner hypothesis. Similarly, the state of being landlocked is generally irrelevant, although life expectancy is reduced when a nation is landlocked—a result consistent with Sowell's conjecture and Sachs and Warner's findings. Urbanization is positive and statistically quite robust. Ethnic homogeneity generally increases the components of the Human Development Index. In all estimates, the coefficient is positive and it is statistically significant at the 5 percent level in thirteen of the sixteen estimates. The relationships for GDP and life expectancy are notable. In short, a number of the control variables clearly affect human well-being.

The role of institutions is also important in enhancing human development. The institutional variables are statistically significant in all estimates and quite robust in all cases. The per capita GDP and life expectancy estimates are impressive. The former compare favorably (by adjusted R^2) with the augmented Solow growth model Mankiw et al. [1992]. Property rights and economic freedom tend to dominate the other measures. In essence, favorable economic institutions improve the U.N.'s measures of human well-being and are consistent with recent research that omits geographic variables. A one standard deviation increase in economic freedom would increase life expectancy by about six years. Per capita GDP would increase by nearly \$8,000.

The results documented in Tables 2-4 generally show that the property rights and economic freedom variables have more explanatory power than the other variables, (except for the rule of law and access to health service). Two important considerations merit attention. First, do property rights and economic freedom have significant separate effects—something akin to Scully's [1997] rule and policy space effects, or are they just stronger versions of the same general phenomenon of a better institutional milieu? Second, given the correlation of the two variables documented in Table 1, separate estimates could lead to biased coefficients for the effects property rights and economic freedom, although combined estimates raise the possible problems of multicollinearity. Accordingly, estimates with both property rights and economic freedom included are warranted. The estimates are shown in Table 5.

The results in Table 5 indicate that in more than half of the cases both property rights and economic freedom contribute to human well-being in the sense that the adjusted R^2 increases in the combined estimate compared to the separate estimates reported in Tables 3 and 4. However, in the case of no access to safe water, adult illiteracy, and undernourished children, the estimate with property rights alone has a higher adjusted R^2 and in the case of life expectancy, the estimate with economic freedom alone has a higher R^2 . More importantly, the magnitude of the coefficients

TABLE 5
Economic Freedom and Property Rights as
Determinants of Poverty and Development

Dependent Con Variable		Regression Coefficient/ (<i>t</i> -statistic)						Adj. <i>R</i> ²	S.E.R.	N
		Trop	Land	Urban	Ethnic Group	Property Rights	Econ Freedom			
Death by Age 40	1.38 ^a (2.85)	-0.01 (-0.01)	0.23 ^a (1.70)	-2.03 ^a (-4.77)	-0.90 ^a (-3.48)	-1.64 ^a (-2.69)	-1.44 ^a (-2.60)	0.710	0.442	55
No Health Service	1.85 (1.43)	1.02 ^a (2.12)	-0.10 (-0.13)	-1.76 (-1.62)	-0.08 (-0.15)	-5.28 ^a (-3.10)	-0.23 (-0.23)	0.376	1.105	46
No Safe Water	2.71 ^a (2.77)	0.18 (0.32)	0.28 (0.58)	-2.59 ^a (-2.57)	-1.03 (-1.35)	-2.67 ^a (-1.73)	-1.20 (-0.81)	0.352	1.05	54
Adult Illiteracy	2.89 ^a (2.73)	-0.73 ^a (-2.11)	0.00 (0.01)	-2.53 ^a (-3.19)	-0.62 (-1.13)	-2.60 [*] (-1.79)	-0.95 (-0.73)	0.344	0.942	54
Under- weight Children	0.56 (0.65)	0.38 (1.35)	-0.42 ^a (-2.06)	-2.82 ^a (-5.10)	-0.58 (-1.37)	-0.27 (-0.31)	-1.16 (-1.44)	0.535	0.637	55
GDP	2.30 ^a (6.48)	-0.27 (-1.61)	0.07 (0.40)	2.23 ^a (6.33)	0.74 ^a (3.30)	3.45 ^a (5.66)	2.64 ^a (4.26)	0.903	0.500	94
Life Expect- ancy	3.70 ^a (57.80)	-0.04 (-1.24)	-0.08 ^a (-2.90)	0.25 ^a (5.21)	0.19 ^a (3.25)	0.12 (1.29)	0.25 ^a (2.62)	0.710	0.096	96
Education	16.83 ^a (1.84)	-2.99 (-0.74)	2.27 (0.54)	26.28 ^a (4.31)	6.00 (0.83)	38.74 ^a (2.71)	8.67 (0.70)	0.643	10.68	95
Literacy	5.31 (0.39)	8.39 (1.59)	3.52 (0.52)	40.53 ^a (5.71)	0.12 (1.29)	57.43 ^a (3.31)	1.62 (0.08)	0.488	14.8	78

a. Significant at the 5 percent level or lower (one-tailed test). Estimates are OLS except for education and literacy which are Tobit estimates. The poverty dependent variables are in log-odds form. The dependent variable for safe water and health service are the observed value + 1. GDP and life expectancy are in natural logs. The numbers in parentheses are *t*-statistics for OLS estimates and *z*-statistics for Tobit estimates.

for the institutional variables is often altered, indicating biased estimates in the separate regression estimates and raising interpretative questions regarding the economic or practical significance of institutions on the measures of human well-being.

McCloskey [1996] stresses the role of economic significance as opposed to statistical significance. In that vein, one approach to interpreting the effects of both property rights and economic freedom on human-well being is to use the reported coefficients and examine the effects of a modest institutional reform—a one standard deviation increase in the property rights and the economic freedom measures.⁹ Table 6 shows the effects of such a change using both the separate estimates (Tables 3 and 4) and the combined estimates (Table 5).

The data in Table 6 show substantial effects for hypothetical institutional reforms—both separately and together—for the property rights and economic freedom

TABLE 6
Effects of Institutional Reform on Poverty and Development Measures

Measure of Well-Being	Mean	Reformed Values		
		Property Rights	Economic Freedom	Both
Poverty Measures				
Death by Age 40	21.0	14.1	14.9	12.3
No Health Service	28.2	13.9	19.3	7.2
No Safe Water	34.7	23.4	24.0	19.1
Adult Illiteracy	33.5	19.9	22.7	19.4
Underweight Children	23.2	18.6	19.8	19.2
Development Measures				
GDP Per Capita	5,756	13,872	13,699	15,541
Life Expectancy	64.5	70.9	70.8	71.3
Education	63.1	70.2	69.6	71.8
Literacy	71.4	82.6	76.4	82.6

Reformed values are hypothetical values obtained from increasing property rights or economic freedom by one standard deviation, using the coefficients reported in Tables 3, 4, and 5.

measures. Except for undernourished children and literacy, where the simple estimate with property rights variable shows the largest effect, the combined effects dominate the separate estimates. The fact that the combined effects are (absolutely) smaller than the sum of the separate effects indicates that the separate estimates are somewhat biased. In any case, hypothetical institutional reforms would reduce all poverty measures and increase all development levels.

The effects of institutional reform are noteworthy. The effects of improving both property rights and economic freedom would lower the proportion of the population not surviving to age 40 from 21 percent to nearly 12 percent. The decrease in the number of people without access to health care would drop from 28 percent to 7 percent. GDP would increase more than two and a half times. Life expectancy would increase about 7 years. In short, institutional reform would enhance the quality of life for substantial segments of the world's population.

SUMMARY AND CONCLUSIONS

Previous research indicates that economic institutions are important determinants of human well-being. Some scholars argue that geography is also a strong determinant of human well-being. The results above show that geography plays a marginal role except for urbanization. However, the evidence in the data above strongly affirms the favorable effects that economic institutions have on human well-being. Various nonpecuniary measures of well-being are strongly linked with property rights and economic freedom.

NOTES

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1. Riggs [1964] identifies bureaucratic characteristics, especially the degree of functional specialization as essential for economic development.
2. A number of papers address the theoretical link between institutions and well-being. See Scully [1988], Porter and Scully [1995] and Scully [1997]. These approaches have a strong link to neoclassical theory of production or optimizing behavior in general. Development economists often reject these approaches [Todaro, 1997]. Accordingly, the simple Locke/Epstein state of nature approach is used.
3. The data are collected and disseminated by the IRIS center at the University of Maryland [Knack and Keefer, 1995].
4. The early *International Country Risk Guide* observations are for West Germany.
5. The original *International Country Risk Guide* category was entitled "law and order tradition." See Knack and Keefer [1995].
6. White's [1980] heteroskedasticity-consistent covariance estimators are used.
7. A variable for latitude was included in preliminary estimates and proved irrelevant. Some justification can be found in Hall and Jones [1999] and Theil and Galvez [1995]. A dummy variable for OPEC membership also proved irrelevant and is not reported.
8. The literacy and education variables use Tobit estimates. The GDP and life expectancy estimates use ordinary least squares and the dependent variables are in natural logs.
9. Examining the effects of a change in an independent variable on the dependent variable is always less reliable for values further from the sample mean [Gujarati, 1995]. With Tobit estimates the interpretation is yet more difficult because values outside the truncated data must be adjusted for the probability of unobserved values beyond the truncated value, and the predicted effect is the estimated coefficient times the change in the independent variable plus an adjustment for the probability of lying above some threshold. However, for observations within the limits of the untruncated population, the latter adjustment is unnecessary [McDonald and Moffitt, 1980].

APPENDIX

TABLE A1
Variable Description and Sources

Variable	Description	Source
Adult Illiteracy	Proportion of adults not able to read.	U.N. Human Development Report [1997].
Death by Age 40	Proportion of Population dying before age 40.	U.N. Human Development Report [1997].
Economic Freedom	Composite ranking on 21 measures of economic freedom.	Gwartney and Lawson [2001].
Education	Combined first, second and third level gross enrollment ratio.	U.N. Human Development Report [1997].
Ethnolinguistic Group	Proportion of the largest ethnolinguistic group.	Barrett [1982].
GDP Per Capita	Gross domestic product per capita average of 1990 and 1995 in U.S. \$1995 at market prices.	World Bank, <i>World Development Indicators</i> [2001].

TABLE A1 (Cont.)
Variable Description and Sources

Variable	Description	Source
Government	Normalized ranking of quality of government.	International Country Risk Guide, various years.
Human Development	Index of human development.	U.N. Human Development Report [1997].
Human Poverty	Index of human deprivation.	U.N. Human Development Report [1997].
Landlocked	Equal to one if country is landlocked; equal to zero if not.	Munro [1996].
Life Expectancy	Life expectancy at birth, average of 1990 and 1995.	World Bank, World Development Indicators [2001].
Literacy	Proportion of adults able to read, average of 1990 and 1995.	World Bank, World Development Indicators [2001].
No Health Service	Proportion of population with no access to health service.	U.N. Human Development Report [1997].
Property Rights	Normalized index of government honoring contracts and property.	International Country Risk Guide, various years.
Rule of Law	Making and implementing laws and adjudicating disputes.	International Country Risk Guide, various years.
No Safe Water	Proportion of population without access to safe water.	U.N. Human Development Report [1997].
Tropics	Proportion of land and water that is tropical in 1990.	Global Data Manager, various years.
Underweight Children	Proportion of children under five who are underweight.	U.N. Human Development Report [1997].
Urbanization	Proportion of population living in urban areas in 1990.	World Bank, World Development Indicators [2001].

TABLE A2
Descriptive Statistics

	Mean	Std.Dev.	Minimum	Maximum	Range/Std.Dev.	N
Adult Illiteracy	33.5	21.3	4.3	86.4	3.9	73
Death by Age 40	21.0	12.2	3.20	52.1	4.0	77
Economic Freedom	0.61	0.16	0.20	1.00	5.0	110
Education	63.1	18.4	15.0	100.0	4.6	172
Ethnolinguistic Group	0.68	0.24	0.13	1.00	3.6	150
GDP Per Capita	5,756	9,128	101	44,795	4.9	161
Government	0.55	0.23	0.13	1.00	3.8	127
Human Development	66.4	22.4	17.6	96.0	3.5	174
Human Poverty	31.2	15.4	4.1	66.0	4.0	78
Landlocked	0.19	0.40	0.00	1.00	2.5	180
Life Expectancy	64.5	10.9	35.5	79.5	4.0	174
Literacy	71.4	23.2	12.8	100.0	3.8	130
No Health Service	28.2	21.2	0.0	74.0	3.5	68

TABLE A2 (Cont.)
Descriptive Statistics

	Mean	Std.Dev.	Minimum	Maximum	Range/Std.Dev.	N
Property Rights	0.65	0.19	0.18	1.00	4.3	127
Rule of Law	0.56	0.25	0.14	1.00	3.4	128
No Safe Water	34.7	21.3	0.0	75.0	3.5	75
Tropics	0.49	0.47	0.00	1.00	2.1	154
Underweight Children	23.2	13.3	1.0	23.0	1.7	77
Urbanization	0.50	0.24	0.06	1.00	3.9	172

TABLE A3
Correlation Matrix: Non-Institutional Variables

Variable	Tropics	Urbanization	Ethnic Group
Tropics	1.00		
Urbanization	-0.54	1.00	
Ethnic Group	-0.57	0.36	1.00

Source-see Table A1. N=115.

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