Population Growth, Economic Freedom, and the Rule of Law

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TO THE READER

This paper, "Population Growth, Economic Freedom, and the Rule of Law," is the third *PERC Policy Series* essay honoring the late Julian Simon, a path-breaking economist who revised traditional thinking on issues from population growth to natural resources. Its author, Seth W. Norton, Aldeen Professor of Business at Wheaton College, was a Julian Simon Fellow with PERC in 2001. Julian Simon Fellowships, supported by the D & D Foundation, enable accomplished scholars to conduct research in the spirit of Julian Simon's contributions.

In this essay, Norton shows that characteristics such as a nation's economic freedom and its legal framework are more important in determining the quality of human life and the environment than is population growth. His essay should help the reader consider whether the harms caused by population growth are as serious as many people think and whether institutional changes would do more for humanity and the environment than would population control.

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"Lacking the economic habit
of thought, laypeople tend to be susceptible to
Malthusian thinking that takes into account only
the obvious negative effects of additional persons,
and that presents these ideas in the seductively
fascinating context of exponential growth
and the 'law of diminishing returns.'"
—Julian Simon
Population Matters

Population Growth, Economic Freedom, and the Rule of Law

Seth W. Norton

Introduction

More than two hundred years ago, the Reverend Thomas Malthus argued that people's tendency to have children would inevitably strain food supplies and limit the standard of living attainable by the mass of humanity. His pessimistic argument has proved remarkably durable, its influence ebbing and flowing through the ensuing centuries. In contemporary form, it has been expressed as the "Malthusian population trap" (Todaro 1996, 202–206).

Malthus' idea was that the growth of human population keeps most people in society at a subsistence level of income. As income starts to go up, people produce more children, so the average (or per capita) income declines or stays at a low level. In the original Malthusian view, there were positive checks on population growth—starvation, disease, and wars. Population growth was limited by early mortality.

In today's neo-Malthusian perspective, preventive checks on population growth—persuasive and even coercive measures to reduce fertility rates—are required if people are to escape from mere subsistence living. In their book *Beyond Malthus,* Lester R. Brown, Gary Gardner, and Brian Halweil (1998, 71) illustrate this view: "What is needed, to use a basketball term, is a full-court press—an all-out effort to lower fertility, particularly in the high-fertility countries, while there is still time." They go on to recommend steps such as "filling the family planning gap, educating young women, and adopting a worldwide campaign to stop at two surviving children."

Not everyone shares a dread of population growth. In numerous books and articles, the late Julian Simon (1981, 1990, 1995) documented benefits associated with population growth and also showed that many apocalyptic nightmares are without foundation. Esther Boserup (1998) also took a favorable view of population growth when she said that in comparatively underdeveloped economies it induces technological change and stimulates innovation.

In spite of these important contributions, most of the popular literature on the subject still echoes Malthusian concerns. Lindsey Grant (1996, 3) provides a summary of popular sentiment:

> Population growth is leading us to a world that we do not want. It is the most fundamental of the engines of change, and the most ignored. The poor nations face sheer hunger and the destruction of their resources. The "emerging nations," most of them in Asia, are in varying degrees escaping those horrors to face the problems of industrialization. The old "rich" countries

confront joblessness, failing social structures, growing disparities between the rich and poor, ethnic conflict, the loss of a shared vision, environmental degradation and the huge reality that they are changing the climate we all live in. Bringing population growth under control will not necessarily solve those problems, but it is the condition precedent—a necessary condition for their solution.

In this essay, for the purpose of analysis, I will accept the assumption that there is a population problem—that population growth has adverse effects that may be quite severe. This assumption continues to be the received knowledge among leading policy makers and cultural elites. This "neo-Malthusian view" will serve as a point of departure for analysis to determine its validity and its policy relevance.

My analysis will introduce the role of economic institutions, which so far have been largely ignored in discussions of population growth. By economic institutions, I mean the formal and informal customs, laws, and traditions that guide behavior. A burgeoning body of research shows that several key institutions—economic freedom, which includes the protection of property rights, and the rule of law—are closely and favorably linked to human well-being and environmental quality. It is reasonable to expect that such institutions can ameliorate population problems.

The paper will address whether economic institutions affect population growth and, more importantly, whether they affect the conditions, including poverty and environmental degradation, that population growth is supposed to cause. First, I will consider whether empirical evidence confirms that population growth is a serious problem. Second, I will consider whether growth-enhancing institutions (economic freedom and the rule of law) affect fertility. Third, I will consider the extent to which growth-enhancing institutions address the problems that are often blamed on population growth.

THE ADVERSE EFFECTS OF POPULATION GROWTH

Some observers attribute nearly all of the world's maladies to excessive population growth. They claim that rapid population growth has at least three adverse effects on human well-being. First, it increases poverty—the number of people that are impoverished, the proportion of the community that is impoverished, and the severity of the impoverishment. Second, it increases environmental degradation—the misuse of natural resources—with adverse consequences on many dimensions of human well-being. Finally, it prevents environmental enhancement by holding back the savings and investment that would permit environmentally sustainable economic growth and retards the agricultural productivity that would encourage environmentally friendly agriculture and conservation (Ahlburg 1994; Kelley and McGreevey 1994).

These contentions, however, are not necessarily accurate. The adverse effects of population growth can easily be confused with other factors, because rapid population growth often occurs along with other forces that reduce human well-being (Kelley 1988; Panayotou 1994). For example, rapid population growth is common in many tropical areas of the world. Yet tropical environments themselves retard human productive activity due to heat, endemic disease, and poor soils (Sachs and Warner 1997). It would be easy to conclude that fast population growth lowers productivity, when actually the tropical environment may be the cause.

In such cases, where multiple factors determine various outcomes and it is difficult to distinguish cause and effect, multiple regression analysis is a useful tool. It allows us to examine the effects of population growth simultaneously with the effects of favorable economic institutions and other possible explanatory factors. Essentially, we are holding the other factors constant so that we can measure the sensitivity or elasticity of one factor or variable (such as access to safe water) to the change in another factor or variable

(such as population growth).[1] We can find out to what extent conditions like poverty, early death, and access to safe water respond to changes in population growth.

My first multiple regression analysis examines the impact of population growth, both short-term and long-term, on a number of conditions. The goal is to learn how rapid population growth affects human well-being and environmental protection. The countries in the sample are the countries for which the United Nations reports the Human Poverty Index.[2] Short-run population growth is measured by the percentage increase in population between 1985 and 1990 in the sampled countries. Long-run population growth is the percentage increase in population from 1970 to 1990.

Other important determinants of well-being, such as the proportion of a country that is tropical and the proportion that is urban, as well as economic freedom and the rule of law, are included in the multiple regression estimates. Thus, the sensitivity of poverty and environmental factors to population growth is examined with other factors held constant. Measures of the sensitivity of human well-being—the elasticities of these measures—in response to population growth can be calculated.[3]

Before analyzing the results of the regression (shown in Table 1), I will discuss current thinking about the links between population growth and key measures of human and environmental well-being. This will explain why these measures were chosen for analysis.

POVERTY

A core idea of the Malthusian legacy is that population growth depresses wages because it increases the supply of workers and thus directly lowers the wages of workers—their "price." Depressed wages are likely to be particularly onerous for the poor. Labor earnings constitute the main source of income for the poor, who are less likely to own other income-generating assets such as land (Kelley and McGreevey 1994).

In addition, the argument is made that population growth strains investment. As an economy strives to absorb workers, the supply of savings to be invested in capital declines, even though such investment is what spurs economic growth over the long run. This view is developed in models of economic growth such as the acclaimed Solow (1956) growth model. Of course, proponents of this view recognize that technological advances can accommodate population growth, but neo-Malthusians argue that the accommodation is more the exception than the rule.

It also merits noting that neo-Malthusians view poverty as more than income deprivation. Rapid population growth strains the fixed capacities for basic human services—education, health, and nutrition. Fixed levels of basic infrastructure essential for survival and longevity are spread over greater numbers of people and hence the per capita delivery of services is reduced. In short, nonpecuniary measures of poverty also increase (Ahlburg 1994).

D<small>EFORESTATION</small>

Some observers claim that resources are harvested at excessive rates due to population pressure. Their contention is that timber is harvested too soon in order to supply products such as wood for housing construction. This depletes forests and causes additional environmental problems. More generally, the impoverishing effects of population growth make the populace excessively dependent on natural resource-based activities such as timber production.

Deforestation can cause soil erosion, watershed instability, and loss of carbon sequestration. It can also reduce agricultural productivity. Moreover, the poor, it is said, bear a disproportionate part of the costs of deforestation. Deforestation can cause fuel supplies to dwindle, and the costs of gathering wood from larger areas are thought to be borne disproportionately by women (Todaro 1996).

Water Pollution

Population growth is blamed for overuse of resources and reduction of conservation measures. Soil erosion, threats to marine ecology, and water pollution are commonly viewed as negative consequences of rapid population growth. Water pollution is often considered the most serious pollution. Todaro (1996) claims that water pollution and water scarcity lead to about 2 million deaths per year.

Net Savings

One of the alleged harms of population growth is reduced savings. Population growth, it is said, diverts resources to child raising and consumption, reducing the proportion of the populace that is engaged in production and reducing the fraction of output that is saved and invested. Modern theories of consumption over the life cycle hold that population growth increases "dependency ratios" and in turn reduces savings (Kelley 1988). That is, with fast-growing population, a larger proportion of people are under the age of 15. This group has a lower savings rate than adults between the ages of 15 and 64 (Todaro 1996).

Agricultural Productivity

Agricultural productivity permits greater specialization in an economy and generates greater food supplies. Rapid population growth may keep productivity low, depressing wages and keeping people on marginal farms. Indeed, stagnation of agriculture and the failure to adopt innovative technology represent the basic Malthusian apocalypse. There is ample evidence of low agricultural productivity in relatively poor countries, with corresponding adverse effects on poverty rates and the environment (Todaro 1996).

TABLE 1: THE EFFECTS OF POPULATION GROWTH

MEASURE *Definition*	SHORT-TERM POPULATION GROWTH	LONG-TERM POPULATION GROWTH
HUMAN POVERTY INDEX *A United Nations' measure of human deprivation*	0.445	0.186
DEATH BY 40 *Percentage of people not expected to survive to age 40*	0.520	0.415
ADULT ILLITERACY *Percentage of adults classified as illiterate*	0.764	0.596
SAFE WATER *Percentage of the population without access to safe water*	0.000	0.000
HEALTH SERVICE *Percentage of the population without access to health service*	0.783	0.000
UNDERNOURISHED CHILDREN *Percentage of underweight children under age five*	0.000	0.000
DEFORESTATION RATE *Average annual percentage of natural forest permanently converted to other uses*	0.000	0.000
WATER POLLUTION *Organic water pollution emissions in kg. per day per worker*	0.000	0.000
NET SAVINGS RATE *Gross domestic savings rate minus consumption of fixed capital*	0.000	0.000
AGRICULTURAL PRODUCTIVITY *Value added in 1995 US$ divided by number of agricultural workers*	0.000	0.000

NOTE: The numbers are elasticity coefficients showing the change in a measure (such as Human Poverty Index) in response to a given change in population. Coefficients lower than 1 are weak. (See endnote 1 and discussion in text.) Short-term population growth is from 1985 to 1990; long-term population growth is from 1970 to 1990.
SOURCES: United Nations Development Program (1997); World Bank (2001).

EVIDENCE ON POPULATION GROWTH

To determine how much effect rapid population growth has in these areas, ten specific characteristics of human well-being and environmental quality are measured, as indicated in Table 1.

In each case, using multiple regression analysis, these conditions are examined along with population growth and other factors to identify the relationship of population growth to each one. Table 1 indicates the results of this analysis. There are, as Malthusians argue, some modest effects from population growth on the measure of poverty. As population growth increases, four of the six measures of poverty increase. However, population growth has no discernible impact on the proportion of young children who are undernourished or on people's access to health services. The elasticities of those it does affect are all less than one. That means that the effects are not very strong. In addition, the results are smaller in the long run than in the short run, indicating that, over time, the costs of population growth decrease. (As mentioned earlier, the analysis ignores the well-documented benefits of population growth.)

When it comes to nonpoverty effects, the results are truly remarkable. They are zero. For both short-run and long-run population growth, there is no impact on environmental degradation or environmental enhancement. In short, compared with other forces, the purely adverse effects of population are very small. In comparison with these data, common conceptions of the "population problem" are clearly exaggerated.

THE ROLE OF ECONOMIC INSTITUTIONS

Thus, statistical analysis does not support the existence of strong negative effects from population growth. However, there are *some* detrimental effects from population growth. Do these

justify "solving the population problem" with family planning and direct inducements to reduce fertility?

Not necessarily. It may be that institutional failure—the absence of market-enhancing institutions—contributes more to poverty and other ills than does population growth (Kelley and McGreevey 1994). Well-functioning markets, operating in an infrastructure that fosters production and trade, can reduce poverty, diminish environmental degradation, and stimulate environment-enhancing activities. Market-enhancing institutions may offset many negative side effects of population growth, which, we have seen, are relatively modest.[4]

In addition, such growth-enhancing institutions may themselves reduce fertility. To a large extent, fertility—the number of children born per woman—is something that people choose, much as they make other choices in life. There are ample grounds to believe that people will adjust their fertility—increase or reduce the number of children born—in light of the opportunities they face. The institutional environment affects these opportunities. The link between the institutional environment and fertility is the next subject of my analysis.

INSTITUTIONS AND FERTILITY

Economists Gary Becker and Robert Barro (1988) have developed a model of human fertility indicating that people choose the number of children in response to changing mortality rates, while also taking into account the forgone opportunities associated with raising children. If people anticipate that many of their children will die before reaching adulthood, they will have more children. If they are confident that their children, or most of them, will reach adulthood, they will have fewer children. In both cases, however, they will also consider the costs of lost income and lost free time that occur when raising children. Becker and Barro argue that as females' education and work experience increase, opening

up more productive opportunities for women, the costs of raising children increase.

As economies grow, the costs of having children are high because children must have greater education and higher skill levels to become productive as adults. Economic growth depends in large part on increased skills and productivity and specialization. Thus, economic growth can be expected to reduce fertility, both because of the higher opportunity costs of the parents and because of the longer and more expensive education required for the children.

It is true that higher incomes also permit people to raise more children, so economic growth could have the opposite effect as well. However, extensive empirical evidence suggests that as economic growth occurs, fertility rates rise only for the poorest segments of the population. For income levels above the poorest, economic growth leads to lower fertility rates (Barro and Sala-I-Martin 1995).

Given the link between economic growth and fertility, institutions that encourage economic growth should also reduce fertility. We will examine two measures of the institutional environment.

Measuring Institutions

One is a measure of the rule of law. Countries with a strong legal framework are typically distinguished from countries under the "rule of men," where decisions are made based on political and social power, clout, and status. Countries with a well-established tradition of the rule of law have greater "ability to carry out business transactions" (Barro and Sala-I-Martin 1995, 439) and correspondingly greater incentives for investment (Hirshleifer 1987, 53). Stephen Knack and Philip Keefer (1995) say that the rule of law measure "reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes."

A company called the PRS Group ranks countries as part of its *International Country Risk Guide* (PRS Group 2002). Customers use

the guide to make decisions about investment and production in foreign countries.[5] In the rule of law rankings, higher scores indicate sound political institutions, a strong court system, and provisions for orderly succession of power. Lower scores indicate a tradition of depending on physical force or illegal means to settle claims. Using this database, research by Knack and Keefer (1995) and Robert Barro and Xavier Sala-I-Martin (1995) shows that the rule of law enhances economic growth and human well-being.

Economic freedom, too, enhances growth. The Index of Economic Freedom is a comprehensive measure of citizens' rights to own and trade property unfettered by intrusive public policies. The Fraser Institute compiles this index with the assistance of numerous organizations throughout the world.[6] Essentially, the project measures economic freedom as distinguished from political freedom. It emphasizes the ability of people to use and exchange property relatively free of governmental interference from perverse monetary, fiscal and trade policies (Gwartney, Lawson, and Block 1996).[7]

The most recent compilation by Gwartney and Lawson (2001) ranks countries based on seven broad categories of economic freedom. These are the size of government, the economic structure and the role of markets, monetary policy and price stability, freedom to use alternative currencies, the legal structure and security of private ownership, freedom to trade with foreigners, and freedom of exchange in capital markets. These measures, which are composed of 21 narrower yardsticks, are used to create a summary measure of economic freedom for each country.

A simple relationship between economic freedom and rule of law measures and fertility is shown in Table 2, using a large sample of countries where both the fertility rate and the two institutional measures are available (109 countries for the economic freedom measure; 129 countries for the rule of law measure). The countries are divided into three categories for both economic freedom and the rule of law.[8]

The fertility rate is highest for those countries that have little eco-

TABLE 2: ECONOMIC INSTITUTIONS AND FERTILITY RATES

INSTITUTIONAL MEASURE	FERTILITY RATE
ECONOMIC FREEDOM	
Low	4.27
Medium	3.27
High	1.82
RULE OF LAW	
Low	4.16
Medium	3.53
High	1.55

NOTE: Countries are divided into high, medium, and low categories for both economic freedom and rule of law. See discussion in text for selection of countries.
SOURCES: Gwartney and Lawson (2001); PRS Group (2002).

nomic freedom and little respect for the rule of law. The relationship is a powerful one. Fertility rates are more than twice as high in countries with low levels of economic freedom and rule of law compared to countries with high levels of those measures. Formal analysis of the data indicates that these differences are statistically significant.

The link between these institutions and fertility partly reflects the impact of economic growth. By encouraging economic growth, these institutions indirectly affect fertility. However, there is also evidence that these growth-enhancing institutions affect fertility for other reasons.

PROPERTY RIGHTS AND FERTILITY

Many poor countries have poorly specified or poorly enforced property rights. When resources such as fuel wood are not owned and formal laws of possession do not govern their harvest and use, individuals who consume them do not bear the full cost of their consumption. They have an incentive to appropriate resources at the fastest rate possible, often leading to excessive harvest. The condition is generally labeled the "tragedy of the commons."

What better way, in the short run, to capture open-access resources than to have as many gatherers as possible? Higher fertility is a way to do this. Theodore Panayotou (1994, 151) observes that "most contributions by children consist of capturing and appropriating open-access natural resources such as water, fodder, pastures, fish, fuel wood, and other forest products, and clearing open-access land for cultivation." This, he continues, makes "the number of children the decisive instrument in the hands of the household: the household's share of open-access property depends on the number of hands it employs to convert open-access resources into private property." Yet this could "become devastating for the resource, the community, and eventually the individual household."

The absence of economic freedom encourages fertility in another way, too. Arthur De Vany and Nicolas Sanchez (1979) examined fertility patterns in Mexico based on the proportion of private farms and ejido farms—communally owned farms organized under the laws enacted following the Revolution of 1910. In addition to incentives to have children in order to appropriate resources, they found incentives to have children in order to transfer property. Because of restrictions on sales of land, many people have the right to use but not sell the land. They can obtain some benefits of selling the land by transferring it to their progeny, and more children increase the ability to make such transfers. On farms without clear ownership, the parents with more children will have a greater chance of at least some children taking over the farm and providing for the parents in their old age.

Finally, there may be a simple pro-natal bias to obtain "free" family farm labor. De Vany and Sanchez found that the higher the proportion of ejidatarios (workers on communal farms) relative to women or to total farm workers, the higher the fertility. (This correlation was statistically significant.) In short, fertility and economic institutions are directly related. Where property rights are poorly defined and enforced, the incentives to have children are greater than where property rights are well specified and enforced.

Additional confirmation of the link between poorly protected property rights and high fertility comes from two measures produced as part of the *International Country Risk Guide* (PRS Group 2002). Comprehensive and standardized measures of land ownership patterns across countries are not as available as the economic freedom and rule of law measures, but two indices can serve as proxies for ill-defined property rights in land.

One index ranks countries by the likelihood that contracts will be broken, and the other by the likelihood that their governments will expropriate property. Knack and Keefer (1995, 226) describe the first measure as the "risk of modification in a contract taking the form of repudiation, postponement, or scaling down due to budget cutbacks, indigenization pressure, a change in government, or a change in government economic or social priorities." The second is an assessment of "outright confiscation" or "forced nationalization" of property.

TABLE 3: PROPERTY RIGHTS AND FERTILITY RATES IN POOR NATIONS

INSTITUTIONAL MEASURE	FERTILITY RATE
HONORING CONTRACTS	
Weak	4.88
Strong	3.68
AVOIDING EXPROPRIATION	
Weak	4.62
Strong	3.22

NOTE: Countries designated as "weak" pose a high risk of failing to honor contracts or a high risk of expropriation of private property; those in the "strong" category tend to honor contracts and avoid expropriation.
SOURCE: PRS GROUP (2002).

Table 3 shows total fertility rates for relatively poor countries. The sample contains the 53 countries with per capita GDP (in 1995 US$) lower than the average ($1,579) selected from the group of countries in Table 2. The 53 countries are divided into those below the average and those above the average rates for honoring contracts and expro-

priation risk rankings. In the "weak" category are countries where contracts are less likely to be honored and where expropriation is a risk; "strong" countries generally honor contracts and tend not to threaten expropriation.

Fertility rates are notably lower in the countries that have a tradition of honoring contracts and where property is more secure from expropriation risk. These numbers are remarkable because they show that even among the poorer countries of the world, security of contracts and the protection of private property tend to lower fertility rates.

Thus it appears that well-specified property rights reduce fertility rates. They do so in part by enhancing economic growth. Whatever the transmission mechanism between economic growth and reduced fertility, William Easterly's (2001) contention that economic development is the best contraceptive is consistent with the data above. In addition, well-specified property rights and the rule of law lead to reduction of fertility rates in low-income countries by changing incentives. For example, when a system of laws assigns full ownership and the ability to transfer property, families don't need as many children to capture open-access resources.

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THE IMPACT OF INSTITUTIONS

In addition to reducing fertility, economic institutions and the rule of law may have a powerful effect on the ills often attributed to population growth. To explore whether the more fundamental sources of poverty are not fast population growth but the absence of market-enhancing institutions, I conducted a second multiple regression analysis. My goal was to determine the sensitivity of measures of human well-being and environmental quality to economic freedom and the rule of law. The sensitivities can be calculated while holding constant the effects of population growth. In essence, this analysis repeats the analysis of the impact of population growth on

measures of well-being but replaces population growth with two institutional measures, keeping other factors constant.

The results, reported in Table 4, show that these measures of well-being are much more sensitive to the institutional factors than to population growth. Specifically, expanding economic freedom has a much more favorable effect on the poverty measures than does slowing population growth. Additional economic freedom improves four of the six poverty measures more than slower population growth does. The two exceptions are adult illiteracy, where short-term population growth has a slightly greater effect, and undernourished children, where neither population growth nor economic institutions have a discernible effect. (Expanding the rule of law is generally weaker than economic freedom in reducing poverty.)

For the four nonpoverty measures, either economic freedom or the rule of law reduces pollution and improves net savings and agricultural productivity. Thus, while population growth has no discernible negative effect on the environmental measurements, better

TABLE 4: ECONOMIC AND LEGAL INSTITUTIONS AND WELL-BEING

MEASURE	ECONOMIC FREEDOM	RULE OF LAW
Human Poverty Index	−0.812	−0.449
Death by 40	−0.973	−0.386
Adult Illiteracy	−0.731	−0.386
Safe Water	−1.043	−0.450
Health Service	−1.030	−1.052
Undernourished Children	0.000	0.000
Deforestation Rate	0.000	−1.052
Water Pollution	0.000	−0.256
Net Savings Rate	3.160	1.802
Agricultural Productivity	1.640	0.000

NOTES: Measures are as defined in Table 1. The numbers are elasticity coefficients showing the change in a measure in response to a given increase in economic freedom or the rule of law. Negative coefficients show a decline in the measure and thus improvement in well-being. (For an explanation of elasticity, see note 1 and discussion in text.)
SOURCES: United Nations Development Program (1997); World Bank (2001).

economic institutions—more economic freedom or greater rule of law—lead to positive environmental effects. Better economic institutions reduce deforestation and water pollution and enhance net savings and agricultural productivity. Economic freedom tends to have a stronger effect overall, but the rule of law plays an important role in reducing deforestation and water pollution.

Thus, as we saw earlier, the negative effects of population growth seem reasonably benign when other variables are also examined. It is also evident that economic institutions can offset many of the negative effects of population growth. Except for adult illiteracy, human well-being measures are proportionally more sensitive to economic institutions than to population growth.

INSTITUTIONAL REFORM

This analysis makes a compelling case for institutional reform as the means to solve problems caused by population growth as well as problems that are often erroneously attributed to population growth. There are two reasons to advocate institutional reform.

First, the findings in Table 4 show that nations adopting growth-enhancing reforms such as better protection of property rights and acceptance of the rule of law will improve people's lives. These reforms directly decrease human poverty and environmental degradation and enhance the environment, improving conditions even in realms where population growth has little effect.

Second, economic freedom, the rule of law, and related market-enhancing institutions should also reduce fertility rates, as discussed earlier and shown in Tables 2 and 3. By reducing population growth, they should reduce any adverse consequences of population growth.

To illustrate the effects of these institutions, I have constructed a table (Table 5) showing hypothetical changes in the measurements of well-being if economic freedom and the rule of law were in-

TABLE 5: HYPOTHETICAL EFFECTS OF INSTITUTIONAL REFORMS

MEASURE	AVERAGE	DIRECT EFFECTS	INDIRECT EFFECTS	IMPROVED MEASURE
Human Poverty Index	31.01	–5.99	–5.17	19.95
Death by 40 (years)	20.84	–4.82	–4.06	11.96
Adult Illiteracy (%)	35.14	–6.11	–10.07	18.96
Safe Water (%)	34.29	–8.51	---	25.78
Health Service (%)	28.14	–10.26	–8.14	9.74
Undernourished Children (%)	22.92	---	---	22.92
Deforestation Rate (%)	0.902	–0.329	---	0.573
Water Pollution (kg/day)	0.212	–0.019	---	0.193
Net Savings Rate (%)	5.64	4.78	---	10.42
Agricultural Productivity ($)	1,564	610	---	2,174

NOTE: Measures are as defined in Table 1. Improved measure reflect changes stemming from institutional improvements, as discussed in text.
SOURCES: United Nations Development Program (1997); World Bank (2001).

creased. (The Economic Freedom Index is used for all measures except for access to health service, deforestation, and water pollution, where the rule of law is used because its elasticities are greater for these measures.)

The indirect effects—the impacts on fertility itself—are identified in the following way. Using the information in Table 2, I assume that the low levels of economic freedom and the rule of law increase to the medium levels, and the medium levels to high levels. Going from low to medium economic freedom (one standard deviation[9]) would lower the fertility rate from 4.27 to 3.27, or 1 child per woman of child bearing age. Going from medium to high economic freedom would lower the total fertility rate from 3.27 to 1.82, or by 1.45 children. Because I am interested in modest institutional reform in general (not just from low to medium or medium to high), I average the two values, bringing the average reduction in the fertility rate to 1.22, which I round off to 1.2. I then use the 1.2 figure to calculate the degree to which some of the measures—such as adult illiteracy—would fall with a 1.2 decline in the fertility rate. For a

similar improvement in the rule of law, the total fertility rate would on average decline by 1.3.

Thus, using the elasticities reported in Table 1 (the sensitivity of measures of well-being to population growth), it is possible to calculate the decrease in human poverty measures caused by lower fertility rates. (The reader will recall that lower fertility rates did not affect the environmental factors.) The decreases in poverty measures constitute the indirect effect of institutional reform.

Table 5 combines the direct and indirect effects. The first column, the average levels of the well-being measures, is based on the definitions in Table 1. For example, in the sample of countries, the average fraction of the population that fails to survive to age 40 is 20.8 percent. The last column shows the new average that would result from an improvement (by one standard deviation) in either the Economic Freedom of the World Index or the rule of law measure. The results reflect both the direct and indirect effects of reform.

To see this more clearly, consider the effects of modest institutional reform such as a one standard deviation increase in the economic freedom or rule of law measures. (A change of that magnitude would be an increase in economic freedom from the levels in Colombia or Togo to the levels of Paraguay or Guatemala, or an increase in the rule of law measure from the levels in El Salvador or Nigeria to the levels in Egypt or India.) If such a modest institutional reform occurred, the proportion of people not surviving to age 40 would decrease by about 4.8 percent. That is because economic freedom is associated with a reduction in death rates. This is the direct effect. The same modest institutional reform would also decrease fertility rates, reducing the proportion of people not surviving to age 40 by about 4 percent. This is the indirect effect.

On net, this level of institutional reform would reduce to about 12 percent the proportion of the population not surviving until 40, compared with nearly 21 percent today. Similarly, institutional reform would lower the proportion of illiterate adults from 35 percent of the population to just under 19 percent of the population.

Deforestation is another example. The average annual rate of deforestation among the sampled countries could be reduced by one-third—from .9 to .6 percent—through modest reform of the rule of law (a one standard deviation increase). This would occur through greater government stability and greater ability of private owners to protect their forests and to manage them with a long-term view.

Given the high elasticity for net savings due to economic freedom, the reform would increase the savings rate from about 5.64 percent to over 10 percent. The increase in economic freedom would raise agricultural productivity from an average of $1,564 (in 1995 US$) to $2,174. These are truly significant effects. In comparison, the effect of direct reductions in population growth through persuasion or coercion would be small indeed.

CONCLUSION

The data presented above suggest that there is no population apocalypse and that changes other than reducing population growth will do more for well-being and for the environment. Specifically, these data lead to four simple conclusions:

❙ Market-enhancing economic institutions lower fertility rates.
❙ Adverse effects of population growth are small.
❙ Economic institutions can offset the adverse effects of population growth.
❙ Reforming institutions is far more important than controlling population growth.

Institutional reform can at least partially offset any population problems—both directly by improving well-being and indirectly by lowering fertility rates. In short, there is considerable basis for optimism.

Yet, despite these findings, there is also considerable room for

pessimism. Institutional reform is not free, as Hernando de Soto (2000) illustrated in his book *The Mystery of Capital*. De Soto argues that the majority of the world's population still remains outside the institutional infrastructure that protects property rights. Numerous nation-states, for various reasons, resist the kind of reform that would ameliorate population problems specifically and human problems in general. Perhaps the evidence documented here will help spur policy makers to reform the institutional environment and thus establish and strengthen the most basic building blocks of human well-being—markets and growth-enhancing institutions.

NOTES

1. Economists define elasticity as the percentage change in one dependent variable divided by the percentage change in an independent or causal variable that affects it. The causality is assumed to be consistent with common sense as well as the data.

2. The multiple regression analysis is performed only for the countries for which the United Nations Human Poverty Index is available. These are generally poorer countries. For comparability reasons, the same sample is used for the nonpoverty group. The selection in all cases is consistent with the common conjecture that population problems exist primarily in the poorer countries of the world.

3. The full multiple regression estimates are provided in Norton (2001) and are available from the author. The Human Poverty Index is described in Norton (1998).

4. Partha Dasgupta (1995) pursues a similar argument, suggesting that institutions may offset negative side effects of population growth, but he focuses on political and civil liberties.

5. The data, now available from the PRS Group (2002), were originally obtained from the Center for Institutional Reform and the Informal Sector (IRIS), University of Maryland (www.umd.edu).

6. The research is reflected in Gwartney, Lawson, and Block (1996)

and by Easton and Walker (1997).

7. Gwartney and Lawson (2000) provide a detailed bibliography of empirical studies showing that human well-being is enhanced by higher measures of economic freedom.

8. The category borders for the high and low classification of economic freedom and rule of law are plus or minus one standard deviation above or below the mean (average). For normal populations, one standard deviation is about 34 percent above or below average.

9. One standard deviation is the conventional calculation for measuring statistical variation. For normal populations it corresponds to about 34 percent above or below average.

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