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Governance and growth: A simple hypothesis explaining cross-country differences in productivity growth *

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Abstract. Cross-country evidence shows that a subset of developing countries is growing very rapidly, taking advantage of opportunities to "catch up" at the same time that other developing countries are growing slowly. We argue that this is due to differences in the quality of governance. In particular we show that productivity growth is higher in better-governed countries.

1. Introduction

Much of the research on long-run economic growth is grounded either on the neoclassical theory of economic growth or on endogenous growth theory. The neoclassical model assumes that there are diminishing returns to investment in physical and human capital and it predicts what Robert Lucas called a "strong tendency to income equality and equality in growth rates ... which simply cannot be seen in the world at large".[1] By contrast, endogenous growth models feature constant or increasing returns to human or physical capital and thus are consistent with initially poor economies remaining, as Lucas (1988: 16–17, 25) put it, "permanently below an initially better endowed economy" and even with the observed divergence in per capita incomes (Pritchett, 1997).

Broadly speaking, neither neoclassical nor endogenous growth theory predicts the striking fact that, at the same time that the developing countries as a whole have been falling further behind, a subset of these countries has grown much faster than the developed countries. From 1985–95, the three fastest growing countries were all developing countries (China, Korea, and Thailand) and they grew on average more than *twelve* times as fast as the three countries with the highest *per capita* incomes (Canada, Switzerland, and the U.S.).[2] The diminishing returns to investment in the neoclassical theory leads us to expect that the capital-poor low income countries should grow more rapidly than the well-endowed rich countries. Externalities that increase with

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stocks of capital or rates of investment or other forces that generate decreasing or constant costs in endogenous growth models lead us to expect that well-endowed rich countries should be among the fastest growing countries.

Admittedly, there is a type of endogenous growth theory that might ultimately be able to accommodate the fact that a subset of developing countries grows very much faster than all other countries. It hypothesizes that there is more learning-by-doing in some industries than in others, that such things as accidents of comparative advantage may give some countries relatively more of the industries that generate more learning-by-doing, that at least some of this learning can spill over as an externality to other parties in the country, and that this diffusion of learning may lead the country to specialize in exporting goods that are higher on a quality ladder and thus might generate still more learning-by-doing and growth. This fairly elaborate chain of causation could emerge in a low-income country and generate an "economic miracle" at the same time that other low-income countries specialized in less educational commodities and failed to converge. Robert Lucas (1993) is again the main author of this line of thinking.

Lucas meticulously stresses the many restrictive and special conditions (and thus the many *ad hoc* elaborations of the theory) that are required if one is to accommodate economic miracles in the type of growth theory he uses. His (1993: 267) purpose is to obtain "a formulation that is capable, under *some* parameter values, of generating the behavior we are trying to explain." We believe that this is an important purpose: when anomalies are discovered, we need to know how, if at all, they can be reconciled with familiar theory. When anomalies emerge, it is also important to ask whether something crucial has been left out.

We argue here that, to explain why the fastest growing countries are a subset of the developing countries at the same time there is no tendency for general convergence, it is necessary to focus upon something that has been left out of both neoclassical and endogenous theories. We offer a very simple hypothesis that explains all of the facts about levels of income and rates of growth that Lucas attempts to explain, and then show with econometric tests that this hypothesis can, in addition, account for much of the detailed variation in a large cross-national data set.

2. The hypothesis

A number of economists, such as Bhagwati (1982), Easterly (1993), Fischer (1993), Krueger (1990), Little (1982), Murphy, Shleifer, and Vishny (1991), and Sachs and Warner (1995a) have observed that the extent of the losses from bad economic policies, at least in the less developed countries, are very

large. Alesina, Ozler, Roubini, and Swagel (1996), Nehru and Dhareswar (1994), and Perotti (1996) have shown that political instability can undermine growth. Some economic historians, such as Mokyr (1990), North (1990), and Rosenberg and Birdzell (1985) have concluded that differences in governance and institutions are crucial for explaining innovation – and even the industrial revolution and why modern economic growth emerged in the West rather than in other parts of the world. Some who have looked at the political and bureaucratic processes by which politically powerful groups obtain redistributions to themselves, like Tullock (1967), Krueger (1974), and Posner (1975), find significant dissipation of resources on distributional struggles that must be added to the losses from the distortions introduced.

A few economists take this emphasis on governance one step further. They take the structure of incentives facing the participants in an economy to be a crucial determinant of the economy's performance and see the structure of incentives as given by a country's institutions and economic policies and thus by its government. Given this view, it is then appropriate to give the quality of governance the central role in analyses of economic growth that capital-intensity and diminishing returns have in the neoclassical theory, or that externalities, increasing returns, or learning-by-doing have in models of endogenous growth. A focus on governance does not imply that the variables emphasized by neoclassical and endogenous theories are unimportant, but it does lead to a different emphasis in empirical inquiries. This difference in emphasis is strikingly evident when Parente and Prescott's (1992, 1994) account of international differences in growth rates and Olson's 1982 and 1996 works are compared with the hypotheses suggested by Lucas's writings.

It should also be evident in this paper: our simple hypothesis is that differences in governance play an indispensable role in explaining why most developing countries fail to grow any faster than the high income countries at the same time that certain other developing countries grow far faster than the rich countries do. Countries differ in their economic policies and institutions. In most (but certainly not all) countries, these institutions and policy regimes remain broadly similar over considerable periods of time. This is particularly the case for their constitutional and legal systems, but the extent of corruption in government, the quality of educational systems, the degree of protectionism, the prevalence of government intervention in markets, and the proportion of industry that is state owned do not usually change a great deal from year to year. The governance of some countries is quite unstable, but often this instability also recurs, so that firms and individuals must endure continuing uncertainty about their rights to property and contract enforcement as well as about the policy environment.

If differences in governance are often a decisive influence on economic performance, then countries will vary dramatically in the extent to which they achieve their economic potential. We argue that the per capita incomes of the poor countries are only a small fraction of what they could be. Because of the same shortcomings in governance that largely account for their low incomes, most of these countries do *not* take advantage of their opportunities for exceptional growth and thus fail to converge. However, though most patterns of governance persist, some developing countries make fundamental changes for the better in their policy regimes and institutions. These countries, because their better governance enables them to exploit the opportunities for catch-up growth that poor countries have, grow much more rapidly than rich countries can.[3]

The biggest obstacle to testing arguments like ours has been the paucity of measures of the quality of governance. Earlier work in this vein, such as Scully (1988), relied on measures of economic, civil, and political freedom developed by Gastil (1982). While this work is valuable, the Gastil measures were not specifically developed to reflect the incentives faced by economic agents.[4] We deal with this problem partly by deploying some measures of economic policy for this purpose, but mostly by following others in using a new set of measures of the quality of governance that has been found relatively recently. These measures have been developed by a private firm for sale to firms and portfolio managers who are considering foreign investments, and are available in a publication called the International Country Risk Guide. The ICRG data were introduced by Keefer and Knack (1993, 1995) and Knack (1996) in a series of studies sponsored by the IRIS Center of the University of Maryland. Other studies in this series (e.g., Clague, Keefer, Knack, and Olson, 1995, 1996) indicate that this measure is reassuringly correlated with other measures of the quality of governance and is also related to both economic outcomes and political regimes in ways that make theoretical sense. Barro (1996, 1997) has also used the ICRG data as a measure of the quality of governance and found them to be associated with economic growth.

The foregoing studies using ICRG and other measures of the quality of governance and institutions are very much consistent with the argument offered here. They find that the quality of institutions and economic polices explains a quite significant part of the variation in growth rates across countries. Some of these studies, such as Clague et al. (1995) and Keefer and Knack (1995) also find that the quality of governance and institutions is important for explaining rates of investment. There is further evidence for this in Mauro (1995). This suggests that one way in which better governance can improve economic performance is by improving capital markets and the climate for investment.

At the same time, as a founder of neoclassical growth theory (Solow, 1957) and others (such as Kuznets, 1966) emphasized long ago, much of modern economic growth is due to increases in productivity. It is also clear that while some countries have seen extraordinary productivity increases over the last few decades, others have stagnated.[5] However, while there is research which shows that better macro-economic policies can increase productivity growth, there has been no effort, so far as we know, to use the new measures discussed above to investigate the impact of quality of governance and institutions on growth of productivity in a neoclassical production function framework.[6,7] That is one of the things this study attempts to do.

The remainder of this paper is organized as follows. Section 3 outlines our methodology. Section 4 explains in detail how we measure governance and provides summary statistics. Section 5 presents and discusses our general results. The final section relates our findings to the neoclassical and endogenous growth theories and concludes.

3. Methodology

We assume that the contributions of additional capital and labor to growth are given by an aggregate Cobb-Douglas production function in each country. Any additional growth reflects an increase in total factor productivity and we relate these differences in productivity growth rates to differences in governance. Though much of our conceptual framework is commonly used and well-understood, our econometric methodology, while appropriate, is less familiar and requires some explanation.

The availability of panel data sets that provide data over time for a cross-section of countries has enormously enriched the literature on cross-country growth because it allows the use of the fixed-effects approach. This procedure, which essentially involves including a dummy for every country in the estimated equation,[8] produces consistent estimates even if we do not have data on some time-invariant or slow-moving country-specific factors that affect growth. Several recent papers, such as Islam (1995) and Harrison (1996), have reported fixed effects estimates. Ideally, we too would like to use a fixed effects approach in estimating the following type of equation: the dependent variable would be the rate of growth of GDP, and explanatory variables would be the rates of growth of labor and capital stock, a measure of the quality of governance, and a dummy for each country. The coefficient on the governance variable would reflect the impact of institutions and policy regimes on GDP growth, controlling for factor accumulation and unobserved time-invariant country-specific factors, i.e., it would reflect their impact on the growth of productivity.

The fixed effects estimator has, however, one important data requirement: because the parameters are identified only from within-country variation, each included variable must vary significantly within countries.[9] Because institutions and policy regimes usually change only very slowly, our main governance measures do not satisfy this requirement. Therefore, we adopt the following approach, which is recommended for such situations by standard texts in panel-data econometrics, such as Hsiao (1986).[10] We first regress the rate of growth of output on the rates of growth of labor and capital stock, including a dummy for each country. The coefficient on the dummy reflects the effect on growth of all time-invariant or slow-moving variables, including institutions and policy regimes. We then run a second regression in which the coefficient on the country dummy from the first regression is the dependent variable and explanatory variables are measures of the quality of governance and control variables. The coefficients on the measures of quality of governance in the second regression reflect the impact of governance on GDP growth, controlling for factor accumulation and the other variables included in the second regression.

More formally, our methodology is as follows. As mentioned earlier, we assume that each country's production possibility set can be described by a Cobb-Douglas production function. (For reasons that will be explained below, the production possibility set here may be limited not only by resources and technology, but also by the structure of incentives inherent in the policy-regime and institutions of a country.) The labor force and physical capital stock in country "i" in year "t" are L_{it} and K_{it} respectively. The overall productivity level of country "i" in year "t" is A_{it}. The production function can be written as:

$$Y_{it} = A_{it}K_{it}^{\alpha}L_{it}^{\beta} \tag{1}$$

We allow each country to start with a different level of initial productivity (A_{0i}) and productivity can grow at different rates (τ_i) across countries. These differences can be due to the quality of governance or other factors. We also allow for a period and country-specific productivity shock (ϵ_{it}). Thus, the specification for productivity is given by:

$$A_{it} = A_{0i}\exp(\tau_i t + \epsilon_{it}) \tag{2}$$

Combining (1) and (2) we get:

$$Y_{it} = A_{0i}\exp(\tau_i t + \epsilon_{it})K_{it}^{\alpha}L_{it}^{\beta} \tag{3}$$

Taking logs we get:

$$\ln Y_{it} = \ln A_{0i} + \alpha \ln K_{it} + \beta \ln L_{it} + \tau_i t + \epsilon_{it} \tag{4}$$

First-differencing (4) yields:

$$\ln Y_{it} - \ln Y_{it-1} = \tau_i + \alpha(\ln K_{it} - \ln K_{it-1}) + \beta(\ln L_{it} - \ln L_{it-1}) + (\epsilon_{it} - \epsilon_{it-1}) \quad (5)$$

We first estimate Equation (5). This yields an estimate of τ_i for each country. We then regress τ_i on our measures of quality of governance and other variables.

We do not include growth of human capital as a regressor in Equation (5) because several recent papers such as Benhabib and Spiegel (1994), Bleaney (1996), and Pritchett (1996) have found that it does not enter significantly as a determinant of the growth of GDP. However, Benhabib and Spiegel have argued that the initial *level* of education in a country is an important determinant of future productivity growth; therefore we include this variable in the second-stage regression, as a determinant of τ_i.[11]

Most aggregate production function and growth accounting studies assume that the marginal private products of each of the factors of production are equal to their marginal social products, so the economies are efficient and produce the maximum output that can be obtained from the available resources and technology. Any growth in productivity is then due to the advance of technology or new access to foreign technologies. By contrast, according to our argument, the output that a country may attain from given resources may also be constrained by the structure of incentives inherent in its policy regime and institutions. This means that a stagnant low income country could have the same access to the world's technologies as a rapidly growing one, but because of poor governance its firms and workers do not have the incentives to use available technologies (or capital and labor) efficiently.[12]

4. The data

We start with a sample of 68 countries for which capital stock figures for the years 1960–87 were created at the World Bank, as background to the *World Development Report* of 1991. The ICRG variables are available for 58 of these. The remaining variables are also from World Bank data, except for the secondary enrollment rate in 1960, which is from Barro (1991). Here we focus on our main measures of the quality of institutions and economic policies. The other variables are described in the Appendix. As mentioned before, our main measures of governance were collected by a private firm and are available in a publication called the International Country Risk Guide.[13] We use the earliest data available, for the year 1982.

4.1. *The Risk of Expropriation and the Risk of Repudiation of Contracts by Governments*

The Risk of Expropriation (EXPRO) measures the risk of confiscation and forced nationalization of foreign enterprises. Risk of Repudiation of Contracts by Government (REPU) is a measure of the risk that the governments will repudiate or unilaterally change the terms of contracts with foreign investors. Governments that do not respect their own contracts are less likely to respect and enforce contract between private individuals. Risk of Repudiation is also an indicator of government credibility. Both variables range from 0 to 10 and lower scores indicate a greater risk of expropriation or repudiation.

4.2. *Administrative effectiveness and the rule of government*

We use three variables to measure the quality of public administration and the rule of law.

(i) Countries score high in terms of Quality of Bureaucracy (BUR) when the bureaucracy is insulated from political pressures and "has the strength and expertise to govern without drastic changes in policies or interruption of government services when governments change." The existence of "an established mechanism for recruitment and training" is also considered a plus.

(ii) Another indicator of government quality is the level of corruption. The country receives the lowest ratings for Corruption of the Government (CORRUPT) if government officials at all levels are likely to demand illegal payments. These could, for example, be "bribes connected with import and export licenses, exchange controls, tax assessment, policy protection, or loans."

(iii) Law and Order Tradition (RULELAW) reflects "the degree to which the citizens of a country are willing to accept the authority of established institutions to make and implement laws and adjudicate disputes." Higher scores indicate "sound political institutions, a strong court system, and provisions for an orderly succession of power." Lower scores indicate a tradition of "depending on physical force or illegal means to settle claims." When countries score low on this measure, new leaders may fail to honor the commitments of the previous regime.

The above three variables are scored on a scale from 0 to 6 and higher scores indicate a more favorable institutional environment. We have also

Table 1. Institutional variables: Summary statistics

	N	Median	Min	Max
Risk of expropriation	58	5.4 (Gabon)	1.5 (Haiti)	9.5 (Hong Kong)
Risk of repudiation	58	5.0 (Philippines)	2.5 (Syria)	9.5 (Hong Kong)
Corruption in government	58	3.0 (Argentina)	0.0 (Haiti)	6.0 (Hong Kong)
Quality of bureaucracy	58	2.0 (Costa Rica)	0.0 (Haiti)	6.0 (Hong Kong)
Rule of law	58	2.0 (Kenya)	0.0 (Syria)	6.0 (Hong Kong)
ICRG	58	4.5 (Senegal)	1.7 (Haiti)	9.8 (Hong Kong)

Table 2. Correlation between institutional variables

	EXPRO	REPU	CORRUPT	BUR	RULELAW	ICRG
EXPRO	1					
REPU	0.9	1				
CORRUPT	0.69	0.65	1			
BUR	0.83	0.82	0.81	1		
RULELAW	0.81	0.72	0.72	0.85	1	
ICRG	0.91	0.88	0.87	0.96	0.91	1

Note. N = 58; p-value = 0.0001 in all cases.

constructed a variable called ICRG which is the average of the above five variables after scaling all of them from 0 to 10.

Summary statistics for these governance variables are provided in Table 1. Hong Kong performs best in all categories, while the lowest figures are for Haiti and Syria. Table 2 reports the correlations between these measures. It is reassuring that these are high. The next section considers whether these variables are correlated with growth rates of productivity.

5. Results

As mentioned above, we first estimate Equation (5). We regress the annual growth of GDP (ZGDP) on annual growth of the labor force (ZLAB) and capital stock (ZK) and a dummy for each country. The coefficients on labor and capital are reported below. The coefficients on the dummies are too numerous to be reported individually, but will be discussed at some length below. We obtain the following results (t-stats are in parentheses).

Table 3. The estimated country-fixed effect: Summary statistics

	Country fixed effect
Maximum	2.14 (Hong Kong)
75 percentile	0.46 (Singapore)
Median	–0.57 (Mexico)
25 percentile	–1.20 (Bolivia)
Minimum	–3.47 (Nigeria)

Note. N = 68.

$$\underset{\quad}{\text{ZGDP}} = \underset{(17.63)}{0.499 * \text{ZLAB}} + \underset{(17.33),}{0.501 * \text{ZK}}, \quad \text{Adj. } R^2 = 0.21, \ N = 1836$$

The estimates for the returns to labor and capital are reasonable and highly statistically significant. Our main interest, however, is in the country-fixed effect (CFE), i.e., the coefficient on the country dummy, and its relationship to the governance variables.

In the estimates reported above we made the assumption of Constant Returns to Scale, i.e., we imposed the restriction that the coefficients on labor and capital sum to unity. We tested this restriction, using an F-test. The null that the coefficients add up to one was not rejected.[14] The results of this paper do not depend on the CRS assumption. We repeated the entire analysis without this assumption and obtained very similar results.[15]

Summary statistics for the country-fixed effects (CFE) are in Table 3. Recall that the CFE is the parameter τ_i in Equation (5), i.e., it is the country-specific annual growth rate of overall productivity. The CFE ranges from 2.14% (Hong Kong) to –3.47% (Nigeria). The dispersion in the CFE across continents is reported in Table 4. We divide countries into three groups, Low, Intermediate, and High, corresponding to CFE less than –1, between –1 and 1, and greater than 1, respectively. The majority of African and South and Central American countries fall in the low and intermediate ranges, whereas the Asian and European countries are mainly in the intermediate range.

There is considerable variation within regions, which suggests that productivity growth cannot be explained by regional factors alone. Within Africa, Nigeria (–3.47), Sudan (–2.83) and Zaire (–3.06) are lowest, whereas Congo (1.45) and Mauritius (1.23) are highest. Within Asia Hong Kong (2.14) and Taiwan (1.35) are highest, whereas Bangladesh (–1.50) and Indonesia (–1.19)

Table 4. Dispersion across continents of country fixed effect

	Low (< −1)	Intermediate (−1 to 1)	High (> 1)	N
Europe (%)	0	85.71	14.29	7
Asia (%)	12.5	62.5	25	16
South and Central America (%)	46.67	53.33	0	15
Africa (%)	43.33	50	6.67	30

Note. N = 68.

Table 5. Correlation of country fixed effect with governance variables

EXPRO	REPU	CORRUPT	BUR	RULELAW	ICRG
0.55	0.64	0.55	0.62	0.51	0.63
(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)

Note. N = 58; p-values are in parentheses.

are lowest. The CFE varies in South America from 0.56 (Brazil) to –1.87 (Venezuela) and in Central America from –0.06 for Panama to –3.00 for Haiti.

5.1. *Does governance explain productivity growth?*

Our simple hypothesis was that the structure of incentives that faced the participants in the economy was crucial for economic performance and that this depended on the quality of governance. We should therefore find that productivity growth as measured by CFE tends to be higher in the countries with better institutions and economic policies.

We start with the simple correlations between CFE and our ICRG governance variables that are reported in Table 5. They vary between 0.51 and 0.64 and are all statistically significant, with p-value 0.0001 in each case. We also ran a regression (not reported in the table) in which the dependent variable was CFE and the explanatory variables were the five original institutional measures, not including the combination ICRG variable. The R^2 was 0.475, suggesting that this set of governance variables can "explain" as much as 47% of the variation in the rates of growth of productivity across countries.

The ICRG data do not measure some aspects of governance. It is also important to remember that the CFE could reflect not just institutions and

policy regimes, but other country-characteristics that were not included in the first regression (Equation (5)). Therefore, in Table 6 we regress CFE on the ICRG variables one at time and also on other measures of economic policy and on variables that control for other potential determinants of productivity. We use the country-average (over the period 1960–87) black market premium on foreign exchange in percent as a measure of its openness and the country-average of the percentage of government consumption in GDP to measure the relative size of government. When a government is expanded beyond optimal size it should have a negative impact on growth of productivity. In the least developed countries, on the other hand, the governments that can control only exceptionally small shares of GDP may lack the administrative capacity and political coherence needed to provide effective governance throughout their territory, and this can reduce productivity.

As mentioned earlier, Benhabib and Spiegel (1994) argued that the initial level of human capital can affect the growth path of productivity. Therefore, we include the secondary school enrollment percentage in 1960 (from Barro, 1991) as an explanatory variable. We also include GDP per capita in 1960 as a regressor to control for catch-up opportunities.

Some of the other variables that could be significant for growth vary by region. Climate varies by region, and though it is not clear whether or how productivity might be affected by climate, we probably should not ignore the fact that most of the poorest countries are in tropical or sub-tropical zones. Though they are not well defined or measured, there are probably also cultural characteristics that have significance for growth. We shall later try to distinguish "culture" into less amorphous categories, but for now we note that it also varies by region. We address these concerns to some extent by including regional dummies to reflect cultural, climatic, or other factors common to regions. It is also possible that cultural or climatic advantages or disadvantages may be reflected in the level of initial GDP per capita, which, as mentioned above, is included as regressor.[16]

Accordingly, we regress CFE on the ICRG measures, two further measures of governance (the country-average percentage black market foreign exchange premium and the country-average percentage of government consumption in GDP), on GDP per capita in 1960 (in thousands of dollars), on the secondary enrollment rate in 1960 in percent, and on regional dummies. Our results are in Table 6.

The second row of numbers contains the coefficients and t-statistics on the ICRG governance variables. They enter significantly in every case. In column 1 the coefficient on the governance variable (Risk of Expropriation) is 0.264. The maximum and minimum values for Risk of Expropriation are for Hong Kong and Haiti, respectively.[17] How much faster would productiv-

Table 6. Determinants of rates of growth of productivity
Dependent variable: country fixed effect (CFE)

	EXPRO	REPU	CORRUPT	BUR	RULELAW	ICRG
Intercept	–1.265	–2.108	–0.402	–1.045	–0.894	–1.348
	(2.21)	(3.35)	(0.92)	(1.93)	(–1.40)	(2.26)
Quality of	0.264	0.396	0.249	0.330	0.266	0.272
governance	(3.82)	(4.86)	(2.88)	(3.63)	(2.55)	(3.86)
Black mkt	–0.0005	–0.0006	–0.0007	–0.0006	–0.0006	–0.0006
prem %	(3.78)	(5.26)	(4.57)	(4.33)	(4.20)	(4.43)
Govt cons %	0.066	0.070	0.046	0.071	0.080	0.072
	(2.46)	(2.53)	(1.76)	(2.80)	(2.69)	(2.88)
Africa	–1.689	–1.510	–1.550	–1.348	–1.499	–1.449
	(3.92)	(3.61)	3.90)	(3.26)	(3.47)	(3.50)
Asia	–0.691	–0.580	–0.612	–0.398	–0.426	–0.507
	(1.89)	(1.61)	(1.81)	(1.08)	(1.11)	(1.40)
Central America	–1.182	–0.654	–1.288	–0.790	–0.989	–0.882
	(3.39)	(1.80)	(3.68)	(2.08)	(2.39)	(2.32)
South America	–0.588	–0.401	–0.676	–0.531	–0.451	–0.425
	(1.52)	(1.12)	(1.69)	(1.35)	(0.95)	(1.04)
Gdp per cap 1960	–0.430	–0.401	–0.303	–0.350	–0.387	–0.411
in $1000s	(3.54)	(3.84)	(2.25)	(3.36)	(2.98)	(4.06)
Sec enrol % 1960	0.005	–0.003	0.004	0.002	0.007	0.001
	(0.43)	(0.30)	(0.44)	(0.20)	(0.68)	(0.15)
N	51	51	51	51	51	51
R^2	0.540	0.596	0.504	0.540	0.497	0.561
Adjusted R^2	0.439	0.507	0.395	0.440	0.387	0.464
P-value for F-test	0.00008	0.00005	0.0003	0.00008	0.00038	0.00003

Note. T-stats are based on White std. errors which are consistent in the presence of heteroskedasticity.

ity have grown in Haiti if it had the same Risk of Expropriation as Hong Kong? The answer: 2.11% per annum, which is a substantial number. In column 2 the institutional variable is Risk of Repudiation; a similar exercise as above (Hong Kong-Syria) yields a differential of 2.77% per annum. The corresponding figures for Corruption (Hong Kong-Haiti), Quality of Bureaucracy (Hong Kong-Haiti), Rule of Law (Hong Kong-Syria), and ICRG (Hong Kong-Haiti) are 1.49%, 1.98%, 1.60%, and 2.20%, respectively. These findings suggest that the quality of governance has a substantial impact on growth of productivity.

Of course, this exercise should not be taken too literally, since we do not expect all else to remain equal when institutions and economic policies change. Still, it is hard to imagine changes which result from improvements in governance that would offset their positive effect on productivity growth. Therefore it is unlikely that we are overestimating the impact of the quality of institutions and economic policies.

Are the aspects of governance that the ICRG variables do not capture also significant? Here we do not have the data needed to say as much. But it is clear from the third row of Table 6 that in countries where the black market premium is higher, productivity growth is lower. This is consistent with our emphasis on governance and also with the findings of others (e.g., Levine and Renelt, 1992) that countries with more open trade regimes have grown faster than protectionist countries. A higher share of government consumption in GDP is associated with faster growth of productivity. We had not expected this. A closer examination of the data reveals an interesting possibility. When we select out the countries that are at the bottom 25% both in share of government consumption and productivity growth we find only two countries, Nigeria and Zaire, and see that government consumption in both of them is less than 8% of GDP. Given what is known from other sources about these two countries, the notion that their governments are so lacking in administrative capability and political coherence that they are not able either to govern their territories effectively, or to raise a significant share of the GDP for the government, immediately comes to mind. The countries in the top 25% in both productivity growth and share of government consumption include Israel, with by far the highest share of government consumption in our data set, and other countries that were not nearly so disordered as Nigeria and Zaire.

We also see in Table 6 that, all else equal, productivity growth in African and central American countries is slower than in the benchmark category (Europe), which suggests that there are common regional factors which affect growth of productivity. Secondary enrollment in 1960 has no significance.

Initial GDP per capita has a negative and large effect, and this takes us back to the conception of governance and development with which we began.

6. Conclusions

Let us return to the big picture. According to the neoclassical theory, the level of income is determined by resources and exogenously given technology – the higher a country's savings rate and the lower its population growth the higher are steady-state per capita incomes. Countries that have not yet reached their steady state (because they have less capital per worker and thus a higher

marginal product of capital) should grow more rapidly than those that have reached their steady-state growth. Endogenous growth theory, on the other hand, emphasizes externalities that increase with the stocks or investments of capital or other forces that abridge diminishing returns, and thus can nicely account for the absence of general convergence. Though neither theory predicts the observed pattern, with a subset of the developing countries growing far more rapidly than all other countries at the same time there is no general convergence, endogenous growth theory can accommodate the observed pattern if an extensive set of conditions identified by Lucas prevail. Neither theory gives governance an explicit role, and the neoclassical theory, with its assumption that output is at the limits given by the available resources and technology, implicitly assumes optimal governance. The governance-centered conception set out at the beginning of this paper is consistent with the observed pattern of income and growth rates and also explains much of the cross-national variation in productivity growth in our data set. By contrast with the neoclassical and endogenous theories, it predicts that low income countries will tend to catch up only if they have passable governance.

We can test this prediction of our governance-centered conception with Tables 6 and 7. First note once again that in Table 6, where we are controlling for quality of governance, GDP per capita in 1960 has a strongly negative effect on productivity growth. A $1000 increase in GDP per capita in 1960 reduces productivity growth by 0.3–0.4% per annum. In Table 7 we run the same regression as in the last column of Table 6, except that we omit the ICRG governance measure. Notice that GDP per capita of 1960 now has a much smaller magnitude (in absolute terms) and no longer enters significantly. This appears to be a straightforward case of omitted variable bias. The ICRG variables and GDP per capita in 1960 are positively correlated[18] and the ICRG measure enters positively. If we omit ICRG, part of its effect is picked by by GDP per capita in 1960, which is biased upward, towards zero. Though it is not reported in the table, the same result holds when we also drop our other measures of governance, black market premium and share of government. There is also no simple correlation between initial per capita income and growth of either productivity or per capita income.

This finding that there is catch-up growth only when governance is not too bad is consistent with several other studies using different data sets. Keefer and Knack (1993, 1995) and Knack (1996) found that convergence could not be explained without taking the quality of institutions into account. Barro has shown in a series of empirical studies that there is "conditional convergence": that the tendency for low-income countries to grow faster holds only under specified conditions. In his empirical studies, variables that measure aspects of economic policy or institutions and thus governance are shown

Table 7. Determinants of rates of growth of productivity

Dependent variable: Country Fixed Effect (CFE), abs. t-stats in parentheses.

	Coefficient
Intercept	0.188 (0.49)
Africa	–1.709 (4.19)
Asia	–0.596 (1.65)
Central America	–1.470 (4.71)
South America	–0.918 (2.19)
Black mkt prem %	–0.0007 (4.43)
Govt cons %	(0.048) (1.53)
Gdp per cap 1960 in $1000s	–0.220 (1.13)
Sec enrol % 1960	0.001 (0.930)
N	51
R^2	0.413
Adjusted R^2	0.301
P-value for F-test of model	0.002

Note. T-stats are based on White std. errors which are consistent in the present of heteroskedasticity.

to be among the conditions for convergence, and we are encouraged that variables that depend on governance are even more important in his later than in his earlier studies (compare Barro, 1991 and 1997).

Lucas has made an observation that, if suitably supplemented, would seem, at first sight, fatal to our argument. He noted that, at the time when most of what is now called the Third World were colonies of developed countries, there was normally no danger of expropriation or other "political risk" when investors from a developed country invested in that country's colonies. So, Lucas (1990: 95) asks, "why were not ratios of capital to effective labor equalized by capital flows in the two centuries before 1945?" The possibility that he considers most seriously is that the colonial powers limited the flow of capital to their colonies in order to obtain monopoly rates of return on it there. But he notes evidence that investment in the late British Empire was open to firms from any country on competitive terms and that rates of return in these colonies were similar to those of comparable investments in Europe (see Davis and Huttenback, 1986, 1989). How do we account for this?

The great depression and the extraordinary protectionism between the two World Wars surely limited investment, particularly in export oriented industries, in colonies in the development in the 1920s and 30s, but we still must account for the period before World War I. There was, as Lewis (1970) and

others have shown, significant investment and much faster economic growth than is often supposed in the tropical colonial areas in the two generations just before World War I. Still, no colony in what is now the Third World appears to have attained a high level of capital intensity – or to have become a developed area – before World War I, the way Hong Kong (as a colony of Britain) was to do after World War II.

We can obtain some insight into this matter if we consider growth rates in Europe before World War I, when Britain, as the country of the Industrial Revolution, had the lead in development and some of the countries on the continent enjoyed catch-up growth. In the 1870s the four fastest growing countries of continental Europe grew 0.3 of 1% faster than Britain and the top four countries of the 1880s also grew 0.3 of 1% faster than Britain. By contrast, in the 1970s the four fastest countries in the world grew 6.9% faster than the U.S. did, and the fastest growing four countries in the 1980s outdid the U.S. rate of growth by 5.3%. In other words the rates of catch up growth in the 1970s and 80s were more than fifteen times as fast as in the 1870s and 80s.

Thus we hypothesize that the larger the gap in per capita incomes, technologies, capital stock per worker, between an undeveloped area and the leading country at the time, the greater the marginal product of capital, the larger the inflow of capital, and the rate of catch-up growth, if the undeveloped area is adequately governed. Our answer to Lucas's question is that the socially optimal inflow and rates of investment in a poor area with adequate governance was relatively smaller in the 19th century than in the last few decades.

There were often considerable differences (especially with respect to public investment in human capital) in the way imperial governments ruled their homelands and their colonies. In some colonies, such as the Belgian Congo, the indigenous people who obtained an advanced education had to live outside the colony. The frequent British reliance on "indirect rule" meant that, in part, the British Empire was governed by traditional indigenous mechanisms rather than in the same way Britain was.[19] In view of this, and of the much smaller opportunity for rapid catch-up growth in the 19th century than now, the failure of the tropical colonies to grow at the rate post-war Hong Kong has grown, or to reach the levels of development of the imperial countries, does not contradict our hypothesis that governance is decisive for economic growth.

The possibility that our statistical results are erroneous must also be taken very seriously. One possible source of error is the subjectivity of the ICRG measures – the evaluators who produced the indices may have been influenced by outcomes: where growth was good or incomes were high the evaluators may consciously or unconsciously have perceived governance to

be better than it really was. The resonance of our results with those in other studies provides less reassurance than it otherwise would because some of these studies also use ICRG or other similarly subjective measures of the quality of governance and institutions. Thus it is fortunate that the ICRG measures are all highly correlated with another measure of the quality of governance that is entirely objective – that is, determined by the practical decisions of the participants in each economy rather than by evaluators – and that, in countries that have experienced major and relatively rapid changes in governance, obviously varies over time in the way that it should. This is the "Contract-intensive Money" measure introduced by Clague et al. (1995, 1996). For the present study, it is also important to remember that our dependent variable is not the rate of growth of the economy. It is the country-specific growth rate of productivity over the period 1960–87, which the firm which computed these indices does not observe. Moreover, we have regressed this country-specific growth rate on other policy variables, regional dummies, and several other control variables. For our results to be spurious the perceptions of the firm have to be responsive to the part of the country-specific productivity growth rate that cannot be explained by our other policy and control variables. This seems unlikely. Moreover, Syria, whose average annual GDP growth rate is higher than all but 16 countries of our sample of 68, is ranked lowest in terms of two of our indices of governance.

Another possible source of error is that here, as in any cross-sectional regression, the estimates are biased due to the omission or poor measurement of relevant variables. This is particularly true where the various forces that are covered by the word "culture" are at issue. We only have crude proxies, in the form of regional dummies, for these cultural variables. One possibility is that some cultural characteristics make the people in some countries more innovative and willing to take risks and that this is responsible for their more rapid productivity growth. If such countries also happen to have good governance, we might erroneously be attributing the productivity to governance when it should be credited to culture. Fortunately, we can to a great extent exclude this possibility, and understand the relationship between culture and development much better, when we notice that culture consists of two very different things.

One of them is the set of attitudes and attributes that influence an individual's earning power when the governance and structure of incentives is given: these individual traits are "marketable human capital" or "personal culture". The set of attitudes and beliefs that individuals in different societies have about how societies ought to be governed are another matter: they affect the governance of societies and are a form of "public good human capital" or "civic culture". This distinction is evident when immigrants from poor coun-

tries start working in a high-income economy. Though the immigrants may eventually come to have the culture of the country to which they migrate, that is not the case when they first arrive. Since the recently arrived immigrants are unable to change the governance of the country to which they have migrated, the governance of these societies is given. An examination of the earnings of freshly arrived immigrants to the U.S. from diverse poor countries immediately reveals that their marketable human capital commands a wage that is a substantial fraction of that of native-born workers – and a substantial multiple of what these same individuals earned in the country of emigration.[20] These natural experiments make it clear that the more than forty-fold variations in real per capita income across countries cannot mainly be explained by appeal to differences in marketable human capital of their peoples (Olson, 1996). Thus the large differences in economic performance across the countries in our sample were almost certainly not due to differences in personal culture.

It might very well be due in substantial part to differences in civic culture, but this is not a competing explanation. If different beliefs about what economic policies and institutions should prevail influence the quality of governance, that would not call our conclusions into question.[21]

Another conceivable source of error is standard in regression analysis: simultaneity bias. It is logically possible that the quality of governance is the result rather than the cause of productivity growth. However, one does not need to spend much time studying conspicuous cases of economic growth and decline to understand the main direction of causation. The changes in governance and economic policy that occurred in mainland China when Deng defeated the Gang of Four and ended Mao-ism, in South Korea shortly after Park replaced Rhee,[22] in Taiwan when Chiang-kai-shek changed economic policy in the early 1960s, in Indonesia when Suharto and his colleagues prevailed in the civil war, and in Chile after Allende could hardly be attributed to a prior growth of productivity or income, among other reasons because most of these changes in economic policies and governance followed bad economic performance. The different economic regimes in East and West Germany, North and South Korea, or in mainland China and Hong Kong also cannot be attributed to any preceding differences in income or productivity. The increases in income in most oil exporting countries during the oil price shocks did not lead to transformations of governance that brought sustained economic growth. Paradoxically, large endowments and exports of primary products even appear to be negatively related to subsequent economic growth (Sachs and Warner, 1995b). Simultaneity bias appears to be a theoretical, but not a realistic, possibility.

We are left with the presumption that the structure of incentives given by the institutions and economic policy regimes – and thus by the gov-

ernance – of a country are a major determinant of their rates of growth of productivity and economic performance. Valuable as both the neoclassical and endogenous growth theories are, they do not by themselves provide a simple and straightforward explanation of the general failure of convergence at the same time that a subset of developing countries has much the fastest rates of economic growth. Our conception of governance and growth does.

Notes

1. Strictly speaking, the Solow-Swan neoclassical theory, as Hulten (1990) points out, explains growth in a *single* economy, does not allow for linkages among economies, and does not present a theory of differential growth. But it does show that a country that is below its steady-state growth path can grow more rapidly than in the steady state and thus naturally leads to a presumption that low-income countries will gain on high-income countries.
2. *World Development Report*, 1997: Table 1; the purchasing power parity measure of income for 1985 was used to select the three richest countries.
3. This argument was first outlined in Murrell and Olson (1991) and elaborated in Olson (1993).
4. For a detailed discussion of this point, see Keefer and Knack (1995).
5. We provide evidence of this in Section 5.
6. Scully (1988) has shown, in a neoclassical production function framework, that the Gastil measures predict differences in productivity across and within countries. As argued above, we believe the ICRG measures are more appropriate. Also, unlike Scully, we control for a number of other factors that can affect productivity, such as levels of education, initial GDP per capita, the degree of openness of the economy, share of government expenditure in GDP, and dummies to control for unobserved region-specific factors.
7. Fischer (1993) has found that inflation and adverse changes in terms of trade reduce productivity growth, whereas budget surpluses increase it. Nehru and Dhareswar's (1994) work is discussed in footnote 8.
8. There is no intercept, to avoid the dummy variable trap.
9. Fixed effects estimation is equivalent to running Ordinary Least Squares after transforming all the variables by subtracting off the country mean. Therefore, there must be sufficient variation *within* countries.
10. See Section 3.6.1, "Estimation of models with individual-specific variables". For another application of this approach see Townsend (1994).
11. Nehru and Dhareswar (1994) also use a two-stage approach to examine the determinants of productivity growth. Their first-stage equation is estimated in levels, i.e., the dependent variable is the log of GDP, and the explanatory variables are logs of the levels of factors of production and a time-trend; the coefficient on the time trend, which is allowed to vary across countries, is the dependent variable in the second stage. They find that productivity growth is negatively related to initial GDP per capita and the number of revolutions and coups and positively related to the initial level of human capital and the degree of openness of the economy.
12. When the marginal private products of factors of production, which determine how much firms use of each factor, are not equal to their marginal social products, the contribution of factor augmentation to growth is not estimated accurately. This is a problem for all aggregate production function studies (including ours) of economies that are not fully

efficient. This means that our apportionment of the growth between factor accumulation and productivity growth is imprecise; however, the variations in productivity growth that we observe are so very large that our conclusions should not be sensitive to this difficulty.

13. Another set of measures, developed by a Washington-based firm called Business Environmental Risk Intelligence (BERI) has also been used in the literature. We have not used the BERI indices because they are available only for 41 countries. We have capital stock figures for only 26 of these, which is too small a sample.
14. The p-value was 0.51.
15. Without the assumption of CRS the return to labor is 0.606 and the return to capital is 0.506. We also repeated the analysis of Tables 5, 6, and 7, which explore the relationship between the country fixed effect and institutional variables, using CFE estimates obtained from the unconstrained regression. The results obtained were very similar to those reported in the paper.
16. If productivity growth in a country in the period after 1960 is high due to (say) a climatic factor, it is likely to have been high before 1960 as well. Therefore GDP per capita in 1960 should be relatively high for such a country.
17. Recall that our variable takes a higher value when expropriation risk is lower.
18. The correlation coefficient is 0.36, with a p-value of 0.009.
19. Uniformity of institutions and economic policies in the imperial country and conquered colonies would have required imposing radical and disruptive changes upon the subject peoples. Such changes were not only sometimes bitterly resisted by the colonial peoples, but were also regarded as ethically undesirable by some imperial officials and commentators. Changes of this type, especially if combined with the levels of public investment in human capital typical of the imperial country, could also prove to be costly for the imperial exchequer, especially in comparison with indirect rule. Thus it is probably not surprising that history did not perform anything like the controlled experiment of providing uniform institutions, public expenditures, and economic policies in both the imperial country and in tropical colonies.
20. The increase in marginal productivity of an immigrant who earns more under one pattern of governance than another is unlikely to be due in any large degree to selection bias: it is the same person who earns different wages in the different environments. Selection bias could explain differences in productivity between migrants and those left behind, and there is a tendency for migrants to be younger and better educated than average for the country of emigration. Migrants to the United States are, however, often drawn from the lower half of the income distribution of their home countries and are not likely to be much, if any, more productive than the average non-migrant (see Borjas, 1990).
21. The distinction between the two types of culture is not erased by the fact that some of the same social structures, such as families or schools, may transmit both marketable and public good human capital, and sometimes do still other things as well. The main organized units of the traditional Indian caste system, the jatis or sub-castes, have passed on both such things as marketable craft skills and also beliefs about how the community or society should be organized, and at certain times and places they also appear to have been part of the governance structure. But the distinction between personal and civic culture remains necessary; the beliefs (and divergences in belief) about caste that affect government policy and politics in India are separate from the marketable human capital of the individuals in different groupings.
22. While Krueger (1985) believes that South Korean success is testimony to the virtues of minimal government intervention in markets, Wade (1990) argues that government intervention was extensive, but judicious. We doubt if either would argue that the institutional and policy framework was a consequence, rather than a cause, of growth.

Appendix: Data sources

Except for the ICRG variables and secondary enrollment in 1960 (Barro, 1991), the data used in the paper were obtained from supplementary data sets made available by the team which prepared the *World Development Report* of 1991. Capital stock were constructed, using the perpetual inventory method, for 68 countries for the period 1960–87. The ICRG variables were available for only 58 of these countries.

The 68 countries are the following: Argentina, Algeria, Bangladesh, Benin, Bolivia, Brazil, Burkina Faso, Burundi, Cameroon, Central African Republic, Chile, China, Colombia, Congo, Costa Rica, Egypt, El Salvador, Ethiopia, Gabon, Ghana, Greece, Guatemala, Haiti, Hong Kong, Hungary, India, Indonesia, Israel, Ivory Coast, Jamaica, Japan, Kenya, South Korea, Liberia, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Morocco, Nicaragua, Nigeria, Pakistan, Panama, Peru, Philippines, Portugal, Rwanda, Senegal, Singapore, Spain, Sri Lanka, Sudan, Syria, Taiwan, Tanzania, Thailand, Togo, Turkey, Uganda, Venezuela, Yugoslavia, Zaire, Zambia, Zimbabwe.

Summary statistics for the World bank data are provided below.

Variable	N	Mean	SD
Average annual GDP growth in %	68	4.2	1.8
Average annual cap. stock growth in %	68	7.2	2.2
Average annual lab. force growth in %	68	2.3	0.8
Secondary enrol rate 1960 (%)	65	13.4	14
GDP per capita 1960	66	1105.5	892.8
Avg. black mkt. prem. %	66	90.5	298.7
Avg. % of govt. consn in GDP	63	13.6	4.9

References

Alesina, A., Özler, S., Roubini, N. and Swagel, P. (1996). Political stability and economic growth. *Journal of Economic Growth* 1: 189–211.

Barro, R. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics* 106: 407–443.

Barro, R. (1996). Democracy and growth. *Journal of Economic Growth* 1: 1–27.

Barro, R. (1997). Determinants of economic growth: A cross-country empirical study. Development Discussion Paper No. 579. Harvard Institute for International Development.

Benhabib, J. and Spiegel, M.M. (1994). The role of human capital in economic development: Evidence from aggregate cross-country data. *Journal of Monetary Economics* 34: 143–173.

Bhagwati, J.N. (1982). Directly unproductive, profit-seeking (DUP) activities. *Journal of Political Economy* 90: 988–1002.

Bleaney, M.F. (1996). Macroeconomic stability, investment and growth in developing countries. *Journal of Development Economics* 48: 461–477.

Borjas, G. (1990). *Friends or strangers: The impact of immigrants on the U.S. economy*. New York: Basic Books.

Clague, C., Keefer, P., Knack, S. and Olson, M. (1995, revised 1997). Contract-intensive money: Contract enforcement, property rights, and economic performance. IRIS (Institutional Reform and the Informal Sector), University of Maryland, Working Paper #151.

Clague, C., Keefer, P., Knack, S. and Olson, M. (1996). Property and contract rights in autocracies and democracies. *Journal of Economic Growth* 1: 243–276.

Davis, L.E. and Huttenback, R.A. (1986). *Mammon and the pursuit of Empire*. New York: Cambridge University Press.

Davis, L.E. and Huttenback, R.A. (1989). Businessmen, the raj, and the pattern of government expenditures: The British Empire, 1860–1912. In D.W. Galenson (Ed.), *Markets in history*. New York: Cambridge University Press.

Easterly, W. (1993). How much do distortions affect growth? *Journal of Monetary Economics* 32: 187–212.

Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics* 32: 485–512.

Gastil, R.D. (1982). *Freedom in the world*. Westport, CT: Greenwood.

Harrison, A. (1996). Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of Development Economics* 48: 419–447.

Hulten, C.R. (1990). From productivity slowdown to new investment opportunities? In H. Siebert (Ed.), *Capital flows in the world economy*. Tübingen: J.C.B. Mohr (Siebeck).

Hsiao, C. (1986). *Analysis of panel data*. New York: Cambridge University Press.

Islam, N. (1995). Growth empirics: A panel data approach. *The Quarterly Journal of Economics* 110: 1127–1170.

Keefer, P. and Knack, S. (1993). Why don't poor countries catch-up?: A cross-national test of an institutional explanation. IRIS (Institutional Reform and the Informal Sector), University of Maryland, Working Paper #60.

Keefer, P. and Knack, S. (1995). Institutions and economic performance: Cross-country tests using alternative institutional measures. *Economics and Politics* 7: 207–227.

Knack, S. (1996). Institutions and the convergence hypothesis: The cross-national evidence. *Public Choice* 87: 207–228.

Krueger, A. (1974). The political economy of the rent-seeking society. *The American Economic Review* 64: 291–303.

Krueger, A. (1985). The experience and lessons of Asia's super exporters. In V. Corbo, A. Krueger, and F. Ossa (Eds.), *Export-oriented development strategies: The success of five newly industrialized countries*. Boulder, CO: Westview Press.

Krueger, A. (1990). Government failures in development. *Journal of Economic Perspectives* 4: 9–23.

Kuznets, S. (1966). *Modern economic growth: Rate, structure, and spread*. New Haven: Yale University Press.

Levine, R. and Renelt, D. (1992). A sensitivity analysis of cross-country growth regressions. *American Economic Review* 82: 942–963.

Lewis, W.A. (Ed.) (1970). *Tropical development, 1880–1913*. Evanston, IL: Northwestern University Press.

Little, I.M.D. (1982). *Economic development*. New York: Basic Books.

Lucas, R.E. (1988). On the mechanisms of economic development. *Journal of Monetary Economics* 22: 3–42.

Lucas, R.E. (1990). Why doesn't capital flow from rich to poor countries? *American Economic Review* 80: 92–96.

Lucas, R.E. (1993). Making a miracle. *Econometrica* 61: 251–272.

Mauro, P. (1995). Corruption and growth. *Quarterly Journal of Economics* 110: 681–712.

Mokyr, J. (1990). *The lever of riches*. New York: Oxford University Press.

Murphy, K.M., Shleifer, A. and Vishny, R.W. (1991). The allocation of talent: Implications for growth. *Quarterly Journal of Economics* 106: 503–530.

Murrell, P. and Olson, M. (1991). The devolution of centrally planned economies. *Journal of Comparative Economics* 15: 239–265.

Nehru, V. and Dhareswar, A. (1994). New estimates of total factor productivity growth for developing and industrial countries. Policy Research Working Paper 1313, The World Bank.

North, D. (1990). *Institutions, institutional change, and economic performance*. Cambridge and New York: Cambridge University Press.

Olson, M. (1982). *The rise and decline of nations*. New Haven: Yale University Press.

Olson, M. (1993). Why are differences in per capita incomes so large and persistent? In H. Siebert (Ed.), *Economic growth in the world economy*, 193–214. Tübingen: J.C.B. Mohr (Siebeck).

Olson, M. (1996). Big bills left on the sidewalk: Why some nations are rich and others poor. *Journal of Economic Perspectives* 10: 3–24.

Parente, S.L. and Prescott, E.C. (1992). Technology adoption and the mechanics of economic development. In A. Cukierman, Z. Hercowitz, and L. Leiderman (Eds.), *Political economy, growth, and business cycles*, 197–224. Cambridge and London: MIT Press.

Parente, S.L. and Prescott, E.C. (1994). Barriers to technology adoption and development. *Journal of Political Economy* 102: 298–321.

Perotti, R. (1996). Growth, income distribution, and democracy: What the data say. *Journal of Economic Growth* 1: 149–187.

Posner, R.A. (1975). The social costs of monopoly and regulation. *Journal of Political Economy* 83: 807–827.

Pritchett, L. (1996). Where has all the education gone? World Bank Policy Research Working Paper #1581.

Pritchett, L. (1997). Divergence, big time. *Journal of Economic Perspectives* 11: 3–17.

Rosenberg, N. and Birdzell, L.E. Jr. (1985). *How the West grew rich: The economic transformation of the industrial world*. New York: Basic Books.

Sachs, J.D. and Warner, A.M. (1995a). Economic reform and the process of global integration. *Brookings Papers on Economic Activity* 0(1): 1–95.

Sachs, J.D. and Warner, A.M. (1995b). Natural resource abundance and economic growth. NBER Working Paper #5398.

Scully, G. (1988). The institutional framework and economic development. *Journal of Political Economy* 96: 652–662.

Solow, R. (1957). Technical change and the aggregate production function. *Review of Economics and Statistics* 39: 312–320.

Townsend, R. (1994). Risk and insurance in Village India. *Econometrica* 62: 539–591.

Tullock, G. (1967). The welfare costs of tariffs, monopolies and theft. *Western Economic Journal* 5: 224–232.

Wade, R. (1990). *Governing the market: Economic theory and the role of government in East Asian industrialization*. Princeton, NJ: Princeton University Press.

World Bank. (1991). World Development Report. New York: Oxford University Press.

World Bank. (1997). World Development Report. New York: Oxford University Press.