

Determinants of Long Term Growth

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1 Introduction

1.1 The last 20 years have seen wide-ranging research, both theoretical and empirical, on the determinants of long term growth. "Old growth models" of closed economies have given way to "new growth models" of open economies in concert with "new trade" theories. Facilitated by the availability of data that compare income levels across countries in real terms, econometricians have been able to study what factors tend to be associated with more rapid growth.

1.2 The resurgence in research is partly the result of interest in the explanation of the rapid growth in many East Asian economies. The record of growth in this part of the world had been so spectacular, at least until recently, that it was claimed as supporting evidence by *both* sides in *each* of three debates (at least). First is the debate on whether the East Asians' success is proof of the superiority of protectionist policies on the one hand, or of outward-oriented policies on the other. Second is the broad debate whether the East Asian phenomenon is evidence of the virtues of government intervention in general, or of laissez-faire market-oriented policies.¹ Third is the debate over whether the statistics support growth based on simple accumulation of the factors of production (labor, education, and especially physical capital), or growth based on improvements in technology and efficiency (measured as an increase in total factor productivity, or the "Solow residual"). Young (1992, 1994, 1995), Kim and Lau (1994), and Krugman (1994) have upset conventional wisdom by arguing that growth among the four East Asian dragons, especially Singapore, can be explained by simple factor accumulation, with no important residual left over in most cases.²

¹ Examples include Krueger (1990) vs. Pack and Westphal (1986), or the controversy surrounding World Bank (1993), including Rodrik (1994a). Laissez-faire is not the same as outward-orientation, of course, because some governments deliberately use subsidies or an undervalued currency to promote outward orientation.

² Sarel (1995) reviews the state of play. The appropriateness of the word "miracle" lies in the eyes of the beholder. If Krugman had chosen to phrase his conclusion differently: "The miracle of East Asian growth is due to miraculous rates of investment in physical and human capital," most readers would have been less surprised by the article than they were. Yet this is really what the article said.

1.3 Finally, to the extent that growth rates do take the form of increases in total factor productivity, there would also be the question whether this increase in technical efficiency is due:

- (i) to superior government policies, in which case East Asia may have valuable lessons for other countries,
- (ii) to some superior mode of social organization, perhaps some exogenous aspect of “Confucian culture”,
- (iii) to simple catch-up with the technologically more advanced industrialized economies, or
- (iv) to chance.³

1.4 A central hypothesis in the growth literature is that incomes across countries tend to converge to a common level.⁴ In other words, lower-income countries will tend to grow more rapidly than countries at a higher level of income. There are two important kinds of catch-up. First, given the right economic structure and environment, poor countries tend to have high rates of return to capital. The accumulation of physical and human capital, whether financed by domestic saving or capital inflows, leads to rapid growth. Second, they tend to have rapid rates of growth of total factor productivity. They can emulate the technologies and “best practice” management innovations of the more advanced economies that have gone before them. Growth can therefore be facilitated as much through the accumulation of factors as through increases in the efficiency of the use of these factors.

1.5 There is reason to think that the process of catching up has natural limits. As Krugman and Young have pointed out, to the extent that growth is based on high rates of factor accumulation, economies eventually run into diminishing returns to capital. Rural-urban migration is an important source of growth in many countries that eventually runs its course. Furthermore, improvements in total factor productivity, to the extent they constitute emulation of front-runners, also run into natural limits, as the followers draw nearer to the front-runners.

³ Easterly (1995) and Easterly, Kremer, Pritchett, and Summers (1993). The main problem with the chance argument is that the East Asian success stories are all located in the same region. These authors provocatively point out that this ex post reasoning has some pitfalls.

⁴ This is the famous convergence hypothesis: Barro (1991), Barro and Sala-I-Martin (1992), and Mankiw, Romer, and Weil (1992).

1.6 An important question is whether the process of convergence is a gradual one, or occurs with bumps and kinks. Japan's growth rate appears to have converged to that of the United States and other industrialized countries, not gradually, but in the course of two sharp kinks. The first occurred in 1973-74, with the world oil shock. The second followed the bursting of the 1987-89 bubble in Japanese financial markets. Japan's per capita growth rate averaged a remarkable 8 percent during the period 1962-1973, but slowed to 3 percent during 1974-1990 (Table 1). Over the last seven years, it averaged a mere 1 ½ percent. Presumably Japanese growth will soon recover from its recent recession, but whether it will go back to the miracle rates of earlier decades seems dubious. The convergence is complete.

1.7 This paper will not explicitly address the question of whether some other East Asian economies may now be going through a growth-path kink analogous to Japan's 1973 slowdown. There is no necessary connection between transitory shocks such as a sharp increase in the price of oil or a financial crisis and the long-run rate of growth of potential output. With the exception of Japan--and Singapore and Hong Kong--East Asian economies still have a very long way to go before attaining the per capita incomes of the industrialized countries. But for those observers who thought that the miracle rates of growth attained by many East Asian economies over the past several decades were unsustainable, the 1997 episode of instability in financial markets may be interpreted as a signpost indicating that a more moderate and sustainable rate of growth lies ahead.

1.8 In what follows, we present a discussion of factors that researchers have identified as possible determinants of a country's long-term economic performance. The purpose is merely to outline some of the main currents of thought that define the contemporary literature on growth. It is intended to be a representative survey of recent theoretical and empirical growth research. The factors to be examined include:

- investment in private and public capital
- education and training
- financial intermediation
- macroeconomic stability
- openness with respect to trade and investment
- equality of income distribution and
- stability of political and social conditions.

2 Investment in private and public capital

2.1 Capital accumulation is perhaps the most easily identified determinant of future living standards. What is less clear, however, is whether capital accumulation--or the accumulation of any factor of production--can drive growth in per capita terms for an indefinite period of time. In neoclassical theory

(the Solow-Swan growth model), differential rates of investment across countries induce permanent differences in the *level* of per capita output, as opposed to its growth rate. Intuitively, the presence of diminishing returns implies that if the capital stock becomes very large, at some point additional investment is not sufficient to make up for depreciation of the existing capital stock, so higher rates of investment do not lead to increases in the net capital stock or output.⁵

2.2 This view of the role investment plays in driving long-run growth was challenged in the early 1980s in a series of articles by Paul Romer and others. Romer argued that higher rates of investment might induce higher rates of innovation, and thus faster economic growth. Hence economies with higher saving rates will grow faster, and so convergence in the neoclassical sense need not obtain. The new view drew support from two sets of empirical evidence. The first indicated that countries' output levels do not seem to converge in a manner consistent with the neoclassical model. The gap between the poorest and richest economies is at least as wide now as it was 50 years ago. The second contrary empirical finding was that higher rates of investment are correlated with future long-term growth rates, not merely with the level of GDP.

⁵. A corollary of neoclassical growth theory is that all countries with access to a common production technology should converge to a level of output per capita that is identical once one has controlled for countries' differential rates of saving and population growth.

2.3 Economists have also identified a role for public capital, particularly infrastructure capital, in economic growth. This includes transports--highways, bridges, ports, airports, railways--and, under broader definitions, telecommunications, electric power, water and sanitation networks.⁶ Some rapidly-developing economies have run head-on into overloaded infrastructures and congested transport networks, and severe environmental damage to air and water. At low levels of income, most people are willing to put up with some congestion and pollution as the side-effect of growth. When incomes pass a certain intermediate level, people tend to demand better environments as an important component of their standard of living. Even in narrowly-defined economic terms, infrastructure and environment are important. The costs shows up in GDP when workers must spend hours in commute traffic to get to their jobs, when mail and shipments are delayed for days, when acid rain hurts crop and forestry yields, or when extreme air pollution imposes high health costs and scares off tourists and businessmen.

2.4 While it is intuitive that infrastructure accumulation should raise output, it has been difficult to determine whether spending in this area has a greater pay-off than other forms of investment. Some authors have pointed out that, as with any capital investment, changes in the stock of public capital should be less important than changes in the flow of productive services that obtain from that stock. Hence, infrastructure *maintenance* can have a large impact on output.⁷ One strand of the new growth literature identifies another channel through which infrastructure investment can affect the growth *rate* of output: if transportation infrastructure increases the extent of the market in a country, it can foster a faster rate of technical innovation (and hence of productivity growth).⁸

3 *Investment in human capital*

⁶ Easterly and Rebelo (1994) find that investment in transport and communication infrastructure have a strong effect on countries' growth.

⁷Hulten (1993) presents some suggestive evidence along these lines.

⁸. See Romer (1990), who cites work by Sokoloff indicating that the rate of patenting activity in the United States in the early nineteenth century tended to increase in a region when it gained access to a navigable waterway (*e.g.*, as a result of canal construction).

3.1 The term “human capital” is applied to acquisition of skills and know-how through education, training, experience and research. It is difficult to measure education in internationally comparable ways. Nevertheless, enrollment rates in primary and secondary school, adult literacy rates, and cognitive test scores have been found to be higher in high-growth economies in general, and East Asia in particular.⁹ Human capital, together with trade and other international interactions, is apparently a necessary condition to absorb knowledge from other countries.

3.2 Countries that over-invest in higher education relative to basic education, before the economy has reached the stage of development at which graduates with college and higher degrees can be usefully employed, have not necessarily been successful. Nevertheless, as some East Asian economies move rapidly up the ladder, they may find that they run into shortages of skilled workers. Such education bottlenecks mean that increases in years of schooling are a prerequisite for the next stage of economic development.

4 Financial intermediation and financial structure

4.1 Funds for investment must be raised through saving (leaving aside borrowing from abroad). Hence the identity between national saving and national investment. Because financial institutions mediate the transformation of savings into physical capital, the presence or absence of a stable and well-developed financial system can profoundly influence a country’s long-term growth. Early writers such as Schumpeter and Gerschenkron emphasized this point in their writings on economic development, although it was debated whether the presence or absence of a financial system mattered to an economy before it had attained some threshold level of development.

4.2 Broadly speaking, economists identify four distinct channels by which financial institutions influence economic growth.

- First, the financial system promotes saving and investment by reducing the need for self-finance. It allows savers, by lending their funds to others, to earn higher rates of return than they otherwise would earn, while simultaneously allowing firms to borrow at low rates than the opportunity cost they would face if they had to raise the funds internally.
- Second, the risk-sharing or risk-bearing function of financial intermediaries or securities markets permits the implementation of high-risk (but high-return) investment projects.
- Third, the presence of a banking sector or securities markets allows the accumulation of large

⁹ E.g., Helliwell (1994, 1995), World Bank (1993), and Frankel, Romer and Cyrus (1996). Of course, the correlation between education and growth could result from a tendency for the demand for education to rise as income rises, rather than the reverse.

sums of capital. These sums might be necessary in order to finance increasing-returns-to-scale projects with large fixed costs.

- Finally, the development of a financial system, particularly a market-oriented one, allows for more efficient allocation of investment across competing uses.

4.3 Note that the first three channels relate to the mobilization of saving and the *quantity* of investment, while the fourth influences the *quality* of investment.¹⁰ The literature on “financial repression” has emphasized that a liberalized, market-oriented system can better mobilize and allocate funds, as compared to a system where the government keeps real rates of return to savers artificially low and allocates the available savings based on political considerations or bureaucratic judgments as to investment priorities.

4.4 An interesting line of research involves studies that attempt to quantify empirically the influence of financial intermediation on growth. An early study by Goldsmith identified in a number of developed and developing countries a correlation between the relative size of the financial sector and output. As Goldsmith himself acknowledged, however, the direction of causality is unclear in this case: does greater financial intermediation drive development, or *vice-versa*? More recently, King and Levine (1993) demonstrate a correlation between various measures of financial development and the rate of GDP growth, capital accumulation, and multifactor productivity growth in a large cross section of countries; these authors argue that the correlation reflects a causal relationship between intermediation and growth.¹¹

4.5 Another issue regards the specific institutional structure of the financial sector. A distinction has been drawn between a so-called “Anglo-Saxon” model of financial structure and an Asian one. The former relies relatively heavily on securities markets (including venture capital markets) and other “arm’s length” transactions, even in the case of transactions that involve the banking sector. On the other hand, the institutional structure of the financial sector in many Asian economies often involves closer ties

¹⁰ Some recent research has sought to formalize these rather intuitive arguments. For example, Bencivenga and Smith (1991) present a model where agents’ need for liquidity discourages long-term investment, and Greenwood and Jovanovic (1990) consider a model in which the presence of a banking sector allows agents to undertake more profitable investment. This latter model is noteworthy for two reasons. First, it posits the existence of a feedback effect in that a well-developed financial system raises output, while higher-income economies are in turn better able to invest in a “financial superstructure.” Second, the dynamics of the model imply that development induces an increase in income inequality that decelerates and eventually reverses--the famous “Kuznets curve” [see below].

¹¹ De Gregorio and Guidotti (1995) refine this analysis, and suggest that the data support two conclusions: first, that financial development promotes growth by affecting the efficiency of investment (rather than its quantity), with larger effects for poorer countries; and second, that unregulated financial liberalization can induce a negative correlation between economic performance and the extent of the banking sector. They view this as a description of Latin America’s experience in the 1970s and 1980s.

between intermediaries and the firms to which they lend, as

well as a greater role for government allocation of capital, including what sometimes amounts to government subsidization of the banking sector relative to securities markets.¹²

4.6 While generalizations are difficult across a wide class of disparate economies, the Asian model of finance tends to feature:

- high debt/equity ratios
- greater reliance on bank loans than on securities markets
- closer relationships between banks and borrowers
- extensive corporate cross-shareholding
- greater guidance from the government in credit allocation

4.7 Five to ten years ago, economists were wondering if the Japanese system might be superior to the Anglo-Saxon one. Research took both theoretical and empirical forms. The theoretical models assumed “asymmetric information” (between borrowers and lenders). The idea is that, from the viewpoint of a firm seeking to finance an investment project, the typical investor in the securities markets is a stranger, who has no way of knowing whether to expect your project to have as high a return as you claim. Such investors will demand a premium to compensate them. The empirical tests confirmed that firms were better able to finance their investment projects internally, than when they had to go to the securities markets and convince strangers of the worthiness of their projects. Thus relationship banking was thought to be a possible way around the asymmetric information problems that impede capital markets. It was said that American financial markets had excessively short horizons, and would cut a worthy firm off from funds when it was experiencing temporary losses. A Japanese main bank, by comparison, would be sufficiently familiar with the firm’s business that it would continue to furnish the necessary resources to see it through setbacks.

4.8 The question ultimately was an empirical one. The financial systems in Japan, Korea and other East Asian economies seemed to work very well. They had produced very high rates of saving and investment. In doing so, they seemed arguably the key to these economies’ high rates of growth.

4.9 Now aspects of these financial systems are looking somewhat tarnished. Every country has its bumps in the road; one does not want to conclude too much from a single episode. But recent

¹² Frankel (1995) reviews issues concerning Asian financial systems, with an emphasis on the notion that different structures may be appropriate at different stages of development.

developments have called into question various aspects of the model: close relationships between banks and corporate borrowers, heavy government involvement in resource allocation, and special priority to industrial sectors that were once thought key to industrial development or strategic in export markets (e.g., steel). The admired attribute of the Asian system, the readiness

of banks to lend to loss-making firms, proved precisely to be a source of difficulty, as many banks continued to lend to borrowers that should in fact have been cut off.

5 Macroeconomic stability

5.1 Macroeconomic stability, particularly low and stable inflation, is typically viewed as a precondition for--though not a guarantee of--economic growth. Consider inflation first. One theoretical description of how high inflation might retard productivity growth can be found in Milton Friedman's Nobel lecture (Friedman, 1977), the intellectual antecedents of which can in turn be traced to Hayek's description of the coordinative role played by the price system in a capitalist economy. Since prices signal vital information regarding the optimal allocation of resources, any disruption of the price system causes misallocation of resources, with a corresponding loss of efficiency. While it is less clear that high (as opposed to variable) inflation will induce such distortions, there is a general belief that the volatility of inflation, or at least its unpredictability, rises with its level. Other mechanisms by which inflation might affect growth have also been advanced; for example, it has been argued that unexpected inflation discourages saving by transferring income from lenders to borrowers.

5.2 Several studies, including Barro (1995) and Fischer (1993) have sought to quantify the effect of inflation on economic growth.¹³ These studies find that higher inflation reduces growth by a small, though meaningful, amount: each percentage point of inflation depresses a country's growth rate by 0.02 to 0.05 percentage point. Hence, a country with a five percent inflation rate sacrifices anywhere from 0.10 to 0.25 percentage point of growth per year relative to a country with no inflation. It is estimated that an increase in the inflation rate from 5 percent to 105 percent reduces the growth rate by nearly 4 percent per year.

5.3 While most attention has focused on inflation, some authors have identified other macroeconomic factors as having an impact on growth. One such factor is government fiscal policy. It is easy to postulate a mechanism through which large budget deficits or heavy tax burdens might retard growth; for instance, government borrowing can crowd out private capital accumulation. Also, unbalanced government fiscal policy might be a symptom of other, related problems--such as an overall lack of good governance--that could adversely affect a country's productivity growth [see below].

¹³. In addition, Rudebush and Wilcox (1994) find evidence in U.S. data that even moderate inflation depresses productivity growth.

Fischer also finds that distortions in foreign exchange markets reduce economic growth, perhaps by discouraging foreign direct investment and/or trade more generally.

5.4 It is worth stressing that low inflation and/or low budget deficits do not ensure that a country will enjoy healthy macroeconomic performance. As Fischer himself points out, several franc-zone economies in Africa have had low inflation over the 1980s and 1990s, but have

nonetheless grown slowly. However, he emphasizes that high inflation appears incompatible with sustained economic growth. In other words, monetary stability is necessary but not sufficient.

6 The role of openness to trade and investment

6.1 There is a positive relationship between a country's growth rate and the extent to which it is open to trade and investment. Until fairly recently this relationship was understood in relatively simple terms. Trade was understood to facilitate specialization in the production of goods that a country is best able to produce--the principle of comparative advantage. This specialization brings about a more efficient use of existing resources and raises the level of real income on a per capita basis, but doesn't permanently alter the rate of growth. The marriage of the "new" growth theory, which accounts for the endogeneity of technological change, and the "new" international trade theory, which incorporates the notion of imperfect competition, yields insight into the ability of openness to facilitate permanently higher growth rates, rather than merely a small increase in the level of income.

6.2 Openness to trade and or investment can facilitate the transfer of technology from rich/high technology countries to poor/low technology countries. The mechanism through which the technology can be transferred can take on any of a number of forms. A high rate of economic interaction with the rest of the world speeds the absorption of frontier technologies and global management best practices, spurs innovation and cost-cutting, and competes away monopoly.

6.3 As emphasized by Grossman and Helpman (1991a,b), technological spillovers could come via imports as easily as exports. One source of technology transfer is the ability of a poorer country to imitate the production of higher quality goods that have been developed in the rich country. Another important channel is through the importation of higher quality intermediate inputs. By incorporating higher quality inputs into the production process, the extent of domestic value added per unit of domestically added inputs can be enhanced.

6.4 In addition to trade, direct investment can also facilitate the transfer of technology from one country to another. In this context, "technology" can include managerial practices and worker skills, in addition to the physical process of production and the characteristics of the product. Foreign firms will train employees who may subsequently transfer to a domestically owned firm and bring with them the knowledge that they have acquired.

6.5 The process whereby late-comers catch up to the productivity and income levels of those that have gone before has some special attributes in the East Asian case, which sometimes go under the name “flying geese pattern of development.”¹⁴ Countries adopt the commodity composition previously exhibited by those that are one step ahead of them on the ladder. Direct investment into the follower country is an important component of the process of transferring knowledge and production characteristics. One interesting aspect of the flying geese pattern is that it suggests that a country with a high ratio of unskilled labor to capital, such as Indonesia, the Philippines, or China, might have more to learn from a country that made the transition to more advanced products relatively recently, such as Korea, than from a country at the frontier, such as Japan or the United States. [By analogy, a worker has more to learn from a colleague recently promoted to foreman than from a company executive.]¹⁵

6.6 A qualification to the benefits of foreign direct investment is the so-called headquarters effect. This is the alleged tendency of high-income, skill-worker-abundant countries, to take a substantial ownership position in a foreign firm and subsequently transfer the research and development efforts back to the rich country. The effect is to concentrate low-skill intensive activities in the poor country.

6.7 A prime example of the transfer of superior management practices is in the automobile industry. Prior to the 1980s, Japan’s just-in-time inventory methods ran contrary to common practice in the United States for example. This practice has now achieved wide acceptance. Firms in the United States have now attained historically low levels inventories.

6.8 Other schools of thought include “import substituting industrialization” (IS) and “export oriented industrialization.” The first in the past has been pursued extensively in African and South American countries with little success. The rationale behind this approach is related to infant industry arguments. By closing off domestic markets from international competition, domestic manufacturing is encouraged. These new industries will then receive protection until they are capable of competing on world markets. The fundamental flaw has generally been that such domestic industries rarely reach a level of efficiency that matches that in more competitive markets, and thus the barriers are seldom reduced. Export-oriented industrialization, on the other hand, prescribes a complex of policies intended to make exports

¹⁴ The inverted “V” pattern was intended by the originators of the flying geese metaphor--Akamatsu (1962) and Yamazawa (1990)--simply to describe the rise and fall of a given Asian economy’s comparative advantage in a given industry (say, textiles or toys, followed by radios, chemicals, steel, autos and high-tech). The same metaphor can be made more vivid by envisioning Japan as the lead goose in a horizontal “V,” flanked by Singapore and Hong Kong, then Korea and Taiwan, followed by Malaysia and Thailand, and Indonesia and the Philippines, and finally China and Indochina. The lead goose ascertains which economic territory is the most rewarding to enter, and the others in sequence follow the lead of those that went before. See Kwan (1994).

¹⁵ Frankel and Wei (1996) examine direct investment in the context of ASEAN, and give references.

a leading sector. The notion is to exploit opportunities presented by trading with the rest of the world on market terms, rather than adopting a strategy that deliberately tries to limit imports. This approach further relies on the exploitation of increasing returns to scale.

6.9 There is a substantial and growing empirical literature investigating the relationship between openness and growth. Quite a few empirical studies of growth rates across countries find that the ratio of exports to GDP, or some other measure of openness, is a significant determinant of growth,¹⁶ and often that it is an important determinant for East Asian economies in particular.¹⁷ A typical specification begins with the standard determinants of GDP suggested by neoclassical growth theory, and adds a variable for trade as a share of GDP. For example, Feder (1982) regresses growth rates for 31 semi-industrialized countries over the period 1964-1973 against three variables: investment as a share of income, the rate of growth of the labor force, and the rate of growth of exports (times exports as a share of income). The coefficient on the last variable is highly significant statistically. Similarly, Edwards (1993, pp.9-11) regresses the rate of growth of total factor productivity on two measures of openness--total trade as a percent of GDP and total tariff revenue as a per cent of trade--along with some other variables, and finds that "in every regression the proxies for trade distortions and openness are highly significant." Some, such as Harrison (1996), look to the policy determinants that underlie openness. Frankel, Romer, and Cyrus (1996) wrestle with the endogeneity problem: Does openness lead to growth, or does growth lead to openness? The effect of openness on growth turns out even stronger when correcting for the simultaneity, as compared to standard estimates. Each additional percentage point in openness (expressed as imports plus exports, divided by GDP), raises income per capita between 1960 and 1986 by an estimated 0.34 percent.

6.10 The broad evidence on openness and growth is consistent with effects coming via a variety of channels in addition to trade. Coe and Helpman (1995) find that countries' productivity levels are positively affected by domestic as well as bilateral import share measures of foreign research and developments: ie, intermediate goods that embody technology. Keller (1997) looks at individual industries and finds that foreign R&D is between 7 and 17% percent as effective as local research and development. Harrison and Revenga (1995) find a significant correlation between trade policy reform and increased investment flows. They suggest, however, that other factors may be more important; such as the general macroeconomic environment and macro-conditionality imposed by international

¹⁶ Examples include Michaely (1977), Krueger (1978), Feder (1982), Kohli and Singh (1989), Romer (1989), Quah and Rauch (1990), de Melo and Robinson (1991), DeLong and Summers (1991), Dollar (1992), Edwards (1993), van den Berg and Schmidt (1994), Sachs and Warner (1995, p.35-37), Harrison (1995), and Eusufzai (1996). Edwards (1993b) and Rodrik (1993) survey the literature.

¹⁷ Five examples are Helliwell (1992, 1995), Page (1994), Pack and Page (1994), and Fukuda and Toya (1995). Pack and Page find that manufactured exports, in particular, are important in the growth equation, and that this variable explains part of the East Asian success (and that its coefficient is the same as for other parts of the world). Bradford (1994) surveys the literature.

organizations.

7 Income distribution

7.1 The notion that inequality is in some way linked to economic development dates back at least to Kuznets, who argued that inequality should rise during the early stages of economic development, stabilize, and then decline as a country becomes more wealthy (a pattern that was dubbed the “Kuznets curve”). One mechanism that was suggested as the cause of this process is the increasing degree of urbanization that typically accompanies industrialization, the argument being that inequality is lower in rural areas.

7.2 Under the Kuznets process, development drives changes in inequality. A more recent view holds that inequality itself affects development. An oft-invoked example (which is attributed to Lucas, 1988) compares the development experiences of Korea and the Philippines: both countries were virtually equivalent in 1965 in terms of GDP per capita, population, urbanization, school enrollment, and so on, but income inequality was substantially higher in the Philippines. The subsequent growth of the Korean economy was far greater than that of the Philippines: six percent per year on average as compared with two percent. This example is confirmed by more extensive empirical studies; in virtually all cross-country growth regressions, income inequality is negatively correlated with future economic growth. In the case of Korea and some other East Asian economies, land redistribution after World War II is credited with creating initial conditions for growth. A distinction is drawn with Latin American countries, where conflicts arising from distributional concerns have at times in the past interfered with growth.

7.3 A number of theoretical models generate this negative correlation between inequality and growth. Bénabou (1996) groups these models into three general categories. In the first class of models, higher levels of inequality increase the electorate’s demand for redistributive policies by government. To the extent that these policies involve distortionary taxation, it follows that subsequent growth is impeded.¹⁸ A second broad class of models argues that a high concentration of wealth exacerbates the credit constraints that poorer producers face in developing countries. Finally, yet another category of theoretical work involves models in which inequality breeds social unrest, which has an adverse impact on development by reducing the security of property rights.

7.4 While equality might initially be good for development, it is nevertheless possible that subsequent increases in inequality may occur during the course of industrialization--and, in fact, may be necessary

¹⁸ This requires poorer agents to have some sort of access to the political process. An implication of this type of model is therefore that the effects of inequality tend to be more pronounced in a democracy. See Alesina and Rodrik (1994).

for industrialization to progress. For example, an increase in inequality might reflect a greater return to education or skill, which in turn induces greater accumulation of human capital. Regional income disparities within an industrializing country can also develop as better-endowed or better-situated provinces reap the rewards. On the other hand, the rise of a middle class (which typically reduces measured inequality) is sometimes seen as being necessary for industrialization in that it provides a demand for domestic production and acts a source of entrepreneurial capital and talent.

7.5 A negative relationship between inequality and growth does not necessarily imply that a developing country should engage in disruptive redistributive policies, for example, forced redistribution of land. However, it is easily seen that such a relationship strengthens the case for a policy measure such as subsidized education, which itself can augment growth through human capital formation [see above], in addition to any effects that work via the promotion of greater income equality.

8 Political and social conditions

8.1 Researchers have also attempted to quantify the effect of political and social institutions on long-term growth. Some of the factors that have been considered include: the form of a country's political system (*e.g.*, democratic *versus* autocratic¹⁹), its degree of economic freedom and/or lack of government interference in the economy, and its degree of political and economic stability (measured, say, in terms of the risk of collapse of its political or economic institutions). It is difficult *not* to believe that these factors matter for growth; and, unsurprisingly, proxy measures of political and social stability are often correlated with economic performance. Barro (1991), for example, finds that the frequencies of revolutions, coups, and assassinations have significant negative effects on growth. Economic freedom--the right to property and choice--is observed to have a strong positive correlation with growth.²⁰

8.2 It is somewhat less certain that these correlations are meaningful in a causal sense. We might expect, for instance, that poor economic conditions would tend to induce civil unrest, or that demand for access to the political system would increase as living standards improve. But Alesina, Ozler, Roubini, and Swagel (1992) find that political instability has a significant negative effect on growth, even when controlling for the simultaneous effect of growth back on stability.

8.3 One aspect of the political/social structure has received particular interest from students of

¹⁹ A review of empirical studies of the effect of democracy on growth finds some positive and some negative (Borner, Brunetti and Weder, 1995). Logically, authoritarianism can be used either in pursuit of good economic policies or in pursuit of bad. Democracy and freedom, whatever their economic effects, are, of course, highly prized for non-economic reasons as well.

²⁰ Gwartney, Lawson, and Block, 1996.

economic development, namely, the sources and effects of corruption (or rent-seeking more generally) on the part of government. Corruption, while not unknown in developed countries, is particularly common in many developing countries. Some researchers have argued that high returns to rent-seeking behavior can adversely affect the allocation of human capital in an economy, with obvious ramifications on economic performance. In addition, as Shleifer and Vishny (1993) have pointed out, “the illegality of corruption [and corresponding need for secrecy] make it much more distortionary and costly than its sister activity, taxation.” Finally, Wei (1997) finds that economies where corruption is more pervasive tend to receive less foreign direct investment on average.

9 Concluding Remarks

9.1 To summarize, statistical studies find that the strongest determinants of countries’ long-term growth rates are investment in physical and human capital (especially investment in infrastructure and education), openness with respect to international trade and investment, and economic freedom. Also important are macroeconomic stability, financial structure, and political and social stability.

9.2 Many East Asian economies have many of these characteristics in abundance. This observation helps explain the miracle growth rates of the past, and helps reassure us of strong performance in the future as well. On the other hand, some slowdown seems likely, in three ways:

- as the gap separating these economies from the front-runners narrows,
- as they run into diminishing marginal returns to investment
- and as they encounter bottlenecks created by shortages of highly skilled labor, outdated financial structures, overloaded infrastructures, congested cities, and unacceptable environmental damage.

While the first two eventual limitations to continued miracle-growth are probably inevitable, the bottlenecks are not. The aim should be to emulate what industrialized countries have done right, and avoid what they have done wrong. Countries have it within their power to facilitate their movement up to the next stages of development, by further investments in physical and educational infrastructures, reform of their financial systems, and proper pricing of scarce environmental resources such as air, water, and roadways.

Appendix: A technical note on empirical studies of economic growth

The preceding discussion has cited a number of empirical studies that typically attempt to assess the contribution of some factor--say inflation or human capital accumulation--to observed growth in output or productivity. This empirical strategy has come under serious criticism on at least two grounds: first, it is often impossible to assign causality convincingly (for example, it could well be the case that growth induces greater human capital accumulation--say if education is a consumption good--rather than *vice-versa*); and second, the statistical correlations are rather fragile.

Levine and Renelt (1992) provide a comprehensive critique of the empirical growth literature. They define a coefficient in a cross-country growth regression as “robust” if the coefficient keeps its sign and remains statistically significant no matter what other variables are included in the regression. Levine and Renelt find that “...the broad array of fiscal-expenditure variables, monetary-policy indicators, and political stability indicators considered by the profession are not robustly correlated with growth; and a huge assortment of new indicators...constructed to capture exchange rate, trade, tax, and fiscal-expenditure policies are also not robustly correlated with growth.” In fact, the only truly robust correlation that Levine and Renelt find is between growth and the share of capital investment in GDP.

Levine and Renelt’s definition of what comprises a robust correlation has been seen as too strict by some authors, notably Sala-I-Martin (1997). Sala-I-Martin points out that even a factor that truly matters will occasionally show a contrary result, if one experiments with a large number of tests, and thus will fail the Levine-Renelt definition of robustness. He proposes an alternate test in which, essentially, distributions are generated for the coefficient estimates *across specifications*; this in turn allows him to assess the “strength” of a variable’s correlation with growth performance. He finds that a relatively large number of variables are robustly correlated with economic growth, including investment’s share in GDP, a number of political and social indicators, and openness.

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