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THE MYSTERY OF GROWTH: SHOCKS, POLICIES, AND SURPRISES IN OLD AND NEW THEORIES OF ECONOMIC GROWTH

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This paper explores new conceptual views of economic growth which focus attention on the importance of initial conditions, random shocks, and changes in expectations. The role of shocks and policies in new and old views of growth is discussed and empirical evidence is examined pertaining to growth experiences across countries on the role of shocks, and on the relationship between national policies and economic growth.

In the 19th century, one early economics pundit identified a particular developing country as not being really promising: "*Wealthy we do not think it will ever become: the advantages conferred by nature... and the love of indolence and pleasure of the people themselves forbid it.*"[1]

A little bit later, another visitor had similar worries about this country's people. Although the labour was "lowly paid", the return to labour was "equally so". Watching the men at work, said the observer, "made me feel that you are a very satisfied easy-going race". Managers despairingly informed this observer that "it was impossible to change the habits of national heritage".[2]

Much later, after some success and then disaster, outside observers still thought the same developing country would need a lot of help for the foreseeable future. *"Her economic position is extremely weak... it is difficult to see how she can by her own unaided efforts build up her resources even to a modest standard."*[3] Foreign economic advisors thought the country would at best export "knickknacks" to underdeveloped countries.[4] One Western leader thought that "by the standards of modern civilisation", this country was "like a boy of twelve."[5]

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[1]Quoted in Lipton and Sachs (1992, 250), Brookings Russia paper.

[2]James Fallows, More Like Us, p. 21.

[3]George Sansom, "Conflicting purposes in Japan," *Foreign Affairs*, January 1948, pp. 305, 309

[4]Schaller, Michael. *The American Occupation of Japan: The Origins of the Cold War in Asia.* Oxford University Press, 1985.

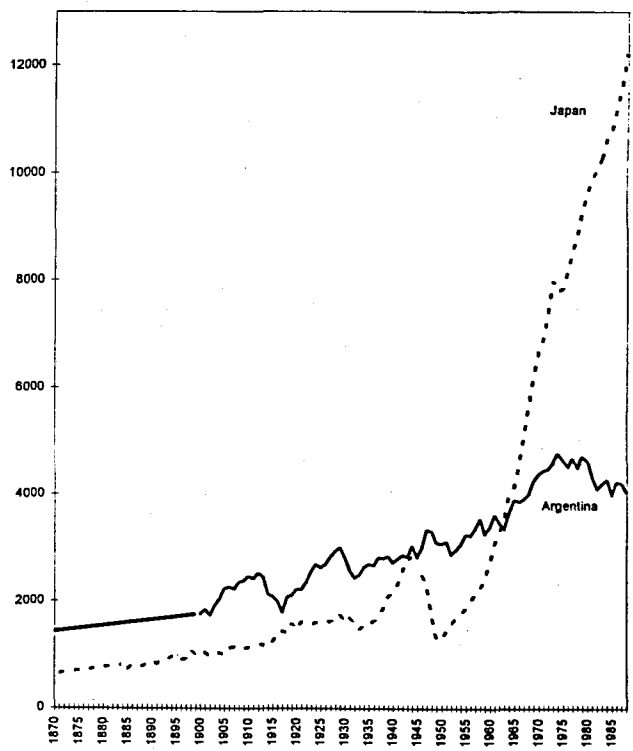
[5]Fallows, Looking at the Sun, p. 125.

The country in question, which is Japan, is graphed in Figure 1. Japan is compared to an economy that was originally thought to show much greater promise, Argentina. The dates of the quotations are 1867, 1913, and 1948.

How did Japan succeed where Argentina failed? How much do actions by governments explain growth outcomes like these? How much does growth depend on purely random events? In new conceptual views of economic growth that have become popular among economists, initial conditions, random shocks, and changes in expectations can drastically change economic growth rates. At a casual level of observation, the highly volatile growth rates in the real world seem to bear this out. This sensitivity of growth to shocks may seem to limit the ability of national policies to affect long-run growth. Yet the same conceptual views that acknowledge growth to be sensitive to surprises also show how growth can be transformed by policy changes. Statistical evidence confirms that national policies do have very strong effects on a country's long-run growth.

Section 1 discusses the role of shocks and policies in new and old views of economic growth. Section 2 looks at growth experiences across countries for evidence of the role of shocks. Section 3 surveys statistical evidence on national policies and economic growth.

Figure 1. PER CAPITA INCOME IN ARGENTINA AND JAPAN, 1870–1988



1. NEW AND OLD VIEWS OF GROWTH

This section sets out in a highly simplified way some of the differences in implications between new and old views of economic growth.

Economists' view of economic growth has undergone a lot of change in recent years. A group of iconoclasts has suggested a new view of growth whose implications are very different from the old.[6] To put it succinctly, the old view assumed that capital scarcity implied high returns to capital; the new view assumes that capital scarcity implies low returns.

The old view of growth assumed that where capital is scarce, it has a high return. There was a natural plausibility about this: when you give a machine to a worker who does not have one, it has a big productivity effect. Together with the assumptions of constant returns to scale and the existence of inalterable factors like labour supply, the assumption of diminishing returns has a sharp prediction. During the transition to a new steady state, growth in capital-scarce countries will be high because of the high returns to capital. So poor countries should catch up fairly rapidly to richer countries.

Just to write down the algebra, the neoclassical production function is:

$$y = A\,k^{\alpha} \tag{1}$$

where y and k are output per worker, and capital per worker, respectively.

Let us follow the convention of the literature in assuming identical consumers and producers maximising utility (assuming a logarithmic function of consumption for simplicity) over an infinite horizon, with a discount rate of ρ. We also assume zero labour growth for simplicity.[7] We also do not allow for any exogenous technological change, so A is fixed. The optimal rate of growth is then:

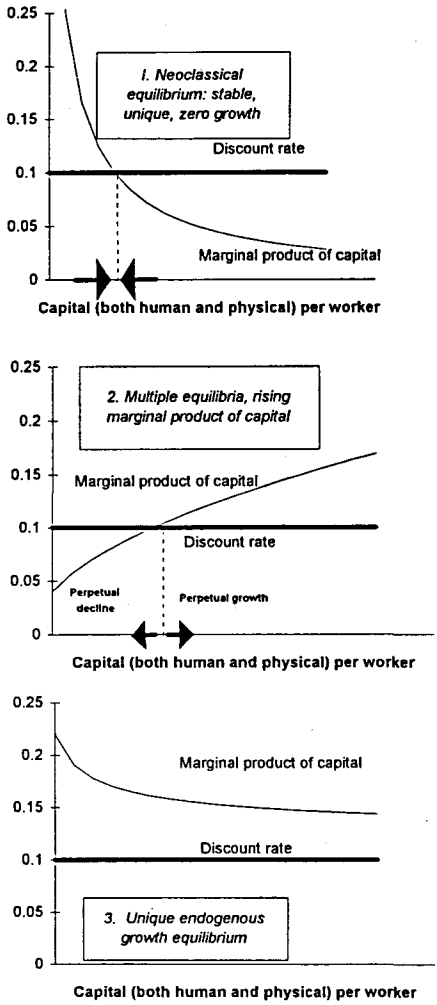
$$dy/y = (Ak^{\alpha-1} - \rho) \tag{2}$$

Growth is high when capital per worker k is low, then declines as k rises. Growth stops when the rate of return to capital is just equal to the discount rate ρ. The constant-k steady state is unique and stable. Figure 2, Panel 1, shows the equilibrium where the rate of return line crosses the horizontal

[6]The new literature on economic growth was led by Romer (1986) and Lucas (1988, 1993). As many have pointed out, the "new" literature contains many echoes of ideas popular in the development and growth literature of the 1950s and 60s, and even echoes from Solow's original 1956 article (see Srinivasan (1993)). The idea of constant returns to capital, for example, has always been a staple of growth models in the development literature (see the work of Taylor (1979, 1983)). The methodology of growth regressions was also common in the development literature (e.g. Balassa 1978).

[7]If labour growth is not zero, then one has to consider deep philosophical issues like whether consumers maximise the per capita welfare of their descendants, or the sum of absolute welfare of their descendants, or something in between. If it is the first, population growth will have a negative one-for-one effect on optimal per capita growth; if it is the second, population growth will have zero effect on optimal per capita growth.

Figure 2. EXOGENEOUS AND ENDOGENOUS GROWTH, ALTERNATIVE SCENARIOS



discount rate line.[8] There is no growth in the long run if there is no change in A, but neoclassical theory usually supposes a constant rate of change in A that will generate long-run growth. In this Figure, that corresponds to a continuous shifting out of the marginal product line.

The new growth theorists have suggested that capital has a higher return where it is already abundant, because of various externalities to capital accumulation, and resulting strategic complementarities. I will list some of the possible mechanisms soon, but let's start with the algebra. If there is an externality to output k^{β} from the average level of per capita capital stock in

[8]This discussion is in terms of economies closed to capital flows. There are also obvious implications for an open economy model: if capital has high returns where it is scarce, then capital should flow from rich to poor countries.

the economy, then optimal growth becomes:

$$dy/y = (Ak^{\alpha+\beta-1} - \rho) \tag{3}$$

If the externality is sufficiently strong such that $\alpha + \beta > 1$, then the rate of return to capital rises with the level of capital per worker.

Figure 2, Panel 2 shows the corresponding rate of return line. The point where the rate of return line crosses the discount rate line is no longer a stable equilibrium; there are now multiple equilibria. If consumers start to the right of this point, they will want to accumulate capital forever, thus generating endogenous growth. Growth will be a virtuous circle of capital accumulation attracting yet more capital accumulation. For this to happen, a critical mass of human and physical capital has to be in place. If consumers start to the left of this crossover, they will want to decumulate capital continuously — endogenous decline. The economy has to pass a minimum threshold level of human and physical capital in order to be able to grow.[9]

The need to pass a threshold makes growth sensitive to shocks. Suppose a country is in the growing regime, then suffers a civil war that wipes out a large fraction of the capital stock, moving the economy into the declining regime. A temporary shock like a civil war could permanently alter the fortunes of the economy, moving it from growth to decline.

Other shocks common to developing countries could work in similar ways. Without working out all the details, let's think about a severe permanent drop in the world price of the commodity in which a country is heavily specialised, rendering unprofitable and useless part of the capital stock devoted to the production of that commodity. To make this hand-waving example work, we suppose that capital investment is irreversible, that capital in commodity production is associated with a range of exogenous production costs like extraction difficulty, and hence that some of the capital simply has to be junked at the new world price. The drop in world price will have an effect like the civil war, effectively wiping out from the economic point of view part of the capital stock. In the neoclassical model, this would have just been a temporary setback — after losing some of your capital, you just start accumulating again. In the new growth models, the terms of trade shock can permanently reverse the direction of the economy from growth to decline. Losing some of your capital may take you below the threshold where it is no longer worthwhile to accumulate capital.

On the good side, an infusion of capital, foreign aid, or a favourable terms of trade shock could bring you above the threshold and enable you to take off.

[9]Again, we are only discussing economies closed to capital flows. In an open-economy model, if capital has a high return where it's abundant, then capital flows to where it is already abundant. This model predicts both a human capital flow (a brain drain) and a physical capital flow from poor to rich countries, the opposite of the old growth model prediction.

Even a temporary receipt of aid or a temporary commodity windfall that passes into saving could be enough to do the trick if one is close to the threshold.

What are the mechanisms for such a fateful externality in the new growth literature? The list is a long one. Moreover, not all of the growth models simplify exactly to (3). But at the risk of oversimplification, it is true that many of the new growth models will have similar predictions to (3). The original suggestion of Romer (1986) was that there was a strong learning-by-doing externality to capital. Romer himself (1993) has subsequently stressed the nonrival nature of knowledge about producing new goods once this knowledge is created. Other views (e.g. Lucas (1988), Azariadis and Drazen (1990), Becker, Murphy, and Tamura (1990), Kremer (1993)) have stressed human capital (we could redefine K to include both physical and human capital). The average level of human capital in a society may have a strong externality to the production of new human capital. Returns to human capital may be rising at low levels of human capital because there is some minimum threshold for economically useful human capital. With strong complementarities in production, an educated person may have a higher return where there are other educated people for her to work with than where there is no one else with her skills.

Other models stress geographic interactions (Krugman 1991). Where there is a lot of capital is where the market is, where the suppliers are, and where the specialised business services are. With fixed costs to starting a new factory and nonzero transportation costs, there are strategic complementarities in capital accumulation in a given location. A similar idea is that technology choice by firms (between "traditional" and "advanced" technologies) depends on the size of the market if the advanced technology has fixed costs (Murphy, Shleifer, Vishny (1989)). The size of the market in turn depends on how many firms choose the advanced technology (since the latter is more productive and raises income). Thus there are strategic complementarities between firms, with multiple equilibria of all firms choosing advanced technology. A "big push" could move the economy from one equilibrium to another, so could a big shock.

The new growth models create a large role for luck and history. But policies also matter. Policies that lower the rate of return to private capital — like high taxes on income, exchange or import controls, financial repression that penalises financial intermediation — make the threshold for takeoff higher and takeoff less likely. With an income tax t on income from production, for example, (3) becomes:

$$dy/y = ((1 - t)Ak^{\alpha + \beta - 1} - \rho) \tag{4}$$

Higher t shifts the rate of return line down, which makes the threshold for growth at higher k. In other words, a higher tax rate expands the region in

which there will be decline and shrinks the region in which there will be growth. Moreover, we can see from (4) that higher taxes make growth lower even if a country is in the growing region and make decline steeper if it is in the declining region.

If countries are close to the threshold, growth is likely to be volatile. Good luck on terms of trade, good policies that make investment attractive, and favourable expectations could all interact to get one above the threshold and to create rapid growth. Then a shift in policies, a bad shock on terms of trade, a political crisis that reverses the favourable expectations, could abort the rapid growth and send the economy down again.

1.1 Models in the Middle

The new growth models are appealing because they offer a rationalisation for the failure of development of very low-income economies like the African ones, and they could explain reverse flows of capital and human skills from poor to rich countries. However, the new growth models also have at least one unappealing prediction, which is that growth accelerates as economies get richer. We can see from (3) that growth should keep accelerating as per capita capital stock rises if $\alpha + \beta > 1$. Now in the very big picture, it is true that world growth has accelerated since the 1700s, with each successive fastest grower (United Kingdom, United States, Germany, Japan) experiencing higher growth rates. A model like (3) may thus be roughly consistent with the stylised facts of very long-run world economic growth. Kremer (1993) discusses how population growth has certainly accelerated over time (since 1 million BC, for example), and relates this to predictions of accelerating growth with increased scale. However, the stylised fact of rising world growth seems a little shakier from the less long-run point of view because of the slowdown in world growth since 1973. And the prediction of accelerating growth certainly seems counterfactual from the viewpoint of cross-section comparisons, where the rich economies grow no faster on average than the middle-income economies. The convergence literature has argued in fact that rich countries grow more slowly once we control for initial stocks of human capital and other factors (Barro and Sala-i-Martin (1992)).[10]

Some authors have sought to modify the unappealing prediction of accelerating growth in new growth models. Some suggest that the externalities are only important at low income levels, making the production function concave-convex (Becker, Murphy, Tamura (1990), Azariadis and Drazen (1990)). There will still be multiple equilibria, but countries in the good equilibrium will experience declining growth just as in the Solow model.

There is also the popular and tractable model proposed by Rebelo 1991 in which $\alpha + \beta$ is exactly equal to unity. This might at first seem like a rather

[10]There is also some evidence that the conditional relation between initial income and growth is hump-shaped, with growth of middle income countries higher than both low-income and high-income countries (Baumol, Blackman and Wolff (1989), Easterly (1994)).

implausible constraint on a purely technological parameter (as argued by Stiglitz 1992 and others). But what Rebelo actually argued was something a little different: he suggests that the neoclassical assumptions of constant returns and diminishing returns to physical capital were fine, it was the assumption of an exogenous fixed factor (raw labour) that we should get rid of. If all factors can be accumulated — labour can be accumulated by increasing human capital without limit — and there are constant returns to scale, then output will be proportional to the aggregate of human and physical capital. That is, if K is reinterpreted as including both human and physical capital, then $Y = AK$. In this model, equilibrium is unique and stable, and there is neither convergence nor divergence of economies. Policies will have growth effects, since growth in (4) now becomes $(1 - t)A - \rho$.

Another attempt at a middle ground was Jones and Manuelli, who suggested an even smaller modification to the neoclassical model. They noted that endogenous growth was feasible in the neoclassical model if the marginal product of capital diminishes not to zero, but to some positive constant. This positive constant will asymptotically play the role of A in Rebelo's model. One model that can have this feature is output as a CES production function of K and L:

$$Y = A(\gamma K^{\varepsilon} + (1 - \gamma)L^{\varepsilon})^{1/\varepsilon} \tag{5}$$

If we suppose that $\varepsilon > 0$, so that the elasticity of substitution between labour and capital is greater than one in absolute value, then the marginal product of capital goes asymptotically to the following as the capital/labour ratio goes to infinity:[11]

$$\partial Y/\partial K \Rightarrow A\gamma^{1/\varepsilon} \text{ as } K/L \Rightarrow \infty \tag{6}$$

The assumption $\varepsilon > 0$ could be seen as a weaker version of Rebelo's assumption that all factors are reproducible: only in the limit can we substitute away from the non-reproducible factors.

Figure 2, Panel 3, shows that when the marginal product of capital curve lies above the discount rate, there will be a unique, positive growth equilibrium. If the marginal product of capital line cuts the discount rate line, then the economy will stagnate at a steady state with constant capital per capita.

What are the implications of these models in the middle for the effects of shocks and policies on growth? All of these models predict strong policy effects on growth, just like the increasing returns to capital models. The concave-convex production functions also imply a big role for shocks if countries are close to the threshold that determines which of the multiple

[11]The result that growth can be sustained indefinitely in a CES with elasticity of substitution above 1 has been known for over 30 years, but was dismissed as a curiosum.

equilibria one goes to. The Rebelo and Jones-Manuelli models have unique equilibria and shocks should not be very important. A one-time shock could pass permanently into income if the proceeds of the shock are saved (or dissaved for a bad shock), but even then the effect on growth will be modest and transitory.

2. GROWTH IS OFTEN A SURPRISE

Let's now look at some characteristics of growth experiences in the real world. Ideally, one would like to use empirical evidence to distinguish between new and old models of economic growth, and between different varieties of new models. Unfortunately, this has not been accomplished very successfully in the literature, and indeed has hardly even been tried. In this and the next section, the goal is much more modest. Evidence on the effects of shocks and policies on growth rates will be discussed, leaving to the reader to interpret the findings in the light of the various alternative models discussed in the first section. We will look first at shocks.

The evidence for the importance of shocks is fairly strong. We see first of all that growth rates are remarkably unstable.[12] Figure 3 shows the per capita growth rates of countries in both 1960–73 and 1974–88.[13] We see a mess of data with no clear pattern — countries that were in the top half in 1960–73 fell into the bottom half in 1974–88, and vice versa. It is *not* true that the same countries are the consistent good performers, or the consistent bad performers. Rather, countries are success stories one period and disappointments the next, often without warning.

The correlation coefficient across the subsequent time periods shown in Figure 3 is only 0.2. This coefficient summarises a surprising fact: only 20 percent of the variation of growth rates over the 14-year periods shown here is due to permanent differences between countries; the remaining 80 percent is due to factors that change over time. Nations do not have permanent superiority in growth performance due to some unchanging national characteristics, like cultures, institutions, or tradition; growth is eminently changeable.

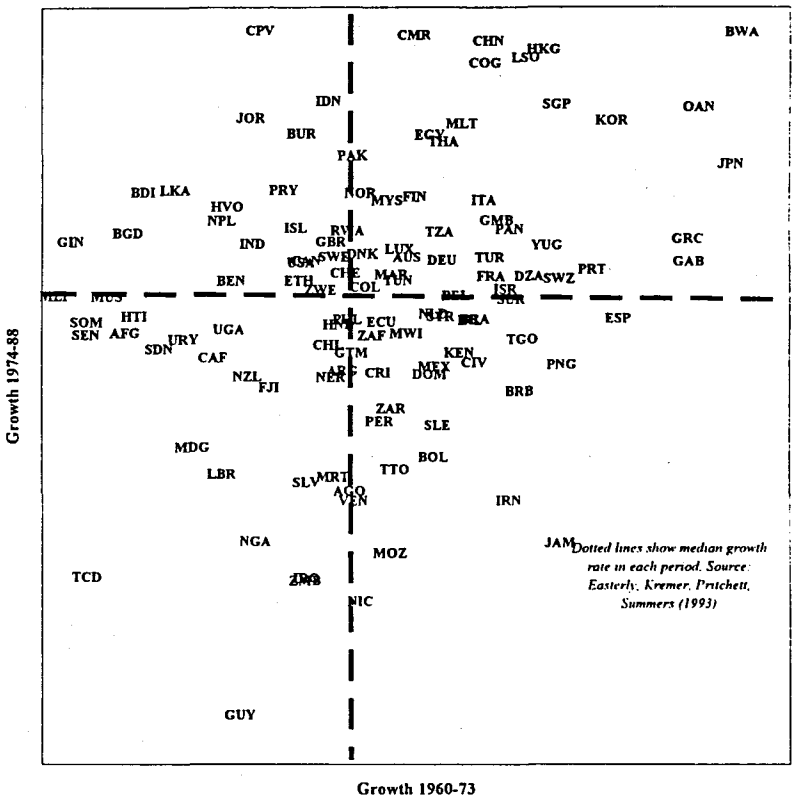
This low persistence is not an artefact of the breakpoint or period lengths chosen for Figure 3. In fact, the low persistence is remarkably unchanging across different period lengths and break points. Even across subsequent 30- year periods since 1870, the correlation across periods is only 0.1 — i.e. only 10 percent of the variation in such data is due to fixed country characteristics.

The lines drawn in Figure 3 show the median world growth rate in each period. We see that a number of the Latin American countries were above

[12]This volatility of growth rates could also be consistent with a neoclassical growth model with a unique steady state, if all countries were close to their own steady states. In that case, random shocks would dominate growth rates. Arguably, however, this condition could not then explain why growth is so sensitive to the levels of policy variables.

[13]The evidence cited here and in the succeeding paragraphs is from Easterly, Kremer, Pritchett, and Summers (1993).

Figure 3. PER CAPITA GROWTH RATES, 1960–73 AND 1974–88



average in 1960–73, only to fall well below world median growth in 1974–88. Examples include Bolivia, Brazil, Costa Rica, the Dominican Republic, Ecuador, Mexico and Peru.

Brazil is one of the more dramatic examples. Brazil was described as a miracle beginning in the late 1960s and through most of the 1970s. Today, the only reason people use the word miracle in relation to Brazil is to pray for one to occur.

Chile is an even more dramatic example, where the word miracle has been used more than once over the past two decades. Chile grew, per capita, by 2.5 percent between 1960 and 1972, then contracted 6.3 percent per annum from 1972 to 1976, rose again at 5.5 percent per annum between 1976 and 1981, dropped 10 percent per annum from 1981 to 1983, then grew again by 3.2 percent between 1983 and 1990. The last *two* expansionary phases have both been widely celebrated as the "Chilean economic miracle".

Volatile growth is not limited to Latin America. Mauritius, for example, had zero growth in the '60s, but then became an economic miracle in the '70s with 7.3 percent per capita growth. Indonesia was below average in 1960–73 before becoming one of the vaunted East Asian success stories in 1974–88. Nigeria

went in the opposite direction: from 2.6 percent growth in the 1970s to a contraction of 4.8 percent per year in the 1980s. The *typical* country saw its per capita growth change up or down by 3.5 percentage points from the '70s to the '80s, after a change of 2.5 percentage points from the '60s to the '70s.

The only significant exception to the volatile growth rule is the spectacularly consistent success of Japan and the Four Tigers (Korea, Singapore, Taiwan, and Hong Kong).[14] These nations are almost the only ones to remain in the top right-hand corner of Figure 3, indicating persistent success across periods. Yet, in the longer run, even some of these nations fit the rule: Korea's and Taiwan's growth was poor prior to 1960. Japan's growth has been impressive over a longer period, although the recent slowdown could indicate that even in Japan, success is not forever.

2.1 Predictions and Surprises

In view of the instability of growth rates, it is not so surprising that we have often been surprised by both success and failure — as we already saw for Japan. The first World Bank mission to Korea described the country's first development programme as absurdly optimistic, in light of the dismal growth in the 1950s: "there can be no doubt that this development programme [the GDP growth of 7.1 percent forecast for 1962–66] *far exceeds* the potential of the Korean economy . . . it is *inconceivable* that exports will rise as much as projected." {Italics added} Korean growth during 1962–66 was actually 7.3 percent, after which it accelerated.

In the early 60s, a group of distinguished economists picked out Sri Lanka as most likely to succeed in Asia, certainly more so than, say, Taiwan. Taiwan's growth over the subsequent 15 years was 7.3 percent; Sri Lanka's was 0.3 percent.[15]

The World Bank's early economic reports also picked out as likely stars the Philippines ("second only" to Japan in potential) and Burma (in light of its "remarkable economic progress", its "long-run potential compares favourably with that of other countries in South East Asia"). Of course, Burma and the Philippines are among the few Southeast Asian countries to which the word "miracle" has NOT been applied.

Asia as a whole was thought to have the worst prospects among developing countries. A development textbook in 1963 ranked them dead-last in development potential — behind Latin America, sub-Saharan Africa, and the Middle East.[16]

Africa was considered as a more likely candidate for stardom than Asia. After rapid African growth in the '50s and '60s, the World Bank's chief economist predicted in 1967 that Africa's economic future was "bright". He even picked out

[14]For a recent interpretation of East Asia's success, see World Bank (1993a), Thomas and Wang (1993), Young (1992), World Bank (1993b), and Pack and Page (1993).

[15]Hicks (1990).

[16]The reference is to Enke (1963).

seven particularly promising African economies that had "the potential to reach or surpass" a 7-percent growth rate. All those economies he picked out had negative per capita growth from that day to this.[17]

Latin America was considered the region most likely to succeed in the 1960s. A group of economists predicted in the early 1960s that Argentina and Colombia would far outpace Hong Kong and Singapore. Instead, Hong Kong grew twice as fast as Argentina, and Singapore more than twice as fast as Colombia.[18]

2.2 Terms of Trade Surprises

One reason that growth is volatile is because many countries' growth rates are highly sensitive to favourable or unfavourable terms of trade movements. Figure 4 makes this point. The countries in the 1980s with the most favourable terms of trade shocks (a gain of about 1 percent of GDP each and every year of the 1980s) had positive per capita growth of 1 percent per annum in the 1980s. The countries with the most adverse terms of trade movements (a loss of about 1.7 percentage points of GDP) had negative per capita growth of 1.6 percent per annum. This sensitivity to shocks seems consistent with the new view of growth that one can go from a virtuous to a vicious circle in a hurry.

Moreover, to add insult to injury, even some of the variation in our measures of policies is explained by external shocks. For example, the black market premium on foreign exchange — often used as a generalised measure of price distortion — is itself affected by changes in the terms of trade.

Many successes and failures are a function not only of economic policies but also of the shocks that they have experienced. Venezuela's disastrous growth in the last decade has been generally attributed to major policy mistakes, and this is no doubt accurate. But Venezuela's growth has been even worse than it would have been because bad policies interacted with a very bad shock to the terms of trade — because of Venezuela's dependence on oil exports, the collapse of the oil price in the 1980s gave Venezuela one of the world's worst terms of trade shocks measured as a percent of GDP. Conversely, Mauritius is often celebrated as an example of policy-induced success in Africa. And policies likely have helped Mauritius achieve its rapid growth in the 1980s. But growth was even easier because Mauritius had one of the world's largest terms of trade gains in the 1980s — benefiting from the fall in oil import prices and gains in its sugar export prices.

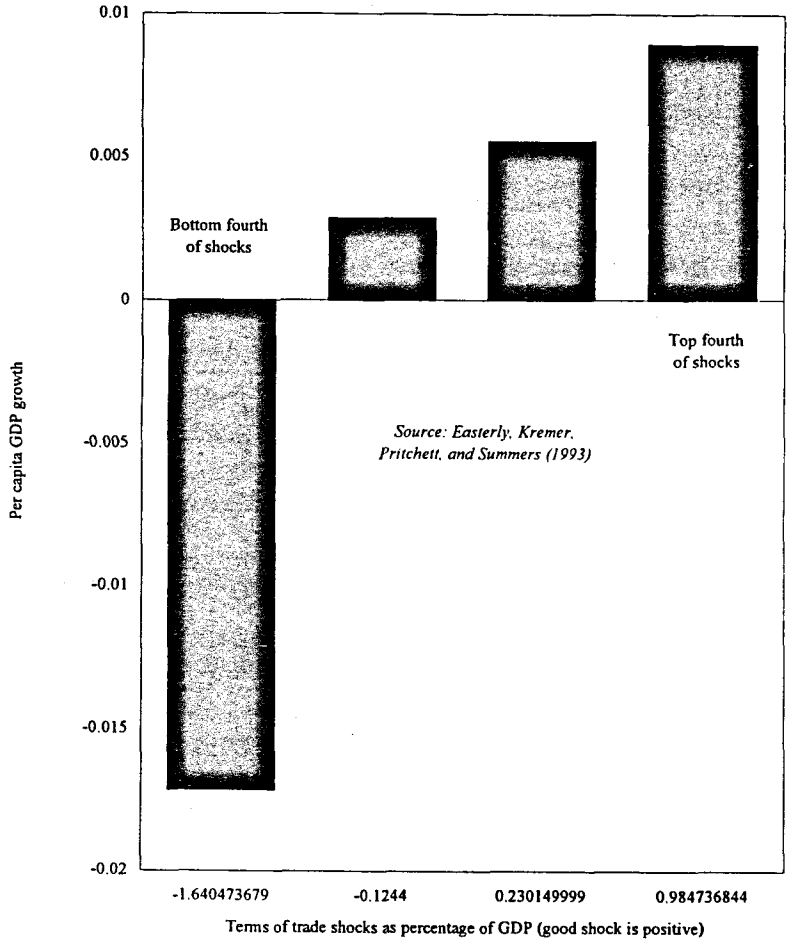
3. POLICY EFFECTS ON GROWTH

Luck matters, but policy also matters. A large amount of study of national economic policies and economic growth has identified some strong associations.

[17]The quote is from Kamarck (1967). See the World Bank's (1994) study of Africa, and Easterly and Levine (1994) for a summary of the disastrous growth outcomes.

[18]Hicks (1990).

Figure 4. EXTERNAL SHOCKS AND ECONOMIC GROWTH IN THE 1980's



3.1 Quantifying Policy Effects on Growth

Table 1 lists the magnitudes of policy effects on growth that have been identified in several recent studies.[19] An increase in the average years of schooling of the labour force by 1.2 years through increased public provision of primary and secondary education will raise growth by one percentage point.[20] A reduction in the role of the central bank in credit allocation — reducing the central bank's share in total credit by 28 percentage points — will raise growth by one percentage point.[21] An increase in public investment in transport and communication by 1.7 percentage points of GDP will raise

[19]This is not intended to be a survey of the vast empirical literature on policies and growth. I am listing some empirical results from a recent Journal of Monetary Economics special issue on growth (December 1993) as examples.

[20]Barro and Lee (1993).

[21]King and Levine (1993).

Table 1. STATISTICAL ASSOCIATIONS BETWEEN POLICIES AND GROWTH

An increase in per capita growth of one percentage point is associated with:	
An increase in average years of schooling of the labor force of:	1.2 years
A reduction in the share of central bank credit in total credit of:	28 percentage points
An increase in the ratio to GDP of public investment in transport and communication of:	1.7 percentage points
A fall in inflation of:	26 percentage points
A reduction in the ratio of the government budget deficit to GDP of:	4.3 percentage points
A fall in the percentage premium of the black market over the official exchange rate of:	36 percentage points

Notes: Table shows association with growth of each policy indicator in isolation, other things equal. Sources (respectively): Barro and Lee (1993), King and Levine (1993), Easterly and Rebelo (1993), and Fischer (1993).

growth by one percentage point.[22] Macroeconomic stabilisation that brings inflation down by 28 percentage points will raise growth by one percentage point.[23] A reduction in the government budget deficit of 4.3 percentage points will raise growth by one percentage point.[24] A unification of the foreign exchange market that eliminates a black market premium of 36 percentage points will raise growth by one percentage point.[25]

With such potent policies at the government's disposal, the potential for policies to overcome bad luck on terms of trade is clear (not to mention the potential for ruining good luck with bad policies). Let's set out a hypothetical experiment. Suppose a country has a 50-percent fall of export prices in a decade. What policy package could offset this? Picking from the menu of policies listed in Table 1, the following combination would do the trick: (1) 10 percentage points lower share of the central bank in total credit; (2) 1 percent of GDP more public investment in transport and communication investment; (3) 2 percentage points of GDP lower government deficit; and (4) elimination of a black market premium of 10 percentage points.

Moreover, it could be that how a country reacts to external shocks can be as important as the shocks themselves. Nigeria and Indonesia provide an effective point-counterpoint. Both are relatively poor economies that relied heavily on oil revenues in the 1980s. But when oil prices collapsed in 1986, Indonesia responded swiftly by cutting budget expenditure; Nigeria delayed its reaction so that macroeconomic imbalances reached crisis stage. Restrictive import policies to redress the exploding Nigerian current account deficit

[22]Easterly and Rebelo (1993).
[23]Fischer (1993). See also Corbo and Rojas (1993).
[24]Fischer (1993), Easterly and Rebelo (1993).
[25]Fischer (1993). See also Harrison (1993), and Edwards (1992) on openness and growth.

made a bad situation worse. The sensitivity of growth to terms of trade shocks may reflect the fact that most countries behaved more like Nigeria than Indonesia.

Case study evidence also makes us suspect that specific macroeconomic policy mistakes may be responsible for some of the instability of growth rates; such mistakes may turn successes into failures in a hurry.[26] The "Chilean economic miracle" of the late 70s, already mentioned, was undone by an appreciating real exchange rate as the nominal exchange rate was held fixed in the face of continuing inflation. Mexico's high growth of the 60s and early 70s was undone by fiscal excess in the late 70s and early 80s. Cote d'Ivoire's exemplary growth prior to 1975 was derailed by mismanagement of the coffee and cocoa boom of the mid-1970s.

3.2 Successes and Setbacks

Will policies help us distinguish between countries or regions that are successes and those that are failures? Can we use policies to explain some of the differences between East Asia and other regions?

3.2.1 East Asia and Latin America

Figure 5 decomposes the income gap that opened up between East Asia and Latin America over 1965–89. The decomposition is based on a regression taken from Easterly and Levine (1994), which was used in that paper to explain Africa's also disappointing performance.[27] The regression, which uses pooled decade-average growth rates and policy indicators, is reproduced in the Appendix. The growth difference between East Asia and Latin America is decomposed into elements which represent a given policy difference between the two regions, times the estimated effect of that policy on growth. For example, the part of the growth difference associated with budget deficits is calculated as (Latin America's average budget deficit — East Asia's average budget deficit)*(coefficient on budget deficits in growth regression). The regression covers 1960–89, but we show just the time period since 1965, which is when East Asia caught up with Latin America.

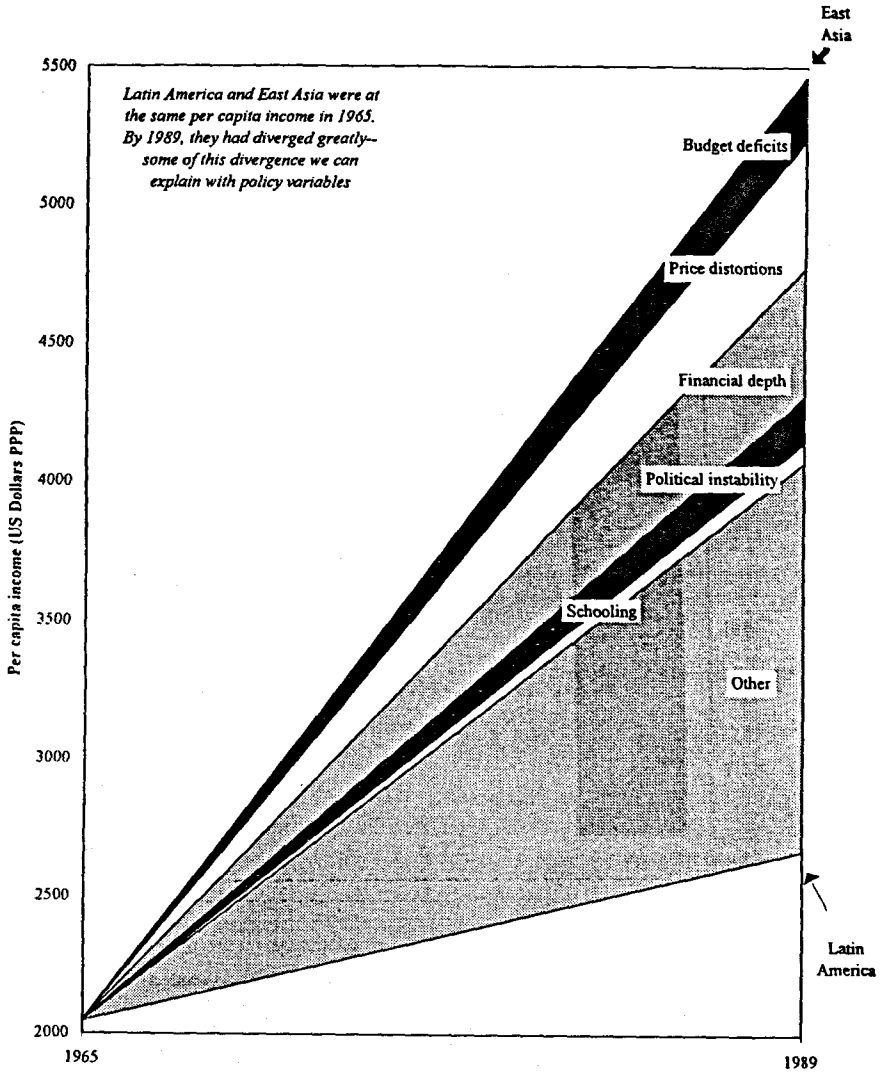
The regression includes the policy indicator variables that have proven most robust in statistical analysis (also limiting the policy variables to those for which a reasonably large sample is available).[28] These are the financial depth of the economy, the black market premium (a measure of price distortions), and the government's budget deficit (measured as the central government deficit only to maximise the sample size). The regression also includes several other now-standard variables: the mean years of schooling of the labour force (from Barro and Lee (1993)), a measure of political

[26]Bruno (1993, 1994) and Bruno and Easterly (1994) present evidence on how discrete inflation crises can explain some of the instability of growth rates.

[27]This decomposition technique is inspired by a similar exercise by Barro and Lee (1994).

[28]The importance of robustness checks was dramatised by the results of Levine and Renelt (1992).

Figure 5. HOW MUCH OF THE EAST ASIA–LATIN AMERICA GAP CAN WE EXPLAIN WITH POLICY VARIABLES?



instability (number of political assassinations), and initial income. Initial income is entered as a quadratic to allow for the possibility that middle-income countries may benefit more than low-income countries from the potential to catch up to advanced countries.

Figure 5 makes clear that not everything can be explained with cross-country statistical analysis of policies and growth. Although the regression statistics are very satisfactory, there remains a large unexplained differential between East Asian and Latin American growth (shown as "other"). This term reflects the statistically significant and negative Latin America effect

that remains in the regression even after controlling for policy variables (as well as a slightly positive but insignificant East Asia effect).

Latin America's higher political instability does help explain part of the growth differential.[29] However, East Asia's educational attainment does not explain much of the growth differential, as Latin America's educational attainment does not lag far behind East Asia's.

In spite of the limitations of cross-country statistical comparisons, it is striking that there are three simple indicators of policies that can explain a significant fraction of the growth differential between East Asia and Latin America. As shown in Figure 5, the lower budget deficits in East Asia, East Asia's higher financial depth, and East Asia's lower price distortions (lower black market premia on foreign exchange) combined to give a large kick to East Asian growth as it pulled away from Latin America.

3.2.2 East Asia and Africa

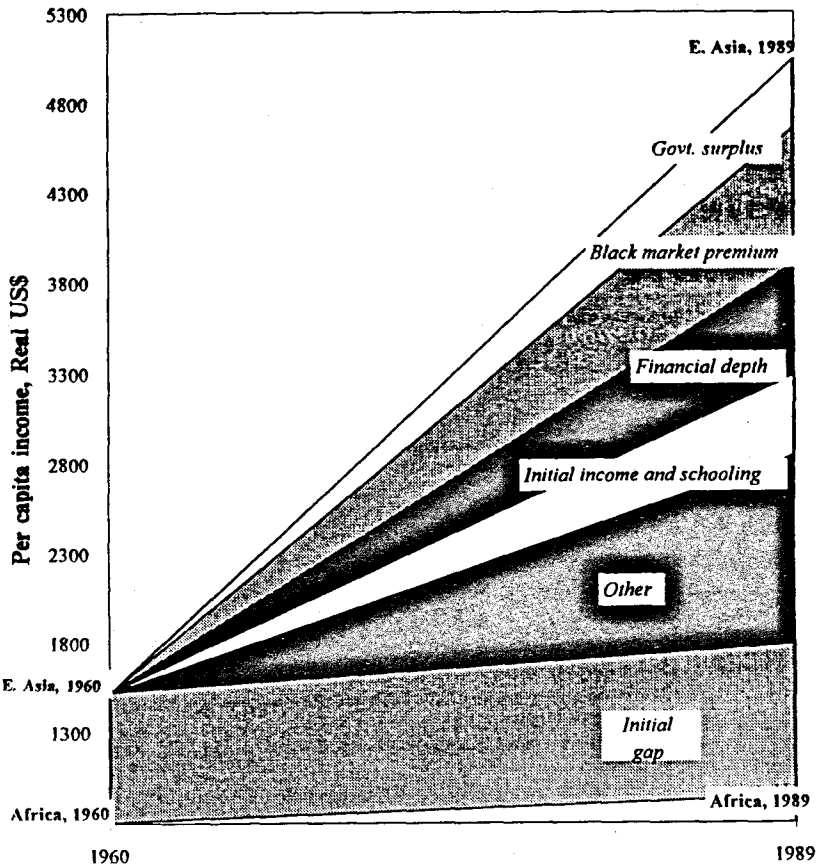
Figure 6 provides the same kind of illustrative decomposition and comparison of the growth performance of Africa versus East Asia, where policy differences are greater. In 1960, Africa's GDP per capita was about $800 while East Asia's was about $1,500. By 1989, Africa's GDP per capita was only about $900, while East Asia's had grown to about $5,000. Political instability was not significantly different between the two regions, at least according to the measure used here. About $850 of the $4,100 gap is due to the original percentage gap in GDP per capita. Policies (financial depth, black market premium, and the government surplus) explain $1,750 of the large gap that emerged over the 1960–89 period. Initial income and schooling in each decade explain $450 of the gap (the disadvantage of lower African schooling more than offsets the advantage of lower initial income in Africa). About $1,050 of the $4,100 gap between East Asia and Africa remains unexplained.

These two exercises show that much but not all can be explained. Growth regressions do successfully explain why East Asia did well, Latin America did worse than expected, and Africa did very badly indeed. At the same time, there remain large and statistically significant growth differences between regions that are unexplained. This may reflect deep-seated country characteristics that are unfavourable for growth, such as Africa's ethnic strife or Latin America's high inequality.[30] The unexplained differential may also reflect how imperfect are the measures of policies by which we try to explain growth differences. Finally, the unexplained residual is consistent with the

[29]See the recent survey by Alesina (1994) on the literature on political instability and growth.

[30]On inequality and growth, see Birdsall and Sabot (1993), Alesina and Rodrik (1994), Persson and Tabellini (1994), and Clarke (1994). On ethnic strife, Easterly and Levine (1994) find some evidence for ethnic divisions being associated with increased corruption, unfavourable policies, and lower growth.

Figure 6. DECOMPOSITION OF THE EAST ASIA AND AFRICA GROWTH GAP



new views of growth that allow some role for random events to change growth outcomes even when policies are unchanged.

4. CONCLUSIONS

Theory and evidence tell us that growth is subject to surprises. Commodity windfalls, terms of trade losses or gains, and other forms of luck beyond a country's control do matter quite a bit for growth even in the medium run. But national policies like financial sector reform, public infrastructure investment, low budget deficits, and maintenance of low and stable inflation also have strong effects on medium-run growth.

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APPENDIX: GROWTH REGRESSION FOR DECOMPOSITION OF EAST ASIAN VERSUS LATIN AMERICAN/AFRICAN GROWTH

LS / / Dependent Variable is GYP
Number of observations: 193
Heteroskedasticity-Consistent Covariance Matrix

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
DUM60	-0.2993107	0.1007544	-2.9706959	0.0034
DUM70	-0.2958322	0.1007023	-2.9376914	0.0037
DUM80	-0.3120710	0.1001451	-3.1161883	0.0021
AFRICA	-0.0135641	0.0053777	-2.5222975	0.0125
LATINCA	-0.0148372	0.0033212	-4.4674337	0.0000
EASIAP	0.0031427	0.0050335	0.6243556	0.5332
LRGDP	0.0914238	0.0261713	3.4932812	0.0006
LRGDPSQ	-0.0064378	0.0017283	-3.7250300	0.0003
LSCHOOL	0.0107039	0.0051292	2.0868446	0.0383
ASSASS	-15.749136	6.5977817	-2.3870350	0.0180
LLY	0.0204562	0.0065385	3.1285762	0.0020
BLCK	-0.0183441	0.0051185	-3.5838986	0.0004
SURP	0.1182126	0.0428476	2.7589100	0.0064

R-squared	0.543118	Mean of dependent var.	0.020842
Adjusted R-squared	0.512659	S.D. of dependent var.	0.025791
S.E. of regression	0.018004	Sum of squared resid	0.058349
Log likelihood	508.1809	F-statistic	17.83123
		Prob (F-statistic)	0.000000

Variables:

GYP Per capita growth, decade averages for 60s, 70s, and 80s.
DUM60 dummy variable for 1960s.
DUM70 dummy variable for 1970s.
DUM80 dummy variable for 1980s.
AFRICA dummy variable for Africa.
LATINCA dummy variable for Latin America.
EASIAP dummy variable for East Asia and Pacific.
LRGDP Log of real GDP (1985 PPP US dollars, Summers and Heston 1991), initial value each decade.
LRGDPSQ Square of log of real GDP.
LSCHOOL Log of average schooling attainment in years of labour force (Barro and Lee (1993)), initial value each decade.
ASSASS Numbers of Assassinations (Barro (1991)), average each decade.
LLY Ratio of liquid financial liabilities to GDP (King and Levine 1993), initial value each decade.
BLCK Log of black market premium on foreign exchange (Easterly, Kremer, Pritchett, Summers (1993)), average each decade.
SURP Central government deficit to GDP ratio (International Financial Statistics IMF), average each decade.
Source for regression: Easterly and Levine (1994).