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ON THE PROCESS OF GROWTH AND ECONOMIC POLICY IN DEVELOPING COUNTRIES

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The findings and conclusions in this report are those of the author and do not necessarily represent the views of USAID.

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Preface

This paper is one outcome of a larger inquiry into the process of growth and economic policy undertaken in 2004–05 by USAID and Arnold Harberger. The effort included meetings and discussions over several months with representatives of multilateral institutions such as the IMF and World Bank, think tanks such as the Center for Global Development and the Center for Strategic and International Studies, and principals in USAID, including Administrator Andrew S. Natsios.

USAID and most other international donors view economic growth as an essential component of the process of raising living standards for poor people in developing countries. This paper focuses on understanding the process of economic growth, the sources of growth, how growth may be reliably measured, and the role of economic policies in facilitating or impeding growth.

In this paper, Harberger provides real-world examples to illustrate the basic concepts and processes that lead to economic growth: the facilitative character of appropriate economic policies, the importance of a competitive private sector in real cost reduction, the idea that growth results from an accumulation of "changes of level" rather than from a self-sustaining process, and the importance of applied welfare economics as an instrument of development policy.

This paper contains a wealth of information and insight, which should be easily understood by the noneconomist. This paper should be required reading for all development professionals seeking a brief, informative explanation of the relationship of economic policies to economic growth, and how the process of growth works to combat poverty in developing countries.

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On The Process of Growth and Economic Policy in Developing Countries

Introduction

The aim of this paper is to help readers understand the problems of fostering economic growth and combating poverty in developing countries. It provides insight into how the process of economic growth really works and explores how economic policy can operate to liberate the forces of growth. It also calls attention to the fact that increased productivity has historically been the most reliable path to poverty reduction, and hence merits a position of high priority in national and international efforts.

This paper provides insight into how the process of economic growth really works and explores how economic policy can operate to liberate the forces of growth.

The Recent Record of Unprecedented Success

Few people, even among the normally well-informed, are aware of how outstanding the world's recent economic performance has been. It is not an exaggeration to say that the half-century from 1950 to 2000 was the greatest in history in terms of improvements in the health, prosperity, and welfare of the world's population. Further, the quarter-century from 1975 to 2000 has no problem in claiming the championship as the best ever. The data to support these assertions are easy to find. The UNDP's *Human Development Report 2003* reports that life expectancy at birth (world average) rose from 58.4 years in 1970–75 to 66.6 years in the first years of this century. These improvements were almost precisely matched in developing countries, where life expectancy moved from 55.8 to 65.1 years. The least developed countries were not left behind—their average rose from 43.7 to 51.4 years. Simultaneously, infant mortality fell worldwide from 96 per 1,000 live births to 56 per 1,000, and in developing countries from 109 to 61 per 1,000. In the least developed countries it dropped from 150 to 99 per 1,000 live births.

We present these figures at the outset to reinforce the story told by the more strictly economic data, which show

that world GDP almost doubled in real terms during the last quarter-century. This feat was amply surpassed in developing nations, whose real GDP grew over the same period to more than 2.5 times its initial level.[1] Table 1 makes clear that poverty need not breed despair: growth in low-income countries surpassed that of middle- and high-income countries. The only areas that witnessed negative per capita growth were the countries of the former Soviet Bloc and in sub-Saharan Africa—the first suffering from the turmoil of transition, the second from massive internal conflicts, political disorganization, and the scourge of HIV/AIDS.

Growth between 1975 and 2001 in the world's 10 most populous countries is summarized in table 2. It makes clear that the very positive picture that emerges from the aggregate data also extends to this group of countries, which contain about 60 percent of the world's population. In six of these countries, GDP per capita growth exceeded the average world rate of 1.2 percent, and China and Indonesia had extremely impressive performances.[2]

Champions of growth in the period 1975–2001—countries that achieved annual per capita growth rates of 4 percent or more over this time span—are presented in table 3. Notably, five of these countries (Korea, Thailand, Indonesia, Chile, and Malaysia) achieved this rate in spite of having suffered a major crisis during the period. Korea experienced political upheaval in 1979, which, along with an oil crisis and crop failure, cut economic growth to –2.1 percent in 1980. Similarly, Indonesia's GDP fell by 13.1 percent in 1998 under the stress of a banking crisis and political turmoil, and Chile's dropped by 14.2 percent in 1982 under the combined weight of an international debt crisis, a failing internal banking system, and plummeting copper prices.

Table 1. World Economic Growth 1975–2001

	Growth Rate (% per Year)		
	Population	GDP Per Capita	Total GDP*
World	1.6	1.2	2.8
Advanced countries (OECD)	0.7	2.1	2.8
Developing countries	1.9	2.3	4.2
Least developed countries	2.5	0.4	2.9
Arab states	2.7	0.3	3.0
East Asia/Pacific	1.4	5.9	7.3
Latin America/Caribbean	1.9	0.7	2.6
South Asia	2.1	2.4	4.5
Sub-Saharan Africa	2.8	–0.9	1.9
CIS/Central/East Europe[1]	0.5	–2.5	–2.0
High-income countries	0.7	2.1	2.8
Middle-income countries	1.5	1.6	3.1
Low-income countries	1.8	1.6	3.4

Sources: UNDP (2003); table 5 for annual population growth rate, 1975–2001; table 12 for annual growth rate of GDP per capita, 1975–2001.

* = column 1 + column 2.

[1]Commonwealth of Independent States.

What do these countries have in common that may signal the likely source of their success? I believe they were all outstanding in the degree to which they undertook and accomplished significant structural adjustment and in the degree to which their economic policies reflected the broad outlines of the "Washington consensus" of macroeconomic stability, domestic liberalization, and, of course, international openness.

It is very difficult to find simple measures that summarize the merits and demerits of a country's economic policy. Each country has different types of comparative advantage, production patterns, resource endowments, geographic layouts, and historical experiences. But one point on which economists widely agree is that it is strongly in a country's interest to open its economy to the rest of the world and to make the most, via trade, of its own comparative advantage. A straightforward measure that is very

1 Data are from UNDP, *Human Development Report 2003*. Life expectancy and infant mortality data are from pp. 26–55, GDP data are from pp. 278–81, and population data are from pp. 250–53.

2 Recognizing that China has a heavy weight in the results for this group, I also present summary figures excluding that country.

likely to reflect a country's efforts in this direction is the course of its exports. Table 4 tracks the exports of the 10 "champions," showing that they nearly tripled their share of world exports over the 1975–2001 span.

Several of these countries began their success stories wrapped in a snarl of economic controls, regulations, and constraints: Korea and Indonesia in the 1960s, Chile in the early 1970s, and Vietnam and China into the late 1970s and even early 1980s. Singapore and Hong Kong were the only growth champions that had historically followed a liberalizing line. But all these growth leaders eventually developed into market-friendly countries with policies that consciously tried to clear the path for the forces of economic growth to work.

Dissecting the Process of Economic Growth

It is absolutely crucial to recognize that all economic growth takes place at the level of the productive enterprise: otherwise it is impossible to have a clear understanding of the growth process. To elaborate, GDP is measured as the sum of the product produced in all counted economic activities of a country. Sometimes it is measured at the level of final goods and services, but it obviously incorporates all the value added (during earlier stages) that went into those final products. Even more often, in building national accounts, we count the value added by each activity along the way, thus catching all the various pieces that end up constituting the final product of the economy.

Table 2. Economic Growth in the 10 Most Populous Countries 1975–2001

	Population, 2001 (millions)	Growth Rate (% per Year)		
		Population	GDP Per Capita	Total GDP*
China	1,285.2	1.3	8.2	9.5
India	1,033.4	2.0	3.2	5.2
United States	288.0	1.0	2.0	3.0
Indonesia	214.4	1.8	4.3	6.1
Brazil	174.0	1.8	0.8	2.6
Russian Federation	148.9	1.3	–1.2	0.1
Pakistan	146.3	2.8	2.7	5.5
Bangladesh	140.9	2.4	2.3	4.7
Nigeria	117.5	2.9	–0.7	2.2
Mexico	100.5	2.0	0.9	2.9
Total or average	3,649.1	1.6	4.5	6.1
Excluding China	2,363.9	1.7	2.6	4.3
World	6,130.1	1.6	1.2	2.8

Source: UNDP (2003); table 5 for total population and annual population growth rate; table 12 for annual growth rate of GDP per capita

* = column 2 + column 3

Table 3. Growth Champions, 1975–2001

	Growth Rate (% per Year)		
	Population	GDP Per Capita	Total GDP*
China	1.3	8.2	9.5
Korea	1.1	6.2	7.3
Thailand	1.5	5.4	6.9
Singapore	2.3	5.1	7.4
Vietnam	1.9	4.9	6.8
Hong Kong	1.7	4.5	6.2
Indonesia	1.8	4.3	6.1
Ireland	0.8	4.2	5.0
Chile	1.5	4.1	5.6
Malaysia	2.5	4.1	6.6
World	1.6	1.2	2.8

Source: UNDP (2003); table 5 for annual population growth rate; table 12 for annual growth rate of GDP per capita.

* = column 1 + column 2.

Table 4. Merchandise Exports of Growth Leaders, 1975–2001 (U.S. Billions)		
	1975	2001
China	6.9	266.1
Korea	7.7	150.4
Thailand	2.2	65.1
Singapore	5.4	121.8
Vietnam	0.2	15.1
Hong Kong	8.5	189.9
Indonesia	8.5	56.4
Ireland	3.2	83.0
Chile	1.6	18.3
Malaysia	3.8	88.0
Group Total	48.0	954.1
World Exports	816.5	6,129.0
Leaders' Share of World Exports	5.9	15.6

Source: International Monetary Fund, *International Financial Statistics*.

The scientific approach to measuring growth, which has been used over the past 50 years or more, breaks it down into five components:

- added labor
- improved quality of labor (through education, training, experience, etc.)
- added capital (net investment during a period)
- the rate of productivity of capital[3]
- an extremely important fifth component that goes by various names, including technical advance, change in total factor productivity (TFP), shift of the production function, or what I like to call real cost reduction (RCR).

Why the label *real cost reduction*?

- RCR is something every business executive understands and identifies with.
- RCR serves as its own justification: for a businessperson to seek to reduce costs is just as natural and self-justifying as for consumers to look for ways to increase the satisfaction they get out of their income and their assets.

Why is this idea important? Because too many economists have for too long sought simple explanations of productivity increases. Once one realizes that real cost reduction is something every business seeks, it is immediately apparent that it can take a thousand forms:[4] one can mechanize loading, computerize payrolls, downsize operations, outsource goods and services, change management styles, add or subtract a shift, shift from metal to plastic, introduce incentive bonuses, or move to piece rates. For example, in El Salvador, I was being shown through a maquila operation for assembling blue jeans. The scene was a shed, almost an open-air operation, but with a roof to protect it from the daily rains. Some 200 women were at work, each at a sewing machine. As I watched, I heard music coming from a set of loudspeakers in the roof. When I remarked on this to the owner, he replied, "Yes, and would you believe it—when I installed the music system, productivity went up by 20 percent!"

Clearly, real cost reduction can take place in a thousand ways, but always it is something that business people are actively searching for. Once this concept is recognized, it becomes easy to see how the incentive to reduce real costs can be blunted or even destroyed:

- In public enterprises, managers often get into trouble when they find labor-saving ways to cut costs.
- In monopolies, regulation may provide a guaranteed rate of return, leading managers to not care about reducing costs.
- In highly protected industries, owners and managers may be free from the challenges of competitors. Many end up enjoying a life of ease while high

[3] For example, invest 10 percent of your income at a rate of return of 10 percent and you get a 1 percent (10 percent × 10 percent) increase in income. Invest at a 20 percent rate of return, and your increment is 2 percent (10 percent × 20 percent).

[4] Note that RCR applies to products at the high as well as low end of the market.

import tariffs guarantee safe, steady profits.

In summary, the five principal ways to generate growth are using more labor, using labor of greater skill and capacity, adding capital via net investment, finding investments of high real rates of return, and continually finding new ways to reduce real costs. All occur at the level of the productive enterprise, and so it is there that the real action of economic growth takes place.

The Role of Economic Policies

The preceding pages make clear that economic policies do not by themselves typically create economic growth. In my opinion, strong education policies come closest to driving growth by raising the skills and capacities of a country's labor force. But today's educational activity does not begin to bear fruit for some10–15 years, when the people who are now being educated finally enter the labor force. Then, of course, the tree bears fruit for 30, 40, or even 50 years. But, in general, economic policies typically do not determine any element in the growth process. Rather, they operate to permit or impede these elements. In sum, one should not seek mechanical connections between economic policies and economic growth. One should instead think of the policy framework as creating an atmosphere or environment that can be helpful to—or impede—enterprises as they seek productive investments and new ways of reducing real costs. Thus, the connection between policy and growth is permissive rather than deterministic, and conducive rather than mechanical. Does this mean policy is unimportant or that we can forget about it or relegate it to a low priority? Not at all!

The easiest way to show the importance of economic policy is to trundle out a host of cases where bad policies brought an economy to ruin—Chile under Allende, Peru under Alan García, Indonesia under Sukarno, Nicaragua under the Sandinistas, and a dozen or more African countries over the last 25 years. It is not in the interest of even a predatory state to kill the goose,[5] yet that is indeed what happened with Allende, García, Sukarno, and the rest.

Countries can create a policy environment conducive to growth in the following ways:

- Keep inflation under control.
- Open the economy to competition from abroad.
- Try to keep policies from distorting or masking the true real costs of the economy's goods and services—both outputs and inputs. People have to see real prices and costs clearly in order to identify the most productive investments and to find opportunities for real cost reduction.
- In short, they can adopt the recommendations of the Washington Consensus.[6]

The Results of Good Policies

What is good economic policy? We should know the answer by now, for policy has been at the center of a great deal of economic analysis from the time of Adam Smith and even earlier. Can we count on good policies leading to steady growth at 6 or 7 percent per annum? History says no: *growth typically comes in spurts*. To see why, let us examine the growth process in more detail.

Many economists have delved into the empirical study of growth, particularly in recent decades. The results reported here are compatible with the great bulk of the findings of others, but they differ somewhat in emphasis. In any case, they represent our own work and our own focus. The first important conclusion is that it is very difficult to predict future winners. We already know this from the stock market, but it also applies to real cost reductions. For example, in the U.S. economy, industries that win the RCR race in one decade typically do not in the next. In the United States, winners in 1948–58 were communications, public utilities, and farming. The winners in 1958–67 were lumber and wood products, railroad transportation, textiles, and electrical machinery. The winners in 1967–76 were finance and insurance, apparel, communications, and chemicals.[7]

5 See Lal (2001).

6 This term was coined by John Williamson and refers to a public policy agenda aimed at creating an environment in which market forces are given ample scope to generate economic efficiency and growth.

7 See Harberger (1998, 6). Basic data are drawn from Kendrick and Grossman (1980). Industries were ranked by percentage of RCR during the indicated period. Those shown are the top-ranked four for each period.

Notably, the set of winners has changed completely from one period to the next. Only communications appears twice, but not in adjacent periods. Also notable is that the pharmaceutical industry does not regularly emerge as a leader. Many would expect it would because of the great amount of resources this industry devotes to research and development. Pharmaceuticals are not RCR champions, however, because the gains made as a result of their research are largely offset by the cost of those very efforts. They appear to get a normal rate of return on research and development costs. To the extent this is the case, we do not have true real cost reduction or productivity improvement.

A second important generalization from our work is that one firm's meat is another firm's poison. The winners' rate of return goes up as they reduce real costs, while their competitors typically lose market share and suffer reduced rates of return and even outright losses. Losing firms typically suffer negative RCRs, that is to say, increased real costs, because they are driven back to reduced volumes of output as demanders abandon them in favor of the innovators.[8] The idea of negative real cost reductions, or reduced total factor productivity, may seem strange at first, but one gets more and more comfortable with it as one thinks of different real-world cases:

- Foreign steel almost killed U.S. producers who stuck too long to outmoded technology.
- Wal-Mart and Target actually did kill many old department stores.
- Supermarkets killed most mom-and-pop grocery stores.

What we are witnessing is the true story of growth, for which Joseph Schumpeter coined the insightful phrase "creative destruction." The victory of the new and destruction of the outmoded are the essence of the growth process in a well-functioning market economy.

Effects of Trade Liberalization

Good trade policy is at the center of good economic policy. The message of market economics, ever since the days of Adam Smith and David Ricardo, has been that freer trade permits an economy to make better use of its resources. In fact, much economic analysis is spent examining the efficiency costs and gains arising from different kinds of policies such as tariffs, taxes, subsidies, incentive schemes, agricultural programs, minimum wages, price controls, and domestic content requirements. A key characteristic of such policies is that they typically introduce distortions that saddle the economy with more costs than benefits. Import tariffs are a classic example of policy-induced distortions. However, freer trade and other liberalizing measures reduce the force of these distortions and bring more benefits than costs.

Second, and very importantly, the main effect of introducing or eliminating distortions is to alter the level of economic output, not its period-after-period rate of growth. It is instructive to note that the standard analysis of free trade and tariffs says nothing about the growth rate and instead talks about economic efficiency. The rate of growth is affected as the economy transits from one level of activity to another, but the permanent effect is on the *level*, not on its *period-after-period rate of growth*. Take the example of a 50 percent import tariff and an exchange rate of 10 pesos = $1. The economy is saying to producers that they can safely use up to 15 pesos of resources to produce a product and be protected from competition from a similar imported product (costing $1 in world markets). At the same time, it says they can use only up to 10 pesos to produce an additional $1 by expanding exports. This example shows clearly why import tariffs are inefficient. Cut import substitution by $1 million and as much as 15 million pesos of resources are released (from activities protected by the 50 percent tariff). Yet, this same value of resources dedicated to export activities could generate as much as $1.5 million of export revenue.[9]

Another example, from my experience in Beijing in 1983, illustrates comparative advantage and how free trade contributes to more efficient allocation of economic resources. China's two main banks sent carefully selected employees—but none with training in Western-style market economics—to an intensive course on project evaluation sponsored by the World Bank. At that time, almost the only cars to be seen on the streets were Chinese versions of the 1942 Pontiac sedan, for which the dies and machinery had decades earlier been shipped to China. These cars weighed

[8] For more detail, see Harberger (1998, 6–18).

[9] This assumes that the resource costs of import substitute products can be as high as the duty-inclusive price of the corresponding imports.

about two tons and had a voracious appetite for fuel. Sprinkled among these behemoths, however, were a few contemporary Toyotas. The contrast was such that any visitor would notice it. But the point of the conversation was our Chinese participants' observation that "We started doing some calculations on autos. And we found that if we reduced by a certain amount the resources being used to make these big old cars, increased the resources in the textile and shoe industries by a similar amount, and then exported the textiles and shoes that these shifted resources produced in their new location, we could use the proceeds to buy two brand-new Toyotas for every big old car we had given up." The two participants had rediscovered, all by themselves, the essence of the principle of comparative advantage: creating more value for the same value of resources.

The benefits of trade liberalization can be illustrated in the same way. If a country has a 50 percent uniform tariff and an exchange rate of 10 pesos = $1, a dollar's worth of imports sells for 15 pesos, while the dollar's worth of exports only brings the exporter 10 pesos. Reducing the tariff to 40 percent will stimulate trade, with the extra exports (costing 10 pesos per dollar) paying for extra imports valued at 14–15 pesos per dollar. The excess of this benefit (14–15 pesos) over the cost (10 pesos) of the extra export dollars represents the gain from the tariff reduction.[10]

Using the same principle, consider a truly major trade liberalization such as reducing a uniform tariff from 50 percent to 10 percent. Suppose, too, that this reform generated a spectacular increase in trade, with exports going from 10 percent to 30 percent of GDP, and with trade being balanced both before and after the change. The gain to the economy from such a major trade liberalization would amount to 6 percent of GDP.[11] Some people find it sobering, even disappointing, when they learn that the consequence of such a major liberalization is a benefit of "only" 6 percent of GDP. However, they should realize that this benefit will go on indefinitely into the future.

If GDP were not to grow at all, the present value of this 6 percent improvement would be 60 percent of GDP at a 10 percent discount rate and 120 percent of GDP at a 5 percent discount rate (present value = annual benefits ÷ discount rate). If GDP is growing at 3 percent per year, the estimated present value of the same 6 percent benefit gets bigger. At a 10 percent discount rate it amounts to 86 percent of the first year's GDP, and at a 5 percent discount rate it goes to a whopping 300 percent of the first year's GDP (present value = first year's benefit ÷ [discount rate – rate of growth of benefit]).[12]

This example shows the substantial potential impact on GDP from trade liberalization. But note that this result does not posit any permanent change in the growth rate as a result of liberalization; rather, trade liberalization affects the *level* rather than the *rate of growth* of GDP. The rate of growth is not totally unaffected, but it changes only as a result of the transition from one level to another (see figure 1).

I cannot leave this topic without adding what may be a significant qualification. I earlier emphasized the important role that real cost reduction plays in the growth process: it is the factor that best discriminates between good and bad growth experiences and is a constant, never-ending objective of businesspeople. It is also reflected in thousands of ways and very difficult to predict. With these complications serving as caveats, we can say that competition typically

[10] This is because when the tariff is lowered on a product that was previously price protected, there will be some new imports of that product, although there will still be local production that will now have to compete with a tariff-inclusive price of 14 pesos.

[11] This is obtained by considering that the "first" increment to trade has a cost of 10 pesos per dollar and a benefit of 15 pesos per dollar (reflecting the initial 50 percent tariff), while the "last" increment to trade has a cost of 10 pesos and a benefit of 11 pesos per dollar. The "average" net benefit is thus equal to 30 percent [(50 percent + 10 percent) ÷ 2]. Applying this average net benefit to the increment of exports (20 percent of GDP), we obtain 6 percent of GDP as the overall benefit of the liberalization.

[12] In the calculation above, the assumption was that in the first year of liberalization, we see the full gain of 6 percent of a year's GDP. That would mean that if the economy were growing at 3 percent normally, then for that one year there would be a growth rate of 9 percent, with the 3 percent growth rate prevailing from year 2 onward. This is grossly unrealistic, as the effects of trade liberalization are realized only gradually, as major resource reallocations move toward export activities and away from import substitution in previously protected sectors. A more likely scenario would be 3 percent growth up to year 1, and then, say, 4 percent growth from years 1–6, followed by a resumption of 3 percent growth thereafter. An alternative would be 3.5 percent growth from years 1 to 12, again with a resumption of 3 percent growth thereafter. Both of these scenarios provide a cumulative gain of 6 percentage points of GDP, with the gain spread over a transition period (of 6 or 12 years in the cases cited) rather than packed into just one year (as in the original example).

Figure 1a. Effects of a Trade Liberalization, Educational Improvement, or Real Cost Reduction on the Growth of GDP: A Simple "Change in Level"

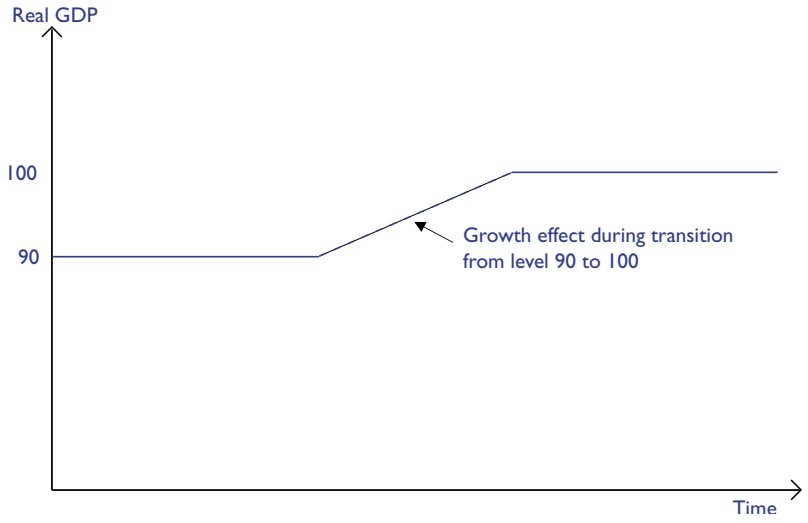
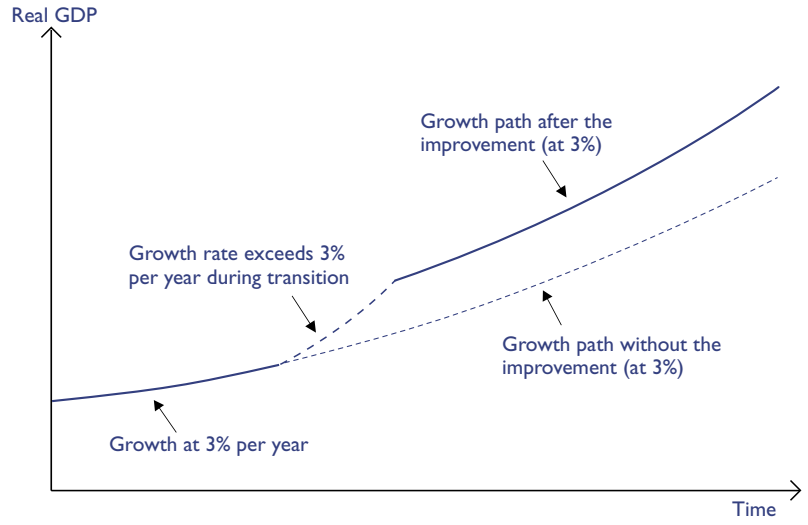


Figure 1b. Effects of a Trade Liberalization, Educational Improvement, or Real Cost Reduction on the Growth of GDP: A New "Improvement" Is Superimposed on an Economy Where Other Forces Lead to Growth of 3% per Year



operates to stimulate RCR. This effect stems from the fact that competition typically makes people work harder, strive more, and put out more effort. Thus we expect that in the more competitive situation that prevails after trade liberalization, people in affected industries will work harder to reduce real costs than they would under the umbrella of protection. There is modest but inconclusive evidence to support this assertion.[13]

In sum, we can be quite sure that although freer trade brings greater efficiency, it does not automatically lead to higher growth rates. Enough countries have joined the freer trade group so that a large permanent effect on growth rates should be readily visible. We must therefore presume that while some permanent effect probably exists, freer trade is only one of many factors accounting for observed rates of RCR.

Growth as an Accumulation of "Changes in Level"

An important recurring theme in economic growth is that an improvement in any one (or more) of its components (the labor contribution, the capital contribution, and the contribution of real cost reduction) will likely generate a permanent rise in the level of GDP, but only a blip in the growth rate. Raising the growth rate for an extended period requires a series of such blips, coming one after the other in rapid succession. And each blip requires its own push of extra effort. Extra growth does not come easily. It takes work—lots of work—opening new vistas period after period. It is wrong, often badly so, to think that big improvements in the growth rate will come automatically, as the concept of self-sustaining growth appears to imply.

[13] It is very difficult to distinguish between the transitional effect on the growth rate and the more lasting effect to which this paragraph refers.

Let us look at three examples of the growth process: adding new investment; increasing the quality, skill, and knowledge of the labor force; and introducing cost-reducing innovations. In each example, growth is generated by changing the level of GDP, not its long-term rate of growth. We have already seen how trade liberalization works mainly in this way.

Example 1: Adding a new investment of 1,000 to the economy with a 15 percent rate of gross return results in a flow of gross benefits of 150 at the start. This contribution will likely decline by 5 percent per year as the investment depreciates (assuming a 10 percent rate of net return and a 5 percent per year depreciation rate). If the depreciation is straight-line for 20 years, the expected flow of gross benefits from the investment would start at 150 and drift downward over the project's 20-year life. In general, each investment can be thought of as giving a positive pulse to the growth rate (+150 in these examples) followed by a series of small negative impacts as the contribution of this investment to GDP (its gross-of-depreciation rate of return applied to a capital value that diminishes year by year) declines. An extreme case would be an investment of the so-called "one-horse-shay" variety that produces a constant service yield (S) throughout its life and then collapses all at once. Here the impact would be a positive jump of +S in period 1, with zero contribution to growth thereafter, followed at the end of period N by a negative jump of –S.

Example 2: We add to the education level of the labor force of the country, increasing its earning power by, say, 12 percent. If labor's contribution to GDP was initially 500 out of a GDP of 1,000, this change would raise it to 560, producing a 6 percent rise in GDP. (I constructed this example so as to yield precisely the same increment to GDP as the trade liberalization discussed in the previous section.) We get the same effect: in a zero-growth setting, the present value of the benefits of this change would, in the simplest case, be 600 if we use a discount rate of 10 percent[14] and 1,200 at a discount rate of 5 percent.[15] If this change were superimposed on a path in which GDP was growing at 3 percent, its present value would be about 860 at a 10 percent discount rate[16] and 3,000 at a 5 percent discount rate.[17] Those calculations are based on a 6 percent extra jump of GDP in year 1, leading to 9 percent[18] growth in that year followed by 3 percent growth thereafter. The more likely scenario for such a change would be an extra 0.5 percent growth over 12 years, or an extra 0.25 percent growth over 24 years as successive new cohorts of better-educated people joined the labor force.

Example 3: Consider a cost-reducing innovation that leads to an increase of real product from 1,000 to 1,060 using the same resources as before. If the innovation is introduced over an extended period (as was the case with hybrid corn, antibiotics, the assembly line, computerization, as well as with just about every other innovation), the extra growth will be spread over time as in the earlier examples, leading to an extra 1 percent of growth over 6 years, an extra .5 percent over 12 years, or an extra .25 percent over 24 years. Again, the same figures as before apply. In a stagnation setting, where GDP is not growing, we have a steady stream of 1,000 being converted to a steady stream of 1,060, with growth only occurring in the transition from the 1,000 level to the 1,060 level.[19]

What lessons can we draw from these examples? First, a "standard" impulse of growth, regardless of whether it impacts the capital contribution, the labor contribution, or the contribution of real cost reduction, will typically operate via a "level effect," increasing the growth rate over a transition period, but not permanently.[20]

The second lesson is that to raise the growth rate permanently, we must keep introducing new impulses to growth. If we raise the average level of education from 8 to 9 years, we might achieve growth of 3.5 percent instead of 3 percent for something like a decade. To keep it at 3.5 percent by this route, we would have to make additional efforts, bringing average education, say, from 9 to 10 years for the next decade and from 10 to 11 years for the one after that.

[14] Present value is 60/0.10 = 600.

[15] Present value is 60/0.05 = 1,200.

[16] Present value is 60/(0.10 – 0.03) ≈ 860.

[17] Present value is 60/(0.05 – 0.03) = 3,000.

[18] 3 percent + 6 percent = 9 percent.

[19] In a growth setting, we shift from a stream starting at 1,000 and growing at 3 percent to a stream starting at 1,060 and also growing at 3 percent. In the simplest case, the growth rate leaps to 9 percent for a single transition year, with no alteration of the 3 percent growth rate thereafter. In more realistic cases, the transition would extend over a much longer period.

[20] Readers may again refer to figure 1.

With physical capital, if we add one increment of net investment this year in a standard pattern, it has to be followed by another the next year and yet another the year after that. This is already captured in our way of representing the capital contribution to the growth rate, where the ratio of net investment to GDP appears as one of the two components of this contribution. Adding to the rate of investment for just one year produces just a blip in the economy's rate of growth. For a permanent effect, we have to be shifting the year-after-year rate of net investment from, say, 10 percent of GDP to 12 percent. At a 15 percent gross rate of return, this *permanent* upward shift in the investment rate will change capital's contribution from 1.5 percent per year to 1.8 percent per year, i.e., it will add 0.3 percent per year to the country's growth rate. But this means a different extra 2 percent of GDP being invested in different new investments in every successive year. The 0.3 percent effect on the growth rate is the composite result of a perpetual chain of extra annual investments, each of which is contributing only a "level effect." To reiterate, these examples illustrate the important point that, normally, improvements in growth generate a permanent rise in the level of GDP, but only a blip in the growth rate.

The idea of "self-sustained growth" can be seriously misleading, because elements that produce growth do so by changing the level of GDP, as opposed to impacting its growth rate as such. The exception occurs when a whole set of bad policies have been artificially holding down the natural forces of growth. For example, bad labor policies can deprive employers of the incentive to hire additional workers, bad education policies can end up producing only tiny increments of productivity and earnings, widespread corruption and arbitrary interference with economic processes can lead to savings being invested outside the country, rampant inflation can blur people's perceptions of relative prices and costs, and major price distortions can cause people to miss genuine opportunities to reduce true real costs while pursuing false opportunities stemming from the wrong price signals. In short, every single component of a country's growth rate can be held down by wrongheaded policies. Such situations can yield negative, zero, or miniscule growth rates for extended periods of time.

When a sensible set of reforms takes away these kinds of trammels to the efficient functioning of the economy, one can get first a significant spurt of growth as distortions are eliminated and as advantage is taken of long-neglected opportunities. But even after this phase of "recovery" or "emergence from the morass," there may be a permanent effect on the country's growth rate as it moves from negative, zero, or miniscule up to the "normal" range of something like 3 percent. This range reflects normal rates of investment, normal rates of return, normal growth of the labor force and its quality, and normal rates of success in the constant search for ways to reduce real costs. This kind of normal growth can legitimately be called self-sustaining, but it represents the functioning of natural forces. Government policies can and should open the door to these forces but by and large cannot create them.

The Role of "Creative Destruction"

Joseph Schumpeter captured the story of the growth process in the insightful phrase "creative destruction." The victory of the new and destruction of the outmoded are the essence of the growth process in a well-functioning market economy. Successful innovators are the big winners. Let us visualize the workings of creative destruction in three examples, standard commodities, differentiated products, and, international competition (which, in a sense, overlaps the first two).

Example 1: Hybrid corn provides us with an easy scenario for standard commodities. As hybrids began to be introduced in the 1930s, some farmers were ready to take a chance and plant the new varieties. Those that were successful made a lot of money, and their neighbors and others proceeded to imitate them. As corn supplies grew, the relative price of corn fell, and the benefit of the innovation—at first reflected in high profits for the hybrid-planting farmers—was in the end passed on to consumers in the form of lower relative prices and higher quality of corn.

Before prices began to fall, farmers who planted the old varieties of corn were substantially unaffected. But as prices fell (relative to costs) they found themselves squeezed. For early adopters, the shift to hybrid corn meant higher profits (which then dropped gradually back to "normal" as prices fell). For late adopters, it was a question of dealing with growing losses as prices fell. For them, shifting to hybrids was a matter of simple survival; in the end, they could

not make it if they stuck with the old, traditional, but now inferior varieties of corn.

This is the "big picture" of the hybrid corn revolution, but the little picture is equally germane. It so happens that given hybrids were successful only in certain areas. Often, as farmers tried to follow the lead of those in neighboring counties, they found that the hybrid that worked in one county sometimes failed in the county next to it. Many farmers tried specific hybrids (that had done well in the experiment stations) only to find that they were ill-suited to local soil and weather conditions. These cases resulted in reduced profits and real cost increases.

Example 2: The example of differentiated products is well illustrated by how supermarkets squeezed out old-fashioned mom-and-pop retail food stores, and how chains such as Wal-Mart, Target, and K-Mart brought a lot of traditional department stores to a painful and protracted extinction. Another example is when competitors develop different technologies and one loses out to another, as Sony's Betamax lost out to the VCR[21] and as the VCR is being replaced by the DVD. Sometimes it is a business plan that wins out—as IBM's computer strategy of licensing its technique to other manufacturers won out over Apple Computer's go-it-alone strategy. The main point is that it is pretty hard to think of a major cost-reducing innovation that worked so evenly on all producers at the same time that there were no losers. Losers are generally an integral part of the picture, and their losses typically give rise to real cost increases that partially offset the gains from the real cost reductions of the winners. In a dynamic economy with rapid growth generated by lots of RCRs, there are likely to be quite a lot of real cost increases suffered by competitors. The end result is typically either that the competitors go out of business or they follow the innovators and adopt the innovation.

Example 3: International competition warrants special mention because of the political overtones it carries. When winners and the losers are from the same country, the beneficence of an innovation is easier to defend. However, when the increased competition comes from abroad, an entire phalanx of resistance is very often formed by the threatened domestic producers, and the protectionist snake is once again poised to strike.

The world has been lucky in recent decades to have resisted protectionist pressures as well as it has. Economists are well aware that the ultimate beneficiaries of real cost reductions are the world's consumers; and in some deep sense, the benefits of an innovation enjoyed by consumers will in the end outweigh the costs borne by labor and capital in the activities that are threatened. But it would be wrong for us to be Pollyannaish free-marketers, telling threatened textile workers or steelworkers that all will be well for them in the end. By far the better approach would be to recognize their problems as real, but then to point out that the solutions typically suggested nearly all involve protectionism in some form or other, and almost always carry economic costs that far exceed their benefits.

Competition from abroad—in the form of lower prices for steel, shoes, textiles, or whatever—is indeed a benefit for consumers, wherever they are located. This same competition is also a threat or—more positively—a "challenge" to other producers of the same or competing products. As such it can generate real cost increases induced by declining demand and can easily lead to mediocre growth performance. We are seeing something of this sort as the world responds first to the challenges posed by the original Asian tigers, and now to the similar but even stronger challenges emerging from China and India as they become world centers for low-end manufactures as well as certain services. Life is tough for the sectors that compete in these products, even in countries not specialized in them. But certainly life is tougher in countries that are more heavily specialized in these low-end products than in those lucky enough to have comparative advantage in other areas. The booms now underway in China and India, for example, have helped trigger rises in the relative prices of many primary products. They have helped the world's producers of oil and copper, while making life quite difficult for producers of low-end manufactures. I regard all these effects as being almost "acts of God," like hurricanes, earthquakes, floods, and wildfires. We all should accept these things as part of reality and then figure out how best to respond.

We can draw useful lessons from this analysis by sensitizing ourselves to these

[21] This is the case of an inferior technology winning with a better business plan. Indeed, the verb betamax denotes an inferior technology beating out a more advanced one.

realities. For example, we do not expect outstanding growth performance from Honduras when half its banana trees have been blown down by a hurricane. Similarly, we should not expect great performances from El Salvador or Mexico when those countries' main products are beset by major competition from Indonesia, China, and India. Finally, we should understand that Chile's outstanding growth performance of recent years—which owes a great deal to a set of very sound economic policies—has also benefited from a booming demand for copper emanating largely from China and East Asia. If we maintain a careful and subtle appreciation of the circumstances of each country, we will end up being far better judges of the quality of its policy performance. In short, policy should not be judged on the basis of growth performance alone.

Infrastructure and Economic Growth

Infrastructure plays an important role in economic growth, but the literature rarely embarks on a serious, detailed discussion of the subject. First, it is important to recognize that the measured rate of return on infrastructure investment determines its measured contribution to growth. Rates of return can differ according to sector, as can be seen when capital's contribution to growth is disaggregated into its sectoral components. Differences in rates of return in different sectors can stem, for example, from differences in tax treatment and in depreciation rates on different types of investment. Thus we have corporate income taxes that are paid only in the corporate sector. At the same time, the housing sector typically benefits from tax exemptions (especially with respect to the imputed rental income from owner-occupied housing) and from outright subsidies, such as those for low-income housing.

It is important to note that the rates of return we refer to here, and in growth accounting generally, cover only those flows actually captured in GDP as measured in the national accounts. These accounts include (in principle) all flows that are paid for (e.g., rents, leases, profits, interest payments) plus a few that are imputed (e.g., rents on owner-occupied housing).[22] Public infrastructure investments often generate returns to capital that are not counted in national accounts. So even in cases where public investments are fully justified, we can expect their measured and attributed rates of return to be significantly lower than those we measure for private enterprises. For example, consider the case of a public highway that improves access within a major metropolitan area. Unless it is a toll road, the methodology of growth accounting will not attribute any growth contribution to the highway once it is built. In reality, however, it may actually play an important part in facilitating growth and improving the welfare of the country's citizens by reducing the costs of trucking and other transport operations. The national accounts will not assign these contributions to the highway infrastructure project, although the benefits would be captured when the real cost reduction component of growth for buses, taxis, and commercial trucking activities is measured.[23]

Different public investments will have different proportions of their benefits reflected in actually measured contributions to growth, attributed directly to them (via tolls on roads and bridges, sales from public utility enterprises, etc.). They will also have different proportions of their benefits reflected in growth that is measured but attributed to some other activity (e.g., as RCRs in the trucking industry). And, finally, different proportions of benefits will be of types not captured at all in measures of GDP growth (e.g., the amenity values of public parks and highway beautification projects, the cultural values of projects that preserve historic sites, or the benefits of highway improvements to noncommercial travelers).

For example, consider that a 10 percent measured rate of return to net (public plus private) investment of 3,000 might reflect a 4 percent measured and attributed return on public investments of 1,000, together with a 13 percent measured and attributed return in private investments of 2,000. Equally, it might reflect a 5 percent measured and attributed return on 1,500 of public investment, together with a 15 percent

22 See example in appendix 1, "Capital Contribution to Growth."

23 Another important benefit of highway projects is the time saved by commuters and others traveling in their own cars on noncommercial trips. Yet since these trips are not counted as part of a country's GDP, neither would these savings. However, a proper cost-benefit analysis judging the overall benefits of the project would certainly count such savings.

return on 1,500 of private investment.[24] This applies even when the "true" rate of return on public investment is equal to that applying in the private sector, and even more so in many real-world cases where poor methods of designing and choosing public sector projects lead to true rates of return that are much lower than those of the private sector—or even negative in many cases.

The importance of these considerations will vary from country to country depending on the share of public investment in the total investment done in each country and on the quality (as reflected in the "true" rate of return) of that public investment. Table 5 gives information on the importance of public investment in a large number of developing countries, both in relation to GDP and as a fraction of total investment.[25] As the table shows, total investment in developing countries tends to be 15–30 percent of GDP. When public investment is expressed as a percentage of total investment, about half of the observations lie between 20 and 40 percent (final column).

Exploring Successful Growth Episodes

What makes for successful growth performance? We have tried to explain

Table 5. Gross Investment as Percentage of GDP, Average 1990–99

	Total Investment (% of GDP)	Private Investment (% of GDP)	Public Investment (% of GDP)	Public Investment (% of Total Investment)
Argentina	17.75	15.74	2.01	11.32
Azerbaijan	30.84	27.46	3.38	10.96
Bangladesh	19.12	12.42	6.71	35.09
Barbados	15.57	11.12	4.47	28.7
Belize	24.64	11.75	12.88	52.27
Benin	15.76	8.10	7.67	48.67
Bolivia	16.79	8.86	7.95	47.35
Brazil	20.11	15.78	4.34	21.58
Bulgaria	15.13	4.25	10.88	71.91
Cambodia	12.08	8.06	4.02	33.28
Chile	23.44	18.07	5.39	23.00
China	32.89	13.87	19.04	57.89
Colombia	18.47	10.83	7.62	41.26
Comoros	16.40	9.04	7.37	44.94
Costa Rica	20.50	15.66	4.80	23.42
Côte d'Ivoire	12.15	7.89	4.26	35.06
Domonica	29.32	18.57	10.75	36.67
Dominican	22.18	14.73	7.44	33.54
Ecuador	18.67	12.26	6.41	34.33
Egypt	19.03	11.86	7.19	37.78
El Salvador	16.58	13.11	3.41	20.57
Estonia	27.88	23.88	3.99	14.31
Grenada	33.55	25.52	8.03	23.93
Guatamala	14.85	12.19	2.69	18.11
Guinea-Bissau	25.65	7.58	18.10	70.56
Guyana	32.62	17.11	15.53	47.61
Haiti	8.15	4.46	3.69	45.28
India	22.19	14.55	7.69	34.66
Indonesia	26.68	18.75	7.93	29.72
Iran	22.39	12.71	9.68	43.23
Kazakhstan	16.50	14.13	2.37	14.36
Kenya	18.59	11.27	7.27	39.11

[24] Appendix 1, "Exploring Successful Growth Episodes," reports on empirical exercises that assume an average real net rate of return of 10 percent per annum on a country's total net investment. Readers should be aware that this assumption implies a significantly higher real return on that part of total investment carried out by the private sector.

[25] We cannot here provide data on the quality of the public investment.

Table 5. Gross Investment as Percentage of GDP, Average 1990–99

	Total Investment (% of GDP)	Private Investment (% of GDP)	Public Investment (% of GDP)	Public Investment (% of Total Investment)
Korea	35.07	29.47	5.60	15.97
Lithuania	23.44	13.46	9.98	42.58
Madagascar	11.88	5.35	6.54	55.05
Malawi	14.79	5.57	9.18	62.07
Malaysia	36.07	23.88	12.20	33.82
Mauritania	18.58	7.63	10.94	58.88
Mauritius	27.60	19.41	8.20	29.71
Mexico	18.97	15.40	3.55	18.71
Morocco	22.13	13.52	8.60	38.86
Namibia	21.16	13.07	8.10	38.28
Nicaragua	25.93	13.23	12.71	49.02
Pakistan	16.94	9.31	7.63	45.04
Panama	22.43	18.93	3.50	15.60
Papua	23.88	18.98	4.86	20.35
Paraguay	22.47	17.53	4.93	21.49
Peru	20.50	16.21	4.30	20.98
Philippines	22.16	17.42	4.74	21.39
Poland	18.27	9.10	9.15	50.08
Romania	15.96	5.30	10.68	66.92
Seychelles	30.20	20.33	9.87	32.68
South Africa	16.21	11.21	4.98	30.72
St. Lucia	23.89	13.59	10.30	43.11
St. Vincent	28.98	17.86	11.14	38.44
Thailand	37.41	28.63	8.76	23.42
Trinidad	20.80	15.86	4.94	23.75
Tunisia	27.02	14.88	12.13	44.89
Turkey	24.32	18.09	6.22	25.58
Uruguay	14.03	10.04	4.00	28.51
Uzbekistan	31.47	11.00	20.43	64.92
Venezuela	17.67	8.16	9.53	53.93
Yugoslavia	12.10	10.60	1.50	12.40

Source: Everhart and Sumlinski (2001).

that all the growth we measure takes place at the level of the individual enterprise,[26] and that of the standard components of measured growth, RCR has by far the greatest quantitative importance. Policies enter the picture by supporting various components of growth—they foster the growth of human capital, facilitate the processes by which firms make productive investments, and, above all, create a favorable environment for seeking and implementing RCRs. Market-friendly, liberalizing policies meet these conditions, but each such policy is likely to have only a modest impact on the growth rate over a limited period of time. If any single measure signals that policies are moving in the right direction, it is the growth rate of a country's exports. We have already seen some reflection of this in table 4, but now we explore it in more detail.

Table 6 presents data on a large number of high-growth episodes, covering the period 1960–2001.[27] A high-growth episode is defined as one where GDP growth averages over 4 percent per year for at least five years. In all, we report on 59 high-growth episodes in 41

[26] This does not deny the positive contributions to growth that arise when labor shifts from low- to high-wage activities, or when capital moves from uses with low rates of return to new ones with higher rates. In such cases, we attribute the growth to a reduced factor use in the losing sector, plus an increased factor use (with higher productivity) in the gaining sector.

[27] For details and methodology, see appendix 1 "Exploring Successful Growth Episodes."

countries.[28] With the exception of the Asian Tigers, which averaged GDP growth rates of 7–10 percent per year, growth rates were nearly all 4–7 percent per year. If one thinks of 7 percent growth as a criterion for success, then the world is full of failures. But under a 4 percent criterion, the picture is quite bright. I believe that good economic analysis, as well as observation of individual cases, support the use of a 4 percent (or even lower) criterion for success.

Table 6 also presents the breakdown of the country's growth rate into a capital contribution, a labor contribution, and a growth component due to real cost reductions. In addition, the table shows the growth rate of exports during each high-growth episode.[29] In comparing high-growth episodes with the experience of other periods, the difference in growth rates between high-growth periods and other times (for the same set of countries) is overwhelmingly accounted for by the contribution of Real Cost Reductions (column 4). We find that there is little difference between the median capital contributions of the high-growth periods and the corresponding median for the other periods. The same holds true, even more forcefully, for the labor contributions. In the OECD countries, we have a growth-rate difference (between high-growth and other periods) of 2.9 percent per year and an RCR difference of 2.3 percent. For the Asian Tigers, the growth-rate difference is 6 percent per year; the RCR difference is 5 percent. For the other Asian countries, the growth-rate difference is 3.4 percent per year; the RCR difference is 3.2 percent. For the African countries the growth-rate difference is 4.2 percent, while the RCR difference is 3.6 percent. And for the Latin American/Caribbean countries, the growth-rate difference is 4.7 percent per year; the RCR difference is 3.8 percent. Can one imagine any more persuasive evidence to convince policymakers of the urgency of creating conditions favorable to firms in their constant search for new ways to reduce real costs?

The final point to be drawn from our discussion on successful growth episodes concerns the speed of export growth. This is not a component of the GDP growth rate in the same sense as the other three (which in each year and episode add up to the observed GDP growth rate). But there are important scenarios that produce the phenomenon of export-led growth. These include *trade-liberalizing* policies by the countries in question, *cost-reducing innovations* by exporters in those countries, and, finally, simply the good luck of *increases in world prices* of those exports expressed in real terms. We can be sure that all three of these scenarios are well represented in the broad panorama shown in table 6. Some of the export success depicted there surely comes from the luck of favorable price movements. But we can be equally sure that the other two elements (liberalizing policies and reductions in the real costs of exports) also played very important roles. With this in mind, then, we can observe that—again for each group of countries—there is a dramatic difference between the export performance of their high-growth episodes and the export experience of other periods.[30]

We also identified a separate set of low-growth experiences;[31] data from those episodes are presented in table 7. The conclusions are the same as those emerging from our discussion of high-growth episodes: the difference between the median growth rates of the low- and high-growth periods is 7.3 percent, and of that, 6.9 percent is accounted for by real cost reduction. By comparison the differences in the capital and labor contributions are tiny. But again, there is a huge difference between the median rates of export growth—8.6 percent for the good periods and 0.1 percent for the bad. Visual appreciation of the evidence can be seen in figures 2–5. In figures 2 and 3, the upper panel summarizes the

28 Generally, when there are two or more high-growth episodes per country, they are separated by an episode of less than high growth. In a few cases, however, we have high-growth episodes following each other directly. This distinction was made when there was an evident change in the growth trend of the country, as between the two adjacent periods. Short lapses from high growth did not disqualify an episode, but to qualify, each episode had to begin and end with years in which the growth rate equaled or exceeded 4 percent.

29 Care was taken to avoid two errors often made in studies of economic growth. The first error consists of only counting merchandise exports rather than the total of goods and services exported. The second error is measuring exports in nominal dollars rather than in real units. We were careful to include both goods and services exports in our analysis and to express exports in "real dollars" before calculating their growth rate. Details of this methodology are given in appendix 1, "Exploring Successful Growth Episodes."

30 In the advanced OECD countries 8.8 percent versus 4.7 percent; 10.5 percent versus 5.9 percent for the Asian Tigers; 7.1 percent versus 4.7 percent for the other Asian countries; 6.2 percent versus 1.7 percent for the African countries; and 9.2 percent versus 4.4 percent for the Latin American/Caribbean countries.

31 These were defined as episodes of at least five years duration, with average growth rates of 1 percent per year or less. We recorded low-growth episodes only for countries that had at least one interval of high growth, which explains the relatively small number of low-growth cases shown in table 7. Tables 6 and 7 facilitate comparisons of growth rates and components of growth for the same set of countries in both low- and high-growth periods (see bottom of table 7).

Table 6. High-Growth Episodes, 1960–2001

	Time Period	Average GDP Growth (%)	Average Capital Cont. (%)	Average Labor Cont. (%)	Average Real Cost Red.	Average Export Growth (%)
Advanced OECD Countries						
Australia	1961–73	5.3	1.5	1.3	2.5	8.1
Canada	1965–73	5.1	0.7	1.5	2.9	8.8
France	1960–73	5.4	1.4	0.5	3.5	9.5
Finland	1960–73	5.0	1.8	0.4	2.8	7.5
Greece	1960–73	7.9	2.1	0.1	5.7	12.5
	1993–2000	4.7	0.4	0.0	4.3	12.4
Ireland	1966–78	5.3	1.4	0.4	3.5	8.6
Japan*	1960–90	6.4	4.9	0.6	0.9	11.3
New Zealand	1960–66	5.5	1.4	1.2	2.9	4.2
	1968–74	5.2	1.0	1.2	3.1	6.1
Norway*	1970–77	5.0	2.5	1.0	1.4	7.4
Portugal	1960–73	6.9	1.8	0.1	4.9	9.6
	1975–80	5.1	1.1	1.6	2.3	–2.9
	1985–91	5.5	1.1	0.5	4.3	14.5
Spain	1960–74	7.2	1.7	0.4	5.1	15.2
Median (high-growth periods)		**5.3**	**1.4**	**0.4**	**3.1**	**8.8**
Median (same countries, other periods)		**2.4**	**1.1**	**0.5**	**0.8**	**4.7**
Difference		**2.9**	**0.3**	**–0.1**	**2.3**	**4.1**
Asian Tigers						
China	1962–81	7.8	2.0	1.2	4.5	7.3
	1981–01	9.8	2.8	0.8	6.3	12.3
Hong Kong (China)	1960–97	8.0	2.3	1.4	4.3	11.5
Korea	1960–97	7.9	2.0	1.4	4.6	17.2
Malaysia	1960–87	6.5	1.8	1.6	3.1	5.9
	1987–97	9.3	3.6	1.5	3.1	11.7
Singapore	1964–2000	9.0	2.9	1.6	4.4	10.5
Thailand	1960–86	7.1	2.2	1.5	3.4	8.3
	1986–96	9.5	3.4	1.0	5.1	15.2
Median (high-growth periods)		**8.0**	**2.3**	**1.4**	**4.4**	**10.5**
Median (same countries, other periods)		**2.0**	**1.2**	**0.7**	**–0.6**	**5.9**
Difference		**6.0**	**1.1**	**0.7**	**5.0**	**4.6**
Other Asia						
India	1979–61	5.7	1.5	1.0	3.1	6.8
Indonesia	1967–97	7.4	1.8	1.4	4.2	13.9

*Japan and Norway are the only cases where the capital contribution is more important than the contribution of real cost reduction.

Table 6. High-Growth Episodes, 1960–2001

	Time Period	Average GDP Growth (%)	Average Capital Cont. (%)	Average Labor Cont. (%)	Average Real Cost Red.	Average Export Growth (%)
Other Asia						
Israel	1960–96	6.1	1.4	1.6	3.1	7.8
Pakistan	1960–96	5.9	1.4	1.5	3.0	6.1
Philippines	1960–80	5.4	1.4	1.5	2.5	7.7
Median (high-growth periods)		**5.9**	**1.4**	**1.4**	**3.1**	**7.7**
Median (same countries, other periods)		**2.5**	**1.1**	**1.4**	**–0.1**	**4.7**
Difference		**3.4**	**0.3**		**3.2**	**3.0**
Africa						
Cameroon	1972–86	8.2	1.3	1.1	5.9	11.6
	1994–01	4.6	0.1	1.2	3.3	19.0
Egypt	1960–75	4.8	1.4	1.1	2.4	4.0
	1975–01	5.8	1.8	1.3	2.6	5.4
Morocco	1966–71	6.8	1.8	1.4	3.6	6.1
South Africa	1960–74	6.1	1.1	1.2	3.8	6.4
Median (high-growth periods)		**5.9**	**1.3**	**1.2**	**3.4**	**6.2**
Median (same countries, other periods)		**1.7**	**0.8**	**1.2**	**–0.2**	**1.7**
Difference		**4.2**	**0.5**		**3.6**	**4.5**
Latin America/Caribbean						
Argentina	1990–98	6.4	1.1	1.0	4.3	14.4
Brazil	1960–80	7.3	2.0	1.6	3.7	10.5
Chile	1975–81	6.9	0.8	1.2	4.9	11.1
	1983–98	7.4	1.9	1.2	4.3	8.4
Colombia	1960–80	5.4	1.2	1.4	2.8	5.2
	1985–95	4.5	1.1	1.7	1.8	6.8
Costa Rica	1961–79	6.5	1.3	2.0	3.2	8.1
	1983–99	5.1	1.2	1.6	2.3	11.4
Ecuador	1969–81	8.4	1.8	1.4	5.2	13.5
Guatemala	1960–80	5.6	0.8	1.4	3.4	7.7
El Salvador	1964–68	4.9	1.0	1.7	2.2	6.0
	1989–95	6.0	1.4	1.4	3.1	13.3
Honduras	1961–68	6.0	1.4	1.4	3.1	13.3
	1977–79	8.9	1.7	1.8	5.4	14.3
Jamaica	1965–72	6.7	2.6	0.6	3.4	4.5
Mexico	1960–81	6.8	1.4	1.8	3.7	9.0
	1995–2000	5.4	1.1	1.2	3.1	17.9

Table 6. High-Growth Episodes, 1960–2001

	Time Period	Average GDP Growth (%)	Average Capital Cont. (%)	Average Labor Cont. (%)	Average Real Cost Red.	Average Export Growth (%)
Latin America/Caribbean						
Nicaragua	1960–77	6.3	1.0	1.7	3.6	9.6
Paraguay	1960–81	6.7	1.3	1.5	3.9	7.5
Peru	1960–74	5.3	0.7	1.3	3.4	5.3
	1992–97	7.1	1.5	1.5	4.0	12.9
Uruguay	1974–80	4.8	1.7	0.3	2.8	7.1
	1990–98	4.4	0.9	0.6	2.9	9.4
Venezuela	1960–65	6.2	0.7	1.6	3.9	0.4
Median (high-growth periods)		**6.2**	**1.2**	**1.4**	**3.4**	**9.2**
Median (same countries, other periods)		**1.5**	**0.8**	**1.5**	**–0.4**	**4.4**
Difference		**4.7**	**0.4**	**–0.1**	**3.8**	**4.8**

Note: Some addition inconsistencies are due to rounding.
Source: *International Financial Statistics;* for further details see appendix 1

results for the Asian Tigers, other Asian countries, and OECD countries, while the lower panel does the same for the Latin American/Caribbean and African countries. In each panel, high-growth episodes are arrayed in descending order of the GDP growth rate of the episode. Each episode is then divided into components due to RCR (dark blue), capital contribution (grey), and labor contribution (light blue). It is easy to see that the dominant growth component is RCR, and the smallest and least variable component is the labor contribution to growth.[32]

The importance of the capital contribution typically lies between that of real cost reduction and that of the labor contribution (figure 2 and table 6). In only two cases, Japan and Norway, is capital contribution more important than RCR. It reaches 2 percent per year in only about a third of the cases, highly concentrated among the Asian Tigers.[33] What emerges from these and many other exercises is the positive relationship between capital contribution and real cost reduction. For example, 13 of the episodes in figure 1 (and table 6) have average capital contributions of at least 2 percent per year. The median capital contribution for these episodes is 2.5 percent, while the median RCR is 4.4 percent. Across the entire sample, the median capital contribution is 1.2 percent, while the median RCR term is 2.0 percent. When we get to the low-growth episodes shown in table 7, the median capital contribution is 0.4 percent, while the median RCR is –3.5 percent per year.

I cannot emphasize strongly enough that *the economics of the growth process is what produces these results*. Favorable opportunities for RCR increase the profitability of investments and incentives to invest. Weak opportunities for real cost reduction mean weaker efforts to invest.

[32] Our methodology, measuring the labor contribution by $s_L(\Delta L/L)$, implicitly maintains constant the quality of labor. Hence, any growth due to improved labor quality is incorporated in the RCR term. As noted earlier, however, this term is unlikely to contribute more than 0.25–0.5 percent per year to the growth rate; thus, shifting it out of the RCR term and into the labor contribution will not seriously affect our conclusions.

[33] Once again our methodology creates a certain relationship between the growth assigned to RCR and that assigned to capital contribution. By our method of calculation, if we assign a higher rate of return to capital, this will automatically mean a higher capital contribution and a lower rate of RCR. This part, in the final analysis, is simply arithmetic. The point of these (and many other) exercises is that despite the built-in arithmetical relationship that says, basically, a positive error in capital contribution will automatically be reflected in a negative error in the calculated RCR term—the actual data show a positive relationship between the capital contribution and RCR.

Figure 3 focuses on the differences in growth rates between high-growth episodes and other periods for the same country rather than on the components of the observed growth rates.[34,35] We've learned two things:

- RCR is a large factor in accounting for the levels of growth rates that are shown in figure 2.
- RCR is an even more dominant factor in accounting for differences in growth rates between high-growth episodes and other periods, as demonstrated in figure 3.

Figure 4 follows the same format as figure 3, but the comparisons are between high- and low-growth (< 1 percent per year) episodes. Once again, RCR is the dominant factor in differences in growth experiences.

More on Export Growth

Figure 5 depicts the excess of export growth over GDP growth in 59 high-growth episodes in 41 countries. One can see very clearly how GDP grew faster than exports in only 10 episodes. Exports in figure 5 are measured in "real dollars," and thus there is no bias attributable to the general rise of dollar prices over this period.[36]

The ratio of goods and services exports to GDP—another measure of exports—is presented in separate panels of tables 10–50 (appendix 2). This figure is given for the beginning and end of each high-growth episode.[37] Only 15 of the 59 high-growth episodes surveyed for this paper show a ratio of exports to GDP lower at the end of the episode than at the beginning, and for most the drop was very small.

Project Evaluation as a Development Policy

The recent trend toward liberalization and modernization in the economic policies of developing countries has been very positive. We have seen this in the opening of their economies (reducing tariffs and import barriers, freeing the international flow of capital), the rationalization of their tax systems (broadening the base of taxation, lowering the highest rates, greatly improving tax administration), and the elimination of much waste and inefficiency in public enterprises (often involving their total or partial privatization).

In contrast to this very positive trend is an extremely important area in which very little progress has been made: bringing criteria of economic efficiency systematically to bear on the spending policies and programs of governments. If there is a single major economic policy challenge facing governments across the world, it is this. What makes reform in this area so difficult are the constant temptations to which governments and legislatures succumb: politi-

[34] Since each comparison in figure 3 is between two types of experience for the same country, we avoid the pitfalls that plague many cross-country comparisons.

[35] The high-growth periods are listed in table 6, and the low-growth episodes are those appearing in table 7. "Other" periods cover all years of observations (for the listed countries) that fell neither into high- nor low-growth episodes. All underlying data can be found in tables 10–50 (appendix 2). The height of a bar in figure 3 represents the difference in growth rates between a country's high-growth episodes and its other growth periods, provided all components of growth were greater in the high-growth episode than in the other periods. There are a few cases, however, where the labor and/or capital contribution to growth in the other periods exceed that same contribution during the high-growth episodes. Those cases are depicted by extending a country's bar below the 0 percent line. Thus, a case where the high-growth period reflected RCR of 4 percent, capital contribution of 2 percent, and labor contribution of 0.5 percent; and the "other" period reflected RCR of 2 percent, capital contribution of 1 percent, and labor contribution of 1.5 percent would have a bar of 3 percentage points in the positive zone and a bar of 1 percentage point in the negative zone. The total difference in growth rates would in this case be 2 percent (the differences between the positive and negative bars). Figure 3's bars are ordered according to the difference in growth rates.

[36] In deflating each country's dollar value of goods and services exports, we did not use a standard price index from the United States. Rather we sought a general index of the prices of tradables expressed in dollars. As wholesale and producer price indexes cover mainly tradable items, we used such indexes from five major countries. The wholesale price index of Japan was then turned into an index of dollar prices by multiplying it by an index of dollar per yen exchange rates. Similarly the wholesale price index of the United Kingdom was multiplied by an index of the dollar per pound exchange rates, etc. The countries from which this information was extracted were those whose currencies are used by the IMF to conform its own monetary unit, the SDR (special drawing rights), and the weights attaching to each of the constituent currencies were those employed by the IMF in its definition of the SDR. The resulting dollar price index is labeled the SDR-WPI. Its values from 1960 to 2002 are presented in table A45, together with a more detailed account of its derivation. We emphasize that our results in no way depend on the choice of the U.S. dollar as the unit in which exports are measured. The value we get for exports in real dollars would not change if we shifted to a real yen basis, for then we would simply multiply the dollar value of exports by a yen per dollar exchange rate, and we would simultaneously adjust the deflating SDR-WPI index by multiplying it by an index of the yen per dollar rate. The growth rates of real exports, as measured here and reflected in figure 4, would remain unchanged.

[37] This measure is fundamentally "domestic" in its focus, and can easily go down, while over the same period the growth rate of exports measured in real dollars exceeds that of GDP. It turns out, however, that this domestically oriented measure leads to the same general conclusion as our real dollar measure of exports.

Table 7. Low-Growth Episodes, 1960–2001

	Time Period	Average GDP Growth (%)	Average Capital Cont. (%)	Average Labor Cont (%).	Avgerag Real Cost Red. (%)	Average Export Growth (%)
Greece	1979–87	0.0	0.5	0.5	–1.0	3.8
Japan	1990–01	1.2	4.6	0.4	–3.8	3.6
New Zealand	1974–80	–0.8	0.4	0.7	–1.8	4.7
	1986–92	0.1	0.7	1.1	–1.7	3.9
Cameroon	1986–94	–3.8	–0.3	1.4	–4.8	–11.0
Guatemala	1980–86	–0.9	0.1	1.3	–2.4	0.1
El Salvador	1978–86	–3.6	0.0	1.0	–4.6	–0.6
Jamaica	1972–85	–1.9	0.0	1.4	–3.3	–1.0
	1995–2000	–0.6	1.3	0.6	–2.5	5.0
Nicaragua	1977–93	–2.6	0.3	1.8	–4.7	n/a
Peru	1987–92	–4.8	0.5	1.4	–6.7	–2.2
Venezuela	1979–85	–1.5	0.4	1.8	–3.8	–1.6
Median (low-growth periods)		**–1.2**	**0.4**	**1.2**	**–3.5**	**0.1**
Median (high-growth periods for countries listed above)		**6.1**	**1.1**	**1.3**	**3.4**	**8.6**
Difference in medians (C – B)		**7.3**	**0.7**	**0.1**	**6.9**	**8.5**

Source: *International Financial Statistics;* for further details see appendix 1

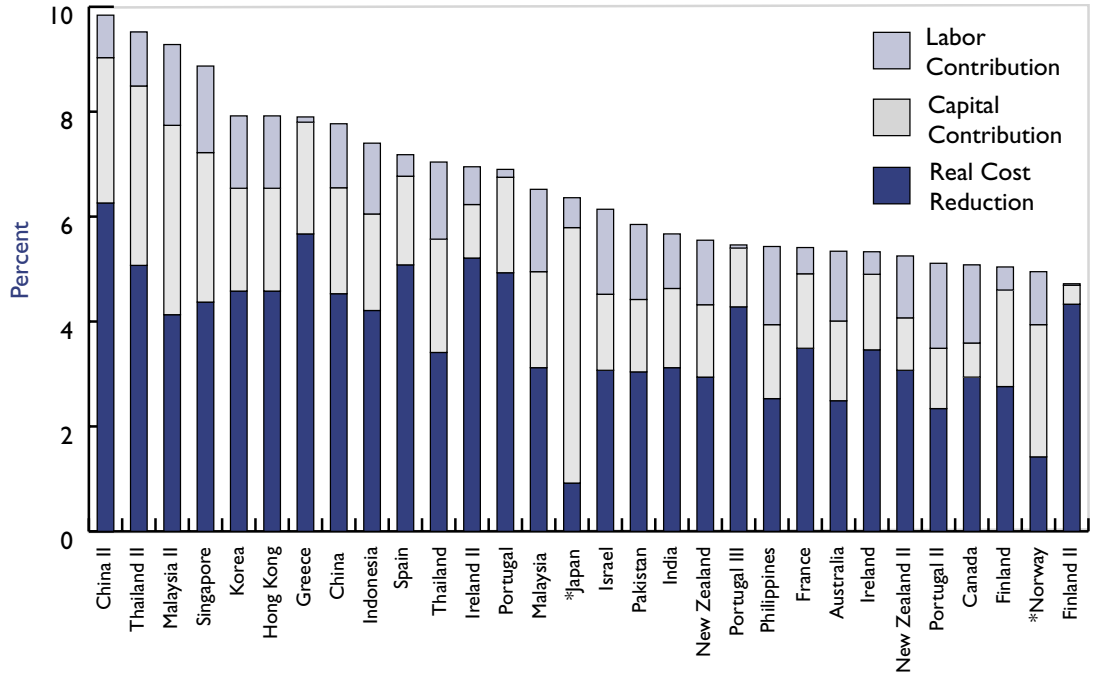
cal pressure and lack of serious technical analysis. In many legislatures, there are traditions whereby groups of legislators support each others' favorite projects. Each legislator represents constituencies that are very likely to benefit from the projects they favor but that very often pay only a fraction of the costs. Sometimes outright corruption enters, with legislators and members of government actually receiving bribes from the private beneficiaries of contracts or new laws.

I have personally witnessed ministers and chief executives almost "creating" projects, simply to have something to announce when making a visit to a city or region. Many government employees all over the world have experienced the tumult that follows an important minister's announcement of a new law or program: the bureaucracy then tries on Monday morning to create the program or law the minister mentioned on Saturday night. The lucky cases are when the minister was not very specific; the most troublesome are those in which the promises were made in excruciating detail.

The overriding challenge is to find ways to make the general welfare the foremost criterion for laws and regulations and for government projects and programs. Procedures must be instituted to protect taxpayers from having their money spent on projects that are overall very wasteful but end up serving the whims and caprices of powerful politicians or the economic interests of favored segments of society to the detriment of the whole. Cost-benefit analysis is needed to make plain *how the total cost of a project relates to its total benefit.*

The basic problem is one of highly concentrated benefits and widely dispersed costs. An irrigation or highway or bridge project may cost a billion dollars and have benefits of only half that amount, yet the people in the area where the project is constructed will tend to view it as a wonderful thing. After all, they are getting nearly all the benefits, but paying (through their taxes) only a small fraction of the cost. It is their correct perception of a very large net benefit to

Figure 2a. Components of Growth: High-Growth Episodes
(Asian Tigers, Other Asian, OECD, 1960–2001)



*Japan and Norway are the only cases where the capital contribution is more important than the contribution of real cost reduction.

Figure 2b. Components of Growth: High-Growth Episodes
(Latin America, Caribbean, Africa, 1960–2001)

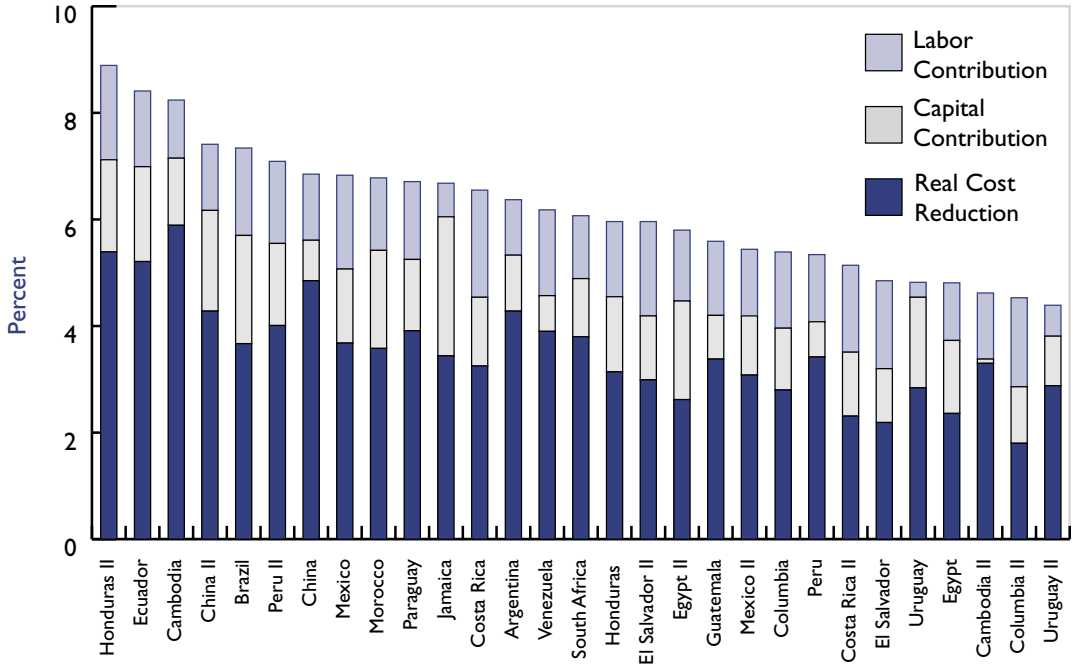


Figure 3a. Growth Differences: High Growth vs. Other Episodes, Asian Tigers, Other Asian, OECD, 1960–2001
(Same Country, Different Periods)

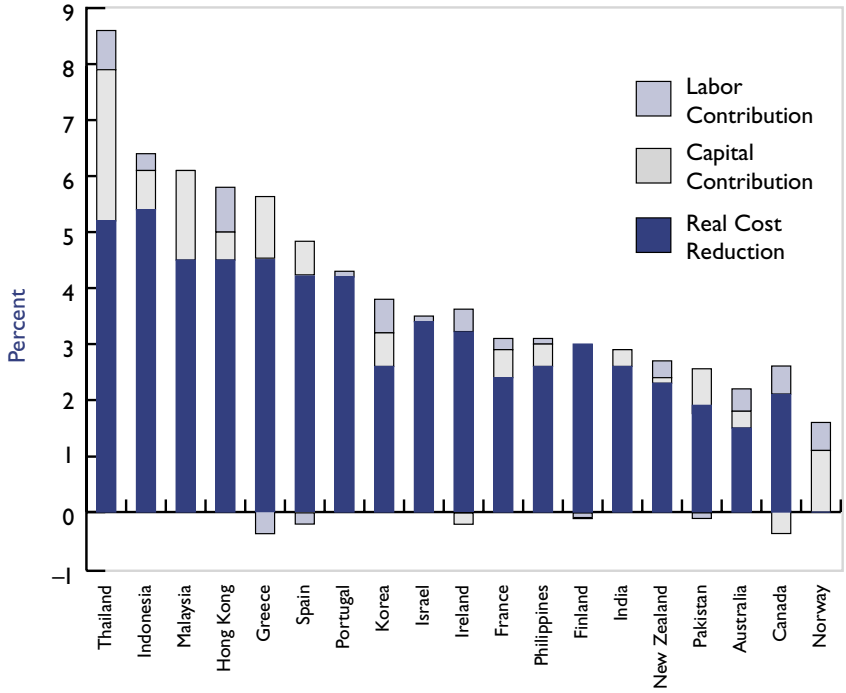
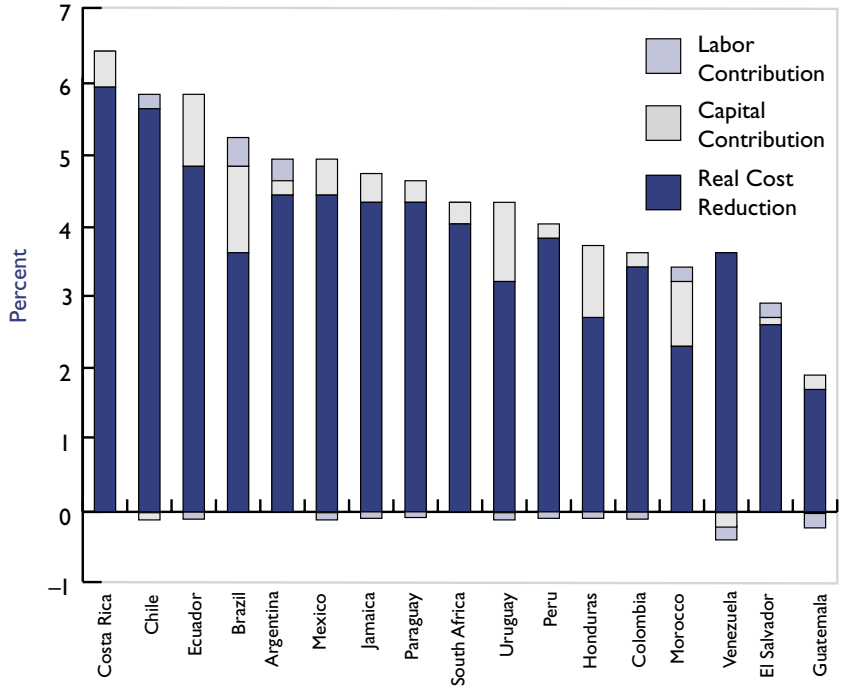


Figure 3b. Growth Differences: High Growth vs. Other Episodes, Latin America, Caribbean, Africa, 1960–2001
(Same Country, Different Periods)



them that stimulates a strong political pressure to do the project. This gives one a capsule picture of how even very uneconomic projects can manage to become important parts of such expenditures.

The branch of economics called "applied welfare economics" is well established, going back more than 200 years. It represents a very serious effort to quantify the benefits and costs of policies, projects, and programs from the standpoint of the economy or society as a whole. It also has the capacity to estimate how benefits and costs are broken down among different subpopulations to determine which groups or categories of people are the main beneficiaries of a project or program, and which, if any, are its net losers. Modern cost-benefit analysis is simply applied welfare economics as it deals with investment projects and government policies. The implementation of cost-benefit analysis at the project level probably dates from the 1920s, but experienced its major development in the 1960s. By now there is a large literature on the subject and a vast array of studies evaluating specific projects.

The task at hand for most countries is to formally integrate economic cost-benefit analysis into their procedures for deciding which projects will be undertaken, and when. This task entails

- establishing administrative mechanisms by which projects will be appraised and reviewed
- establishing technical standards, norms, and procedures to follow in the evaluation

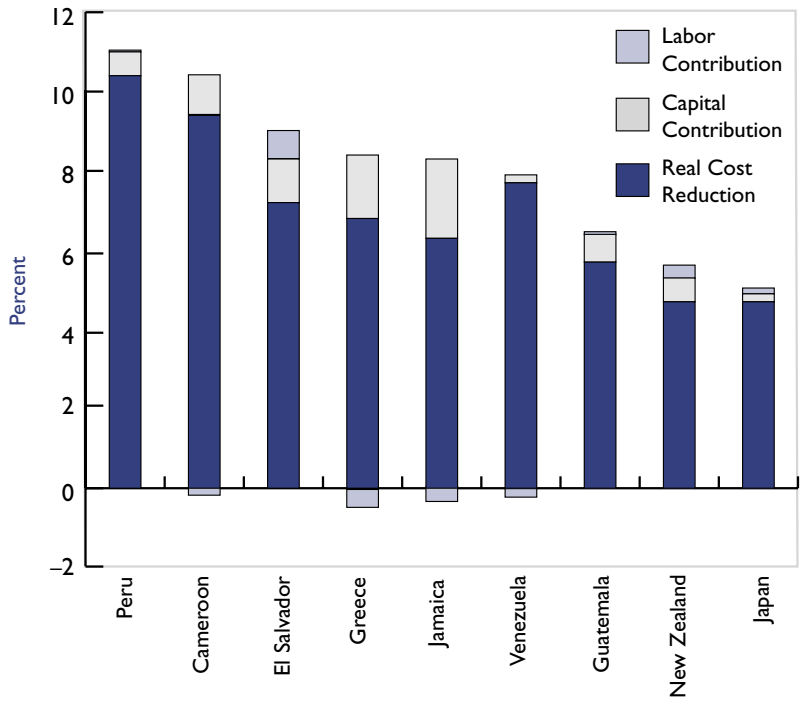
- developing technical staff capable of carrying forward the analysis

This is a daunting task: in addition to creating the technical capacity to accomplish it, there will be resistance to its implementation from the centers of power and interest groups whose interests are threatened. Indeed, common sense tells us—and experience has shown—that noneconomic considerations (mainly political) will always play a significant role in the choice of projects and programs. What can be done is to see to it that, in the main, political choices are made from a set of "good" or "pretty good" projects, and that gross mistakes (such as those that have led in the past to huge losses or costly white elephants) will be eliminated.

To achieve this goal, countries should seek to institute a standardized process of project preparation, evaluation, and review. Ideally, all projects should be scrutinized in the same light, but that is not easy to achieve. The proximate goal should be for the national government to have a clear-cut, rigorous set of procedures and standards, while maintaining a serious campaign to institute similar evaluation processes for projects financed by provinces and municipalities.

It is extremely important to have a team of the highest quality in charge at the birth of a national project evaluation program. Ideally, everybody concerned, from the top level down, should be fully aware of the nature and magnitude of the challenge as well as of the risks. The purpose of the program can be completely defeated simply by putting the wrong people in charge at the outset.

Figure 4. Growth Differences: High Growth vs. Low Growth Episodes: 1960–2001 (Same Country, Different Periods)



There is a huge difference between "real" and "comfortable" project evaluation: the comfortable kind simply goes through the motions but ends up approving, perhaps with a few modifications, the projects that are traditionally thrown up by the political process.

One must not forget that the real purpose of the evaluation enterprise is to influence decisions for the better. If all parties in the struggle for funds are satisfied with the program, i.e., if there are no big fights and loud complaints, it is an almost certain signal that the program has failed. By the same token, all participants in the new enterprise should realize how important it is to be well prepared for each battle. Nothing could be worse for an incipient program than to enter a struggle against powerful, well-entrenched forces and end up disgraced for having a poorly founded or badly analyzed case. The best scenario, on the other hand, is not one in which the new project evaluation agency assumes the attitude of a boxing champion challenging all comers to a fight. Far better is the scenario in which the project agency instills great respect for its expertise and finds ways to be helpful to the government's various operating agencies, even from the very first steps in the development and preparation of new projects.

Economic Growth and Poverty Relief

Far too often, policies designed to facilitate economic growth have been depicted as diverting public resources and energies away from the objective of alleviating poverty. Such

Figure 5a. Excess of Export Growth over GDP Growth: High-Growth Episodes, 1960–2001
(Asian Tigers, Other Asian, OECD)

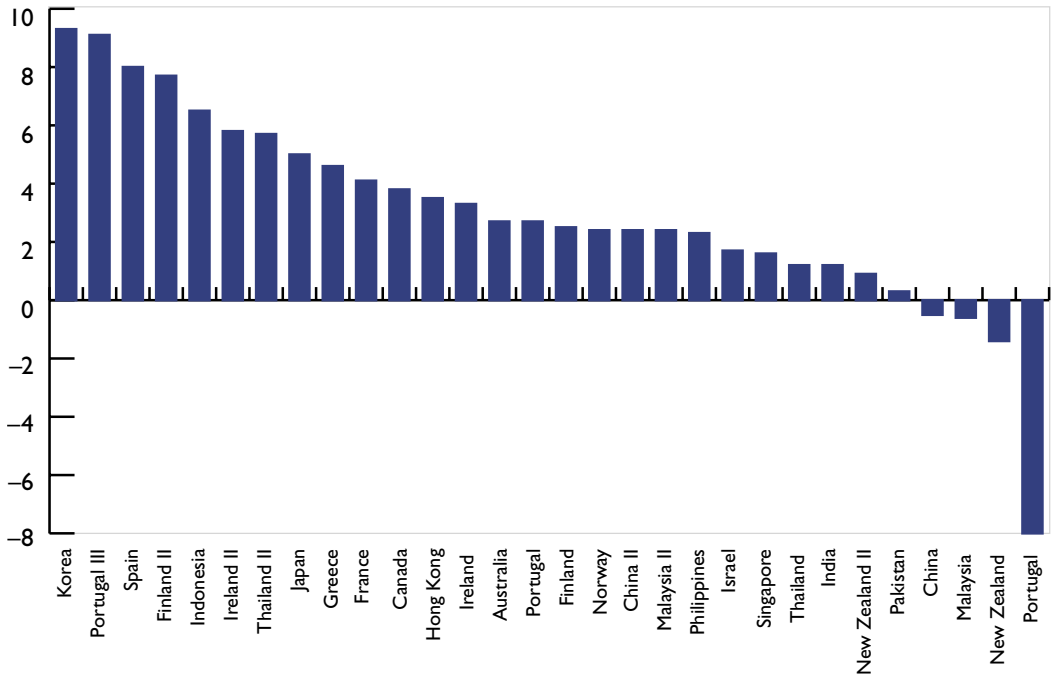
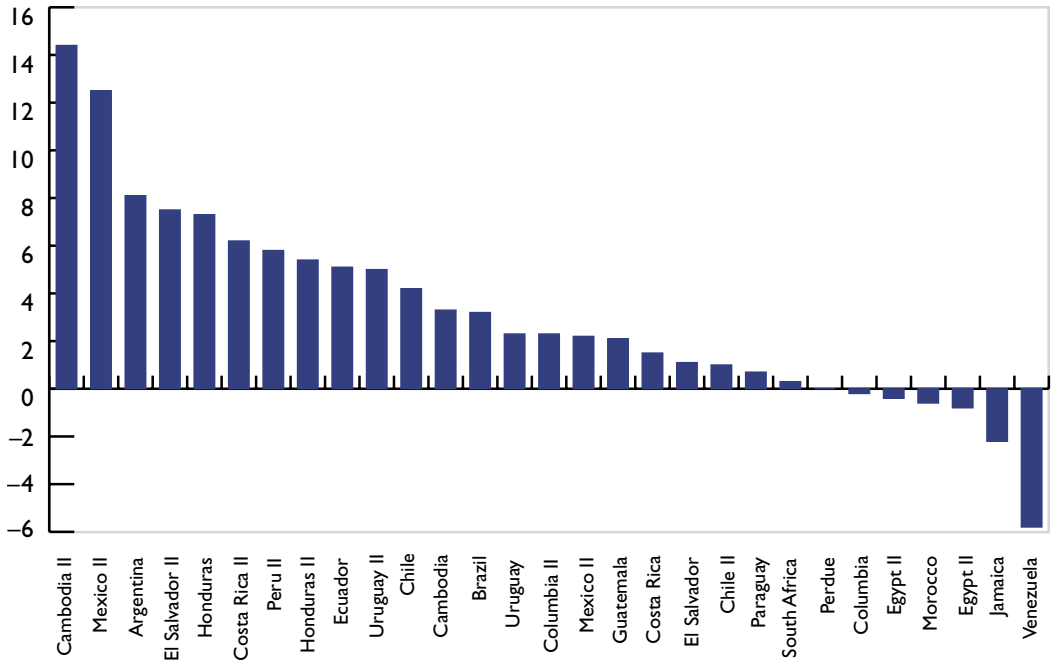


Figure 5b. Excess of Export Growth over GDP Growth: High-Growth Episodes, 1960–2001
(Latin America, Caribbean, Africa)



characterizations create a false dichotomy: economic growth is in no sense an enemy of poverty. Quite the contrary, economic growth is probably the strongest and most reliable force causing the fraction of the population afflicted by poverty to shrink over time. No one has worked harder to marshal the evidence in this regard than David Dollar. Working mainly in collaboration with Aart Kraay, Dollar has produced a series of papers exploring the relationship between poverty and growth. Their most fundamental insight is that when the per capita income of a country rises, that of the poorest quintile rises with it, perhaps even a little bit faster. The evidence they offer is from a cross-section of 137 countries having at least one observation on income accruing to the bottom quintile. When these data are plotted against per capita income of the country as a whole (in logarithms), the correlation is extremely high.[38] The regression indicates that a 10 percent improvement in overall average income tends to be associated with a 10.7 percent improvement in the average income of the poorest fifth.[39]

One can rightly argue, however, that such cross-country relationships reflect many factors—e.g., geographical, cultural, industrial—that are beyond the capacity of a typical developing country to influence. Hence I find more persuasive the results of another Dollar-Kraay regression, in which each observation represents the percentage change in the average income of the poorest quintile, plotted against the percentage change in the per capita income of the country as a whole over the same time span.[40] In this regression a 10 percent change in average income is linked to a change of almost 12 percent in average income of the lowest quintile; the slope of this regression shows an even higher absorption of poverty than the cross-country regression.

Sometimes, too much weight is placed on regressions and correlations. The fact that the income of the poor rises proportionately with overall per capita income in one country does not guarantee a similar relationship in another country. In this light, it is more interesting to look at Dollar and Kraay's specific cases. Here the evidence is very clear as well: in nearly all cases, income of the poor moved in the same direction as overall income. Only in about 10 percent of cases did income of the poor go down while overall per capita income went up, or income of the poor go up while overall income went down.[41] The great bulk of the observations reflect positive growth for overall income and for the lowest quintile, and among these the income of the poor rose faster than overall income in more than half the cases.

Dollar and Kraay (2002a, 218–19) also explore the impact of specific types of policies upon the incomes of the poor. Their broad conclusion is that policies that work through economic growth are the ones whose positive impact in reducing poverty is most clearly evident:

> Average incomes of the poorest fifth of a country on average rise or fall at the same rate as average incomes [of the total population]. This is a consequence of the strong empirical regularity that the share of income of the poorest fifth does not vary systematically with average incomes, in a large sample of countries spanning the past four decades. This relationship holds across regions and income levels, and in normal times as well as during crises. We also find that a variety of pro-growth macroeconomic policies, such as low inflation, moderate size of government, sound financial development, respect for the rule of law, and openness to international trade raise average incomes with little systematic effect on the distribution of income. This supports the view that a basic policy package of private property rights, fiscal discipline, macroeconomic stability, and openness to trade on average increases the income of the poor to the same extent that it increases the income of the other households in society. It is worth emphasizing that our evidence does not suggest a "trickle-down" process or sequencing in which the rich get richer first and eventually benefits trickle down to the poor. The evidence, to the contrary, is that private property rights, stability, and openness contemporaneously create a good environment for poor households—and everyone else—to increase their production and income.

38 $R^2 = 0.88$. See figure 1, Dollar and Kraay (2002a, 197).

39 The slope of the regression line is 1.07.

40 Here the correlation is also significant ($R^2 = 0.49$ for 269 observations). This relationship is graphed on the lower panel of figure 1 in Dollar and Kraay (2002a, 197).

41 See figure 1, Dollar and Kraay (2002a, 197).

Conclusion

By this point, it should be very clear that this paper does not offer easy solutions to those interested in fostering economic growth in developing countries. Our prescription is more like the doctor's orders to follow a healthy diet and get plenty of rest and exercise to build resistance to disease and infection, promote growth or strength, and increase longevity. The doctor's advice is based on a deep understanding of physiological processes. Medical practitioners know, however, that doing everything right does not guarantee you will live to age 60, let alone 90—but they know what you should do to make a long and healthy life more likely. The story is quite similar with respect to promoting economic growth. A nation's economy tends to develop better, and has greater resistance to shocks and vicissitudes, if it follows policies that foster economic efficiency and give scope to the forces of growth. Pursuing such policies is not likely to generate a growth miracle, but it is virtually certain to improve a country's growth prospects.

If there is a single key to distinguishing among good, mediocre, and bad policies, it is the principle of weighing the likely benefits of a policy against its likely costs (see appendix 1, "Project Evaluation and GDP Growth"). This may appear too obvious, or even unnecessary, to articulate. Do not all, or at least most, governments routinely do this? Unfortunately, they do not. Modern societies are incredibly complex, and there are all sorts of elements that stand in the way of the simple pursuit of the general welfare. It is not easy for a society to depart from traditional ways of doing things, or to abandon outmoded institutions or construct new ones. When actions are taken that ostensibly promote the general welfare, it is not easy to prevent their being coopted by particular groups to the detriment of society as a whole. Indeed, it is often not easy to prevent powerful groups from gaining preferential treatment, even without the patina of ostensibly promoting the general interest. Then there is the unpleasant truth that almost any policy change hurts some segments of the population, so even good policy moves have to cope with opposition from these quarters. The dream of economists has been that with good policy moves whose benefits are greater than their costs, one could compensate the losers and still have benefits left over. However, this dream cannot generally be achieved. In reality, it is too hard to identify the potential losers, quantify their likely losses, and avoid false claimants pressing for a share of the compensation. Thus, in broad terms and with only a few exceptions, one has to live with the fact that there will be losers from most real world policy changes—even good ones. The hope—and I believe it is justified—is that when good policies are the general rule, the losers from one policy will end up gaining from a number of others; and thus few will be net long-term losers.

The list of potential reforms makes for quite a long road, and there are many countries that still have a long way to go. Liberalizing trade to build an economy based on a nation's true comparative advantage; modernizing the justice system to eliminate interminable delays, stamp out corruption, and incorporate sensible economic principles; securing property rights at all levels of society; building a strong and modern education system; and providing basic public health facilities, especially in low-income areas: all are important steps on the road to modernization. So too is the creation of a policy framework—a set of established rules and procedures—within which economic activities can freely function and market adaptations and adjustments can freely take place. Included in this are sound macroeconomic policies; a well-functioning banking and monetary system; a police system that holds criminality in check; and a system of laws and regulations that enables companies to be born without a struggle, collect debts that are owed them, adapt to new challenges, and, in the worst cases, be liquidated via a competent, quick, and efficient bankruptcy process.

In judging these policies and reforms, the guiding principle should be weighing benefits against costs. The techniques of applied welfare economics constitute the main tools for this assessment. They can be used to study tax policy, trade liberalization, educational design, industrial organization—virtually any legal, regulatory, or institutional change.

This paper has emphasized the need to apply sound cost-benefit analysis to public investments and to other public expenditure decisions. This is important for the following reasons:

- We have in the past done a better job of general policy reform (trade and

tax policies, monetary institutions, etc.) than we have of specific outlays.

- It is almost impossible to deal in a general fashion with most specific outlays (each road and dam is a separate entity and can be a good or bad investment for society).
- The specific beneficiaries of each project typically form a very strong pressure group in the project's favor, even when its costs far outweigh its benefits (an anomaly that is explained by the fact that those beneficiaries usually pay only a small fraction of the costs but get the lion's share of the benefits).

The big problem in instituting a system of careful cost-benefit analysis of public outlays lies in the need to have a large cadre of trained people to do the job. It is a major task to train such a group, but beyond that, a country's leaders need to have the political will to implement a proper evaluation procedure. Still, the reward from successful implementation of such a system can be very substantial. Indeed, this is one of the few places where a successful policy reform can have a permanent effect on a country's growth rate: through raising the economic yield of public investments, the reform automatically enhances the growth impact of each year's public investment budget.

Most policy improvements also affect growth, but typically only over a transition period. This is because their main effect is typically on the efficiency level of the economy. When a policy change takes a country from 85 percent to 90 percent efficiency, the gain is an extra five percentage points forever, but the growth impact is concentrated in the years during which the transition from 85 percent to 90 percent occurs. Policy reforms can impact growth over a very substantial period of time, but for this to happen, there will generally have to be a series of successive reforms, each one doing its bit (over its transition period) to raise the time path of the country's output.

But what happens when all, or nearly all, needed policy reforms have taken place? What then is the effect of policy on growth? The answer is that in those circumstances the task of policy is to provide the framework—the environment—in which the forces of economic growth can have free rein. These forces are

- adding to the labor force
- increasing (and maintaining) the average quality of the labor force
- adding (via net investment) to the capital stock of the country
- achieving a high real rate of economic return as a consequence of that investment
- generating real cost reductions as efficiently and rapidly as the society can manage

On the whole, government policy does not directly affect these forces of growth, except in the educational field, but even here there is a long lag between the actual investment in schooling and its ultimate impact on economic productivity. Yet in the other direction, government policy can certainly create situations in which investment is unattractive and productivity is stunted. Policy can also place many obstacles and impose many delays in the path of individuals and firms as they strive to reduce real costs. The big achievements that still wait to be accomplished are those of clearing the path for these forces of growth to work their wonders. We must never forget that the underlying forces of growth arise from the efforts, energies, and ingenuity of a country's people. One of the greatest tasks of policy is to unleash these forces. To emphasize this point, let me recall that in every comparison that we made between periods of successful growth and other periods, the element of real cost reduction accounted for the largest share of the difference. This force can be thought of as human ingenuity at work—human energies channeled to get more out of society's resources. This desire comes quite naturally to people. The task of government is to create the framework, the environment in which these natural forces can work to their fullest in bettering the life of a society.

Appendix 1. Notes

The Capital Contribution to Growth

We have seen that the capital contribution to a country's growth rate can be expressed as that country's net investment as a fraction of GDP multiplied by the gross-of-depreciation rate of return on that investment. This approach can be used at an aggregate level, but it may also be applied in a disaggregated way, breaking up total investment into as many parts as one finds convenient. We can thus determine the contributions to growth resulting from different categories of investment, as shown in table 8.

Table 8. Breakdown of the Capital Contribution to Growth

	Amount of Net Investment	Gross of Depreciation Rate of Return %	Contribution to Growth
Corporate Investment	800	20	160
Noncorporate Investment	400	15	60
Housing Investment	1,000	6	60
Public Infrastructure Investment	1,000	4	40
Total Net Investment	3,200	10	320

If GDP is 20,000, the capital contribution to the growth rate would be 1.6 percentage points, representing a rate of net investment of 16 percent (3,200/20,000) times a weighted average gross-of-depreciation rate of return of 10 percent. This capital contribution could be further broken down into 0.8 percent from corporate investment, 0.3 percent from noncorporate investment, 0.3 percent from housing investment, and 0.2 percent from public infrastructure investments.

Quite intentionally, I assigned different rates of return to different sectors in this example. The return to capital in a public sector electricity or water supply project would definitely be captured, but the return to capital invested in the nation's public buildings and road network would typically be neither directly counted nor imputed. This is why a low (4 percent) rate of return is assigned to public infrastructure investments in table 8. This rate is not intended to reflect the actual economic rate of productivity of such investments. Table 8 aims instead to capture just that part of the return represented by public sector receipts from infrastructure activities like public utilities, as those receipts are measured in the national accounts.

This discussion of infrastructure has an important bearing on the analysis of economic growth, most notably on how we interpret the results of a breakdown of growth into its components. The standard calculation of the capital contribution to growth is based on the full net increment to the capital stock. It is expressed here as $(\rho + \delta)(\Delta K/y)$, where ρ is the net rate of return attributed to investment, and δ is the depreciation rate assumed to apply; ΔK is the net increase in the capital stock (measured in GDP baskets), and y is the level of real GDP. Alternatively, the capital contribution can be measured as the share of capital s_k multiplied by the rate of growth of the real capital stock ($\Delta K/K$). It is easy to see that the two approaches become one if $(\rho + \delta)$ is taken from the observed share of capital in the GDP, since then $s_k = (\rho + \delta)K/y$.

The important point is that ΔK, the net increment to the capital stock, typically includes both public and private sector investment. In table 8, the gross rate of return to corporate investment is 20 percent; to business investment (corporate plus noncorporate), the return is 18.3 percent (220/1,200); to "private" investment, including housing, the return is 12.7 percent (280/2,200). Yet the rate of return one should apply to ΔK to arrive at the capital contribution to growth is only 10 percent. Whatever the aggregate rate of return used (or implicit in the use of s_k in a growth accounting analysis), a much higher rate of return to private investment is implied, because the overall average also includes a much lower (here 4 percent) rate of return on public investment.

These figures refer to net rather than gross investment. Thus, the data in table 8 could have come from gross corporate investment of 1,500 with depreciation of 700, gross noncorporate investment of 700 with depreciation of 300, gross housing investment of 1,800 with depreciation of 800, or gross infrastructure investment of 1,400 with depreciation of 400.

The exercises in growth analysis presented in this paper are summarized in tables 10–50 and assume that the net-of-depreciation, gross-of-tax rate of return over the economy as a whole is 10 percent, and that the average depreciation rate applicable to new investment is 5 percent per year. As a further check on the reasonableness of our simple example, we note it would take a capital stock of 44,000 to produce a total depreciation figure of 2,200 (at a 5 percent rate). This in turn implies that reproducible capital (i.e., not counting land), would represent 220 percent of a year's GDP, yielding a quite reasonable ratio of reproducible capital to output of 2.2.

Project Evaluation and GDP Growth

At the very core of cost-benefit analysis—indeed, probably at the very core of the entire discipline of economics—is the idea of *efficiency*. One wants to maximize the benefits obtained for a given cost or set of resources. Except for special cases (related to the fact that our national accounting measures of GDP give only approximate measures of society's welfare), one can say that any operation that is economically worthwhile (generating benefits greater than costs) will cause GDP to be higher than it otherwise would be. When one thinks of an operation or a project whose flows of benefits and costs are spread out over time, it follows that the new trajectory of GDP (with the project) will be higher than the one that would prevail in the project's absence.

It is important to note that a project does not have to have a big effect on GDP to be worthwhile. If the funds used generated, on average, a real rate of return of 10 percent in their alternative use, then the project is borderline acceptable if its use of those same funds also yields a 10 percent real return. A really great project would, under these circumstances, produce a real return of 20–25 percent. A really bad project would generate zero or negative real rates of return.

Few, if any countries could uncover a huge inventory of unexploited projects that could produce real returns of 20–25 percent. Some such projects could surely be found in almost any country, but not enough to permit us to say that the typical "good" project is in that category. It is much more likely that most countries are actually investing significant amounts of public resources in projects whose economic rate of return is lower than the economic cost of capital. In these cases, the trajectory of the country's GDP would be higher without the project than with it. Detecting and eliminating such projects, or better, replacing them with projects yielding more than the economic opportunity cost of capital, is the main route by which a good national system of project evaluation can raise a nation's wellbeing.

To get an idea of the order of magnitude of such effects, let us start with an example of contemporaneous operations—i.e., those whose benefits and costs all accrue in the same period. For such projects, a swing from 80 percent to 90 percent efficiency would mean a gain in GDP equal to 10 percent of the cost of the project. If the public expenditures in question amounted to 10 percent of the country's GDP, this would increase that year's GDP by 1 percent. If this same efficiency gain continued to operate year after year on a similar flow of public outlays, it would augment the country's whole trajectory of GDP by the same 1 percent.

Now let us examine, in as simple a framework as possible, how an improved system of economic project evaluation of public sector investments might affect a country's GDP growth rate. The key element in this examination will be the so-called capital contribution to a country's GDP growth. This can be represented as $\sum_j (\rho_j + \delta_j)\Delta K_j$, where the ΔK_j are the increments to capital of different types or in different sectors, and ρ_j and δ_j are real rates of return (or productivity) and real rates of depreciation, respectively.[42]

When a country shifts to a better way of assessing projects, one can expect that both the amount of public investment (ΔK_g) and its rate of economic productivity (ρ_g) will change. However, for simplicity we assume that new projects will yield precisely the society's general economic opportunity cost of capital. By this assumption, we say that if we invest "more than before," the extra capital will be diverted from society's general uses and will thus generate here—as new public investment—the same rate of return as in its alternative uses. Thus the gain to society is limited to the amount of funds that would otherwise be invested at below-normal yields. In the alternative case, where we invest "less than before" in public projects, the funds not occupied in the project will be shifted to their alternative uses in the private sector, where they can be expected to yield society's general marginal rate of return.

Thus, if public investment previously represented 50 (out of a GDP of 1,000) and was yielding an average of 4 percent, and if from now on public investment will yield society's general rate of return of 10 percent, the impact of this investment on growth will increase by (0.10 – 0.04)50, or 3. The GDP growth rate would accordingly increase by 0.003 percent (3/1,000).

Based on our assumptions, this calculation is valid independently of whether the rate of public investment goes from 50 to 60 or from 50 to 40. If the rate goes up, the extra funds are deemed to have come from alternative investments, which would anyway have yielded 10 percent (society's general rate of return). And if it goes down, the extra funds are considered to have gone to new private investments with the same 10 percent yield.

So a quick indicator of the impact of an improved project evaluation framework on a country's rate of growth is simply the percentage by which the actual economic rate of return to public investments falls short of society's general real opportunity cost of capital, multiplied by the rate of public sector investment (as a fraction of GDP) that would likely

42 The marginal product of capital is measured gross of depreciation, because GDP is defined that way and because market prices generally reflect depreciation as well as other costs.

prevail in the absence of the program. In this case it is (0.06)(0.05) = 0.003.

Such an impact on growth is not negligible. If we start out with a GDP of 1,000, growing at 3 percent per year, the present value of the future stream of GDP is 1000/(0.10 – 0.03), using a 10 percent rate of discount (as we should under the assumption that society's economic opportunity cost of capital is 10 percent). This is equal to 14,286. If we shift to the new scenario, the present value jumps to 1000/(0.10 – 0.033) = 14,925, a gain of 639 or almost two-thirds of the current year's GDP.

A still more positive result is generated if it is assumed, as is quite plausible, that when the policy shift is made, the higher rate of productivity applies to the gross, rather than net, investments that are made under the new regime. The previous calculation might be thought of as representing a gross investment of 90 with depreciation of 40. The assumption implicit in the above example would be that the 40 that represented the replacement of "old" investments would still yield 4 percent, and that only the net increment to the capital stock would yield 10 percent. At the other extreme, we can assume that the entire gross investment of 90 generates a yield of 10 percent, and that the alternative would be this same investment yielding only 4 percent. In this case the immediate impact on growth would be 0.06 × 90, or 5.4 rather than 3.0. Its growth implication would be an initial impact of more than 0.5 percent rather than just 0.3 percent.

Readers should not try to make too much of the depreciation adjustment; first, because some fraction of the expenditure on public investment goes for assets that are nondepreciable; and second, because the gain to be obtained from this source is transitory (only at the start of a reform do all the investments being replaced fall in the low yield category). As time goes on, more and more of new gross investments (yielding 10 percent) will be replacing older ones that were also high yield. When this becomes the general rule, the impact on growth is once again based on the net (as distinct from gross) increment to the capital stock.

To get an idea of the possible order of magnitude of the gains to be achieved from a thoroughgoing program of public sector project evaluation, readers may refer to table 5, which shows the fraction of GDP devoted to public sector investment in a number of developing countries.[43] With the above caveats in mind, the critical results of table 5 are that, for the developing countries considered there, the median ratio of gross public investment to GDP was 7.57 percent, while the first and third quartiles were 4.47 percent and 9.53 percent, respectively. The illustrative example presented above, showing infrastructure gross investment equal to 9 percent of GDP (net = 5 percent), is therefore well within the range of real-world observations, so far as the actual ratios of public investment to GDP are concerned. Unfortunately, it is not so easy to confront with reality our assumptions about actual real rates of productivity of public investments, and about how much they could plausibly be improved under a rigorous program of public sector project evaluation. Yet I feel quite confident that the figures used in the above example are within the reasonable range for a substantial set of developing countries.

I have earlier emphasized that most policy improvements have their main impact on the *level* rather than on the *rate of growth* of GDP. This is largely true for trade policies, education policies, and efficiency-improving reforms of all kinds. All these policies have their main effects in raising the time path of GDP by a few percentage points. Their impact on the growth rate is largely confined to the period in which the economy makes its transition from a lower to a higher level of efficiency.

An improved project evaluation program is different from these and many other important reforms in that it digs directly into the growth process itself by raising the productivity of net public investment. So long as the economy is on a growth path in which net public investment plays a continuing role, a program that significantly raises the rate of economic productivity of public investment will indeed have a permanent, continuing effect on the growth rate.

43 Note that these data refer to gross investment. Net investment would be extremely difficult to obtain, because of uncertainties about how the national accounts of different countries deal with capital consumption allowances for those parts of the public sector capital stock that do not produce salable outputs.

Exploring Successful Growth Episodes

The figures in table 6 were derived from the basic data from the IMF's International Financial Statistics, which summarize the national accounts of member countries. Using these data we applied a single, consistent methodology to all except the smallest countries, Russia, and other transition countries. Output of a country was measured in GDP baskets. Investment was measured in the same units (i.e., deflated by the same index) so that a rate of return could meaningfully be applied. The labor contribution to growth was estimated by multiplying the percentage rate of growth of the country's employed labor force by the factor 0.5. This can be thought of as a rough estimate of labor's share in the country's GDP.[44]

The capital contribution is obtained by taking net investment (deflated by the GDP deflator) times an attributed gross-of-depreciation rate of return of 15 percent. This is thought of as representing a net rate of return of 10 percent plus a depreciation rate of 5 percent, but it can equally be thought of as any combination of the two that adds up to 15 percent. The above depreciation element applies to the contribution of new investment to current GDP. Depreciation once again enters the picture, however, as an offset to each period's gross investment. This offset represents the depreciation of investments made in prior years. This is typically obtained by developing estimates of the country's total stock of reproducible capital and applying an assumed depreciation rate. We here use a different procedure, again designed to extend our coverage to a greater number of countries. Our depreciation offset is obtained by taking 5 percent of the gross investment of each of the past 10 years, plus 1.5 percent of the gross investment of each of the past 20 years.[45]

[44] This is an admittedly rough approximation, but some such convention is necessary; otherwise, many countries would have to be excluded. Readers can see in table 6 that none of our conclusions would be affected if the factor 0.5 were changed to 0.6 or even 0.7, which probably exhausts the plausible range of labor's share. Readers should note that the great difficulty in ascertaining labor's share does not come from data on wages and salaries, which are usually readily available, but from getting information on the income of nonincorporated enterprises and of the self-employed, and from the need to split that income into two parts—one attributable to labor, and the other to capital.

[45] This can be thought of applying a 10 percent depreciation rate to each year's investment in machinery and equipment, and a 3 percent depreciation rate to each year's investment in buildings, with half of each year's investment in each of these two broad categories. If these assumptions are made, some 40 percent of investment in buildings is thought of as representing a permanent addition to the capital stock. One motivation for cutting off the process at 20 years is the difficulty of getting the necessary data on investment. Indeed, there were a number of cases where investment had to be estimated by indirect means. For such periods, the assumption was made that the ratio of investment to GDP in the "unknown" period was equal to the average of that ratio for the closest 10-year period for which the necessary data were available. This procedure works so long as data on GDP are available for each of the relevant years. It also avoids the necessity of assuming an initial capital stock, which is necessary when capital stock series are developed using a perpetual inventory approach. It may also have a slight advantage vis-à-vis methods that assume exponential depreciation in that the latter methods imply a concentration of economic depreciation in the early years of an asset's life. Our main reason for choosing this method, however, is that it provides the closest link of assumed depreciation to the actual past investment pattern of each country.

Appendix 2. Data

Appendix 2 presents basic data on growth performances for a large set of countries. These countries were chosen by a filtering procedure designed to select high-growth episodes. For an episode to qualify as high-growth, it had to last at least five years, begin and end with an annual growth rate greater than 4 percent, and have an average annual growth rate of at least 4 percent over the entire period. The countries in table 1 experienced at least one such episode during 1960–2001. In addition to high-growth episodes, we also identify low-growth episodes. These are defined using the same criteria, except we employed the rule of less than 1 percent growth.[46] Finally, the appendix reports on "other" episodes for the same countries. These cover all years within the 1960–2001 span for which data were available and that were not parts of either high- or low-growth episodes.

In the analysis, exports of goods and services are expressed in "real dollars"; we use the SDR-WPI index as a deflator for the "nominal dollars" series. The SDR-WPI is a weighted index of the producer prices in France, Germany, Japan, United Kingdom, and United States, using as weights the percentage of each country's currency in the determination of the SDR.

The producer price indexes used were those reported in line 63 in *International Financial Statistics* (IMF). For Germany, the producer price index was used; for Japan, the wholesale price index; for the UK, the price of industrial output index; for the United States, the producer price index; and for France, the imported raw material index. Those indexes were denominated in the domestic currency and then converted into dollars using the nominal exchange rate reported in the IFS, which is expressed in units of domestic currency per U.S. dollar (.rf). In the UK, the reported nominal exchange rate is expressed in units of U.S. dollars per pound (.rh); thus the inverse of the reported number was used.

France and Germany presented an additional complication: in January 1999, these countries gave up their domestic currencies for the euro, and the IFS began to report the nominal exchange rate between the euro and the dollar. But, it has continued presenting price indexes in the original currency. Therefore, to convert the price index in domestic currency into dollars, we used the irrevocable fixed factors for converting the national currencies into euros

[46] The low-growth episodes reported here are only those experienced by the 41 countries identified by the high-growth criteria. This exercise also excluded very small countries, the Russian Federation, and other countries that formerly belonged to the Soviet Bloc.

(France, F6.559657; and Germany, DM1.95583).

The SDR valuation basket weights have changed several times since 1981 (for the periods before 1981, original weights were used). To smooth the transition from one weighting scheme to the other, we computed a 24-month moving average of the weights (starting 11 months before time t and ending 12 months after t, where t is the month in which the official change of weights took place).

The dates of the changes were January 1996, January 1999, and January 2001. In 1999, the weights of France and Germany (euro area) were unified. In 2001, the weight for the euro was changed; here we applied the percentage change of the euro to our separate weights for the franc and the deutschemark.

For the convenience of readers, we are including in tables 51 and 52 the corresponding data for the United States and the UK, even though they did not experience any high-growth episodes. We are also including table 9 which gives time series of the SDR–WPI index from 1960 through 2002.

Table 9. SDR–WPI Index, 1995=100

Year	SDR–WPI	Year	SDR–WPI
1960	19.6	1982	65.3
1961	20.0	1983	64.8
1962	20.2	1984	64.5
1963	20.4	1985	63.7
1964	20.7	1986	68.4
1965	21.3	1987	75.0
1966	21.9	1988	82.1
1967	21.9	1989	83.8
1968	21.9	1990	88.2
1969	22.9	1991	87.8
1970	24.1	1992	89.7
1971	25.1	1993	87.5
1972	27.1	1994	91.6
1973	32.5	1995	100.0
1974	37.8	1996	95.5
1975	40.3	1997	92.1
1976	41.3	1998	88.3
1977	44.9	1999	89.1
1978	50.7	2000	91.4
1979	58.1	2001	89.9
1980	66.8	2002	89.6
1981	67.1		

Table 10. Components of Growth and Export Performance (%) Australia, 1960–2001

	High growth 1961–73	Other	High growth vs Other
GDP growth	5.3	3.1	2.2
Capital Contribution	1.5	1.2	0.3
Labor Contribution	1.3	1.0	0.4
Real cost reduction	2.5	1.0	1.5
Exports growth (in real dollars)	8.1	4.5	
Exports growth–GDP growth	2.7	1.4	
Exports/GDP (beginning, in local currency)	0.14		
Exports/GDP (end, in local currency)	0.14		

Table 11. Components of Growth and Export Performance (%) Canada, 1965–2001

	High growth 1965–73	Other 1973–2001	High growth vs Other
GDP growth	5.1	2.9	2.2
Capital Contribution	0.7	1.1	–0.4
Labor Contribution	1.5	0.9	0.5
Real cost reduction	2.9	0.9	2.1
Exports growth (in real dollars)	8.8	4.8	
Exports growth–GDP growth	3.8	1.9	
Exports/GDP (beginning, in local currency)	0.19		
Exports/GDP (end, in local currency)	0.23		

Table 12. Components of Growth and Export Performance (%) Finland, 1960–2001

	High growth 1960–73	High growth 1993–2000	Other	High growth vs Other
GDP growth	5.0	4.7	1.9	2.9
Capital Contribution	1.8	0.4	1.1	0.0
Labor Contribution	0.4	0.0	0.3	–0.1
Real cost reduction	2.8	4.3	0.5	3.0
Exports growth (in real dollars)	7.5	12.4	4.3	
Exports growth–GDP growth	2.5	7.7	2.3	
Exports/GDP (beginning, in local currency)	0.21	0.35		
Exports/GDP (end, in local currency)	0.25	0.38		

Table 13. Components of Growth and Export Performance (%) France, 1960–2001

	High growth 1960–73	Other 1973–2001	High growth vs Other
GDP growth	5.4	2.3	3.1
Capital Contribution	1.4	0.9	0.5
Labor Contribution	0.5	0.3	0.2
Real cost reduction	3.5	1.1	2.4
Exports growth (in real dollars)	9.5	4.8	
Exports growth–GDP growth	4.1	2.5	
Exports/GDP (beginning, in local currency)	0.13		
Exports/GDP (end, in local currency)	0.18		

Table 14. Components of Growth and Export Performance (%) Greece, 1960–2001

	High growth 1960–73	Low growth 1979–87	Other	High growth vs Low growth	High growth vs Other
GDP growth	7.9	0.0	2.7	7.9	5.2
Capital Contribution	2.1	0.5	1.0	1.6	1.1
Labor Contribution	0.1	0.5	0.5	–0.5	–0.4
Real cost reduction	5.7	–1.1	1.2	6.8	4.5
Exports growth (in real dollars)	12.5	3.8	6.7		
Exports growth–GDP growth	4.6	3.8	4.0		
Exports/GDP (beginning, in local currency)	0.09				
Exports/GDP (end, in local currency)	0.14				

Table 15. Components of Growth and Export Performance (%) Japan, 1960–2001

	High growth 1960–90	Low growth 1990–2001	High growth vs Low growth
GDP growth	6.4	1.2	5.1
Capital Contribution	4.9	4.6	0.2
Labor Contribution	0.6	0.4	0.1
Real cost reduction	0.9	–3.8	4.7
Exports growth (in real dollars)	11.3	3.6	
Exports growth–GDP growth	5.0	2.3	
Exports/GDP (beginning, in local currency)	0.10		
Exports/GDP (end, in local currency)	0.14		

Table 16. Components of Growth and Export Performance (%)
Ireland, 1960-2000

	High growth 1966–78	High growth 1986–2000	Other	High growth vs Other
GDP growth	5.3	7.0	2.7	3.4
Cap. Contribution	1.4	1.0	1.4	-0.2
Lab. Contribution	0.4	0.7	0.2	0.4
Real cost reduction	3.5	5.2	1.1	3.2
Exports growth (in real dollars)	8.6	12.8	7.4	
Exports growth-GDP growth	3.3	5.8	4.7	
Exports/GDP (beginning, in local curr.)	0.38	0.56		
Exports/GDP (end, in local curr.)	0.50	0.87		

Table 17. Components of Growth and Export Performance (%)
New Zealand, 1960–2001

	High growth 1960–66	High growth 1968–74	Low growth 1974–80	Low growth 1986–92	Other	High growth vs Low growth	High growth vs Other
GDP growth	5.5	5.2	–0.8	0.1	2.6	5.7	2.8
Capital Contribution	1.4	1.0	0.4	0.7	1.1	0.6	0.1
Labor Contribution	1.2	1.2	0.7	1.1	0.9	0.3	0.3
Real cost reduction	2.9	3.1	–1.8	–1.7	0.7	4.7	2.3
Exports growth (in real dollars)	4.2	6.1	4.7	3.9	3.4		
Exports growth–GDP growth	–1.4	0.9	5.5	3.8	0.7		
Exports/GDP (beginning, in local currency)	0.23	0.25					
Exports/GDP (end, in local currency)	0.22	0.21					

Table 18. Components of Growth and Export Performance (%)
Norway, 1960–2001

	High growth 1970–77	Other	High growth vs Other
GDP growth	5.0	3.4	1.6
Capital Contribution	2.5	1.4	1.1
Labor Contribution	1.0	0.5	0.5
Real cost reduction	1.4	1.4	0.0
Exports growth (in real dollars)	7.4	5.4	
Exports growth–GDP growth	2.4	2.0	
Exports/GDP (beginning, in local currency)	0.35		
Exports/GDP (end, in local currency)	0.35		

Table 19. Components of Growth and Export Performance (%)
Portugal, 1960–2001

	High growth 1960–73	High growth 1975–80	High growth 1985–91	Other	High growth vs Other
GDP growth	6.9	5.1	5.5	1.5	4.3
Capital Contribution	1.8	1.1	1.1	1.3	0.0
Labor Contribution	0.1	1.6	0.1	0.5	0.1
Real cost reduction	4.9	2.3	4.3	–0.3	4.2
Exports growth (in real dollars)	9.6	–2.9	14.5	8.1	
Exports growth–GDP growth	2.7	–8.0	9.1	6.5	
Exports/GDP (beginning, in local currency)	0.16	0.16	0.23		
Exports/GDP (end, in local currency)	0.20	0.18	0.25		

Table 20. Components of Growth and Export Performance (%) Spain, 1960–2001

	High growth 1960–74	Other 1974–2001	High growth vs Other
GDP growth	7.2	2.6	4.6
Capital Contribution	1.7	1.1	0.6
Labor Contribution	0.4	0.6	–0.2
Real cost reduction	5.1	0.9	4.2
Exports growth (in real dollars)	15.2	7.4	
Exports growth–GDP growth	8.0	4.8	
Exports/GDP (beginning, in local currency)	0.11		
Exports/GDP (end, in local currency)	0.14		

Table 21. Components of Growth and Export Performance (%) China, 1962–2001

	High growth 1962–81	High growth 1981–2001
GDP growth	7.8	9.8
Capital Contribution	2.0	2.8
Labor Contribution	1.2	0.8
Real cost reduction	4.5	6.3
Exports growth (in real dollars)	7.3	12.3
Exports growth–GDP growth	–0.5	2.4

Table 22. Components of Growth and Export Performance (%)
Hong Kong, 1960–2001

	High growth 1960–97	Other 1997–2001	High growth vs Other
GDP growth	8.0	2.1	5.9
Capital Contribution	2.3	1.8	0.5
Labor Contribution	1.4	0.6	0.8
Real cost reduction	4.3	–0.3	4.5
Exports growth (in real dollars)	11.5	1.5	
Exports growth–GDP growth	3.5	–0.6	
Exports/GDP (beginning, in local currency)	0.85		
Exports/GDP (end, in local currency)	1.29		

Table 23. Components of Growth and Export Performance (%)
Korea, 1960–2001

	High growth 1960–97	Other 1997–2001	High growth vs Other
GDP growth	7.9	4.1	3.8
Capital Contribution	2.0	1.3	0.6
Labor Contribution	1.4	0.8	0.6
Real cost reduction	4.6	2.0	2.6
Exports growth (in real dollars)	17.2	9.1	
Exports growth–GDP growth	9.3	4.9	
Exports/GDP (beginning, in local currency)	0.05		
Exports/GDP (end, in local currency)	0.32		

Table 24. Components of Growth and Export Performance (%) Malaysia, 1960–2001

	High growth 1960–87	High growth 1987–97	Other 1997–2001	High growth vs Other
GDP growth	6.5	9.3	1.9	6.0
Capital Contribution	1.8	3.6	1.2	1.6
Labor Contribution	1.6	1.5	1.6	0.0
Real cost reduction	3.1	4.1	–0.9	4.5
Exports growth (in real dollars)	5.9	11.7	14.3	
Exports growth–GDP growth	–0.6	2.4	12.4	
Exports/GDP (beginning, in local currency)	0.49	0.66		
Exports/GDP (end, in local currency)	0.66	0.93		

Table 25. Components of Growth and Export Performance (%) Singapore, 1964–2000

	High growth 1964–2000
GDP growth	8.9
Capital Contribution	2.9
Labor Contribution	1.6
Real cost reduction	4.4
Exports growth (in real dollars)	10.5
Exports growth–GDP growth	1.6
Exports/GDP (beginning, in local currency)	1.01
Exports/GDP (end, in local currency)	1.42

Table 26. Components of Growth and Export Performance (%) Thailand, 1960–2001

	High growth 1960–86	High growth 1986–96	Other 1996–2001	High growth vs Other
GDP growth	7.1	9.5	–0.2	8.5
Capital Contribution	2.2	3.4	0.1	2.7
Labor Contribution	1.5	1.0	0.6	0.7
Real cost reduction	3.4	5.1	–0.9	5.2
Exports growth (in real dollars)	8.3	15.2	2.8	
Exports growth–GDP growth	1.2	5.7	3.0	
Exports/GDP (beginning, in local currency)	0.19	0.33		
Exports/GDP (end, in local currency)	0.26	0.48		

Table 27. Components of Growth and Export Performance (%) India, 1960–2001

	Other 1960–79	High growth 1979–2001	High growth vs Other
GDP growth	2.8	5.7	2.8
Capital Contribution	1.2	1.5	0.3
Labor Contribution	1.1	1.0	0.0
Real cost reduction	0.6	3.1	2.6
Exports growth (in real dollars)	4.0	6.8	
Exports growth–GDP growth	1.2	1.2	
Exports/GDP (beginning, in local currency)		6.6	
Exports/GDP (end, in local currency)		13.5	

Table 28. Components of Growth and Export Performance (%) Indonesia, 1960–2001

	High growth 1967–97	Other	High growth vs Other
GDP growth	7.4	0.9	6.5
Capital Contribution	1.8	1.1	0.7
Labor Contribution	1.4	1.0	0.3
Real cost reduction	4.2	–1.2	5.4
Exports growth (in real dollars)	13.9	1.4	
Exports growth–GDP growth	6.5	0.5	
Exports/GDP (beginning, in local currency)	0.11		
Exports/GDP (end, in local currency)	0.28		

Table 29. Components of Growth and Export Performance (%) Israel, 1960–2001

	High growth 1960–96	Other 1996–2001	High growth vs Other
GDP growth	6.1	2.6	3.5
Capital Contribution	1.4	1.4	0.0
Labor Contribution	1.6	1.5	0.1
Real cost reduction	3.1	–0.3	3.4
Exports growth (in real dollars)	7.8	8.0	
Exports growth–GDP growth	1.7	5.3	
Exports/GDP (beginning, in local currency)	0.21		
Exports/GDP (end, in local currency)	0.31		

Table 30. Components of Growth and Export Performance (%) Pakistan, 1960–2001

	High growth 1960–96	Other 1996–2001	High growth vs Other
GDP growth	5.9	3.3	2.6
Capital Contribution	1.4	0.6	0.8
Labor Contribution	1.4	1.6	–0.1
Real cost reduction	3.0	1.1	1.9
Exports growth (in real dollars)	6.1	0.4	
Exports growth–GDP growth	0.3	–2.9	
Exports/GDP (beginning, in local currency)	0.09		
Exports/GDP (end, in local currency)	0.17		

Table 31. Components of Growth and Export Performance (%) Philippines, 1960–2001

	High growth 1960–80	Other 1980–2001	High growth vs Other
GDP growth	5.4	2.4	3.0
Capital Contribution	1.4	1.1	0.4
Labor Contribution	1.5	1.4	0.1
Real cost reduction	2.5	0.0	2.6
Exports growth (in real dollars)	7.7	9.2	
Exports growth–GDP growth	2.3	6.8	
Exports/GDP (beginning, in local currency)	0.11		
Exports/GDP (end, in local currency)	0.21		

Table 32. Components of Growth and Export Performance (%) Cameroon, 1972–2001

	High growth 1972–86	Low growth 1986–94	High growth 1994–2001	High growth vs Low growth
GDP growth	8.2	–3.8	4.6	10.2
Capital Contribution	1.3	–0.3	0.1	1.0
Labor Contribution	1.1	1.4	1.2	–0.2
Real cost reduction	5.9	–4.8	3.3	9.4
Exports growth (in real dollars)	11.6	–11.0	19.0	
Exports growth–GDP growth	3.3	–7.2	14.4	
Exports/GDP (beginning, in local currency)	0.22		24.5	
Exports/GDP (end, in local currency)	0.24		25.4	

Table 33. Components of Growth and Export Performance (%) Egypt, 1960–2001

	High growth 1960–75	High growth 1975–2001
GDP growth	4.8	5.8
Capital Contribution	1.4	1.8
Labor Contribution	1.1	1.3
Real cost reduction	2.4	2.6
Exports growth (in real dollars)	4.0	5.4
Exports growth–GDP growth	–0.8	–0.4
Exports/GDP (beginning, in local currency)	0.21	17.9
Exports/GDP (end, in local currency)	0.18	17.5

Table 34. Components of Growth and Export Performance (%)
Morocco, 1960–2001

	High growth 1966–77	Other	High growth vs Other
GDP growth	6.8	3.5	3.3
Capital Contribution	1.8	1.0	0.9
Labor Contribution	1.4	1.2	0.2
Real cost reduction	3.6	1.3	2.3
Exports growth (in real dollars)	6.1	3.3	
Exports growth–GDP growth	–0.6	–0.2	
Exports/GDP (beginning, in local currency)	0.20		
Exports/GDP (end, in local currency)	0.18		

Table 35. Components of Growth and Export Performance (%)
South Africa, 1960–2001

	High growth 1960–74	Other 1974–2001	High growth vs Other
GDP growth	6.1	1.7	4.3
Capital Contribution	1.1	0.8	0.3
Labor Contribution	1.2	1.2	0.0
Real cost reduction	3.8	–0.2	4.0
Exports growth (in real dollars)	6.4	1.9	
Exports growth–GDP growth	0.3	0.1	
Exports/GDP (beginning, in local currency)	0.30		
Exports/GDP (end, in local currency)	0.28		

Table 36. Components of Growth and Export Performance (%) Argentina, 1960–2001

	High growth 1990–98	Other	High growth vs Other
GDP growth	6.4	1.5	4.9
Capital Contribution	1.1	0.9	0.2
Labor Contribution	1.0	0.7	0.3
Real cost reduction	4.3	–0.1	4.4
Exports growth (in real dollars)	14.4	6.8	
Exports growth–GDP growth	8.1	5.4	
Exports/GDP (beginning, in local currency)	0.10		
Exports/GDP (end, in local currency)	0.11		

Table 37. Components of Growth and Export Performance (%) Brazil, 1960–2001

	High growth 1960–80	Other 1980–2001	High growth vs Other
GDP growth	7.3	2.1	5.2
Capital Contribution	2.0	0.8	1.2
Labor Contribution	1.6	1.3	0.4
Real cost reduction	3.7	0.0	3.6
Exports growth (in real dollars)	10.5	4.8	
Exports growth–GDP growth	3.2	2.7	
Exports/GDP (beginning, in local currency)	0.07		
Exports/GDP (end, in local currency)	0.09		

Table 38. Components of Growth and Export Performance (%)
Chile, 1960–2001

	High growth 1975–81	High growth 1983–98	Other	High growth vs Other
GDP growth	6.9	7.4	1.4	5.7
Capital Contribution	0.8	1.9	1.5	–0.1
Labor Contribution	1.2	1.2	1.0	0.2
Real cost reduction	4.9	4.3	–1.1	5.6
Exports growth (in real dollars)	11.1	8.4	4.6	
Exports growth–GDP growth	4.2	1.0	3.3	
Exports/GDP (beginning, in local currency)	0.25	0.24		
Exports/GDP (end, in local currency)	0.16	0.26		

Table 39. Components of Growth and Export Performance (%)
Colombia, 1960–2001

	High growth 1960–80	High growth 1985–95	Other	High growth vs Other
GDP growth	5.4	4.5	1.6	3.4
Capital Contribution	1.2	1.1	0.9	0.2
Labor Contribution	1.4	1.7	1.7	–0.1
Real cost reduction	2.8	1.8	–1.1	3.4
Exports growth (in real dollars)	5.2	6.8	2.9	
Exports growth–GDP growth	–0.2	2.3	1.3	
Exports/GDP (beginning, in local currency)	0.13	0.19		
Exports/GDP (end, in local currency)	0.16	0.15		

Table 40. Components of Growth and Export Performance (%)
Costa Rica, 1960–2001

	High growth 1961–79	High growth 1983–99	Other	High growth vs Other
GDP growth	6.5	5.1	–0.5	6.4
Capital Contribution	1.3	1.2	0.8	0.5
Labor Contribution	2.0	1.6	1.8	0.0
Real cost reduction	3.2	2.3	–3.1	5.9
Exports growth (in real dollars)	8.1	11.4	–5.0	
Exports growth–GDP growth	1.5	6.2	–4.4	
Exports/GDP (beginning, in local currency)	0.23	0.34		
Exports/GDP (end, in local currency)	0.27	0.52		

Table 41. Components of Growth and Export Performance (%)
Ecuador, 1960–2001

	High growth 1969–81	Other	High growth vs Other
GDP growth	8.4	2.7	5.7
Capital Contribution	1.8	0.8	1.0
Labor Contribution	1.4	1.6	–0.1
Real cost reduction	5.2	0.4	4.8
Exports growth (in real dollars)	13.5	–17.6	
Exports growth–GDP growth	5.1	–20.3	
Exports/GDP (beginning, in local currency)	0.13		
Exports/GDP (end, in local currency)	0.25		

Table 42. Components of Growth and Export Performance (%)
El Salvador, 1964–2001

	High growth 1964–78	Low growth 1978–86	High growth 1989–95	Other	High growth vs Low growth	High growth vs Other
GDP growth	4.9	–3.6	6.0	2.5	9.0	2.9
Capital Contribution	1.0	0.0	1.2	1.0	1.1	0.1
Labor Contribution	1.7	1.0	1.8	1.5	0.7	0.2
Real cost reduction	2.2	–4.6	3.0	0.0	7.2	2.6
Exports growth (in real dollars)	6.0	–0.6	13.5	4.4		
Exports growth–GDP growth	1.1	3.0	7.5	1.9		
Exports/GDP (beginning, in local currency)	0.27		0.19			
Exports/GDP (end, in local currency)	0.30		0.22			

Table 43. Components of Growth and Export Performance (%)
Guatemala, 1960–2001

	High growth 1960–80	Low growth 1980–86	Other 1986–2001	High growth vs Low growth	High growth vs Other
GDP growth	5.6	–0.9	3.8	6.5	1.7
Capital Contribution	0.8	0.1	0.6	0.7	0.2
Labor Contribution	1.4	1.3	1.6	0.1	–0.2
Real cost reduction	3.4	–2.4	1.7	5.7	1.7
Exports growth (in real dollars)	7.7	0.1	6.0		
Exports growth–GDP growth	2.1	1.0	2.1		
Exports/GDP (beginning, in local currency)	0.13				
Exports/GDP (end, in local currency)	0.22				

Table 44. Components of Growth and Export Performance (%)
Honduras, 1960–2001

	High growth 1961–68	High growth 1977–79	Other	High growth vs Other
GDP growth	6.0	8.9	2.8	4.6
Capital Contribution	1.4	1.7	1.2	0.4
Labor Contribution	1.4	1.8	1.7	–0.1
Real cost reduction	3.1	5.4	–0.1	4.3
Exports growth (in real dollars)	13.3	14.3	3.1	
Exports growth–GDP growth	7.3	5.4	0.2	
Exports/GDP (beginning, in local currency)	0.22	0.33		
Exports/GDP (end, in local currency)	0.31	0.37		

Table45. Components of Growth and Export Performance (%)
Jamaica, 1965–2001

	High growth 1965–72	Low growth 1972–85	Low growth 1995–2000	Other	High growth vs Low growth	High growth vs Other
GDP growth	6.7	–1.9	–0.6	3.1	7.9	3.5
Capital Contribution	2.6	0.0	1.3	1.6	2.0	1.0
Labor Contribution	0.6	1.4	0.6	0.8	–0.4	–0.1
Real cost reduction	3.4	–3.3	–2.5	0.7	6.3	2.7
Exports growth (in real dollars)	4.5	–1.0	5.0	4.9		
Exports growth–GDP growth	–2.2	0.9	5.6	1.8		
Exports/GDP (beginning, in local currency)	0.37					
Exports/GDP (end, in local currency)	0.33					

Table 46. Components of Growth and Export Performance (%)
Mexico, 1960–2001

	High growth 1960–81	High growth 1995–2000	Other	High growth vs Other
GDP growth	6.8	5.4	1.3	4.8
Capital Contribution	1.4	1.1	0.7	0.5
Labor Contribution	1.8	1.2	1.6	–0.1
Real cost reduction	3.7	3.1	–1.0	4.4
Exports growth (in real dollars)	9.0	17.9	6.6	
Exports growth–GDP growth	2.2	12.5	5.3	
Exports/GDP (beginning, in local currency)	0.11	0.32		
Exports/GDP (end, in local currency)	0.10	0.31		

Table 47. Components of Growth and Export Performance (%)
Paraguay, 1960–2001

	High growth 1960–81	Other 1981–2001	High growth vs Other
GDP growth	6.7	2.1	4.6
Capital Contribution	1.3	1.0	0.3
Labor Contribution	1.5	1.5	–0.1
Real cost reduction	3.9	–0.4	4.3
Exports growth (in real dollars)	7.5	5.7	
Exports growth–GDP growth	0.7	3.6	
Exports/GDP (beginning, in local currency)	0.18		
Exports/GDP (end, in local currency)	0.11		

Table48. Components of Growth and Export Performance (%)
Peru, 1960–2001

	High growth 1960–74	Low growth 1987–92	High growth 1992–97	Other	High growth vs Low growth	High growth vs Other
GDP growth	5.3	–4.8	7.1	2.3	11.0	3.9
Capital Contribution	0.7	0.5	1.5	0.9	0.6	0.2
Labor Contribution	1.3	1.4	1.5	1.5	0.0	–0.1
Real cost reduction	3.4	–6.7	4.0	–0.1	10.4	3.8
Exports growth (in real dollars)	5.3	–2.2	12.9	2.6		
Exports growth–GDP growth	0.0	2.6	5.8	0.3		
Exports/GDP (beginning, in local currency)	0.25		0.12			
Exports/GDP (end, in local currency)	0.16		0.14			

Table 49. Components of Growth and Export Performance (%)
Uruguay, 1960–2001

	High growth 1974–80	High growth 1990–98	Other	High growth vs Other
GDP growth	4.8	4.4	0.4	4.2
Capital Contribution	1.7	0.9	0.2	1.1
Labor Contribution	0.3	0.6	0.5	–0.1
Real cost reduction	2.8	2.9	–0.4	3.2
Exports growth (in real dollars)	7.1	9.4	2.2	
Exports growth–GDP growth	2.3	5.0	1.8	
Exports/GDP (beginning, in local currency)	0.16	0.21		
Exports/GDP (end, in local currency)	0.15	0.20		

Table 50. Components of Growth and Export Performance (%) Venezuela, 1960–2001					
	High growth 1960–65	Low growth 1979–85	Other	High growth vs Low growth	High growth vs Other
GDP growth	6.2	–1.5	3.0	7.7	3.2
Capital contribution	0.7	0.4	0.9	0.2	–0.2
Labor contribution	1.6	1.8	1.8	–0.2	–0.2
Real cost reduction	3.9	–3.8	0.3	7.7	3.6
Exports growth (in real dollars)	0.4	–1.6	6.0		
Exports growth–GDP growth	–5.8	–0.1	3.0		
Exports/GDP (beginning, in local Currency)	0.34				
Exports/GDP (end, in local Currency)	0.31				

Table 51. Components of Growth and Export Performance (%) United States, 1960–2001	
	Other
GDP growth	3.4
Capital contribution	0.9
Labor contribution	0.9
Real cost reduction	1.6
Exports growth (in real dollars)	5.7
Exports growth–GDP growth	2.3
Exports/GDP (beginning, in local Currency)	0.05
Exports/GDP (end, in local Currency)	0.11

Table 52. Components of Growth and Export Performance (%) United Kingdom, 1960–2001	
	Other
GDP growth	2.4
Capital contribution	0.8
Labor contribution	0.2
Real cost reduction	1.4
Exports growth (in real dollars)	5.1
Exports growth–GDP growth	2.7
Exports/GDP (beginning, in local Currency)	0.20
Exports/GDP (end, in local Currency)	0.28

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