

RECENT EVIDENCE ON THE GROWTH PROCESS

Arnold C. Harberger¹

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Introduction

This report was prepared in response to requests for an updating of the evidence reported and analyzed in my 2005 monograph “On the Process of Growth, and Economic Policy in Developing Countries”. Not a great deal of time has passed since that earlier study was published, but on the whole it was possible to assemble data for the years 2000-2008. This period ends just before the crisis of the world financial system, and it would have been interesting to explore the reactions of different countries and groups of countries to the sharp economic downturn of 2009. But unfortunately the data on 2009 were too scattered to permit that. Ending this study in 2008 was also dictated by the fact that our earlier study focused on high-growth episodes. In trying to replicate that study we used the same criteria for identifying a high-growth episode -- first, the average rate of real GDP growth for an episode had to be at least four percent per year; second, the episode had to last for at least 5 years; and third, the real growth rate in the beginning and

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ending years of the episode had also to be greater than or equal to 4%.² Given the fact that 2009 was a recession year for most countries, that simple fact would be enough to dictate that any high-growth episode in progress would likely end in 2008. In a very few countries, high growth continued and the relevant data were available through 2009; and in these cases 2009 was included.

In organizing this paper I have tried to use the same format as was followed in the earlier monograph. Readers can find that paper at www.dec.usaid.gov entering document ID# PN-ADE-081, or at my website, www.econ.ucla.edu/harberger, under “Recent Papers”.

The Recent Record of Unprecedented Success

One of the motives for my earlier study was the extent to which voices were emerging that seemed intent on building what might be called a counterculture against the lessons of what most of us think of as good economics. These voices were surely most strident in parts of the developing world, where “neoliberalism” was constantly under bombardment in much of the press and other media. But they also reached the developed world, even Washington, DC, where I myself have heard, in respectable public forums, fulminations against neoliberalism, against the so-called “Washington Consensus” and even against the structural adjustment strategy that had been followed by the World Bank, by USAID and by other donors, mainly starting in the 1980s. These efforts were alleged to have failed, leading one to wonder precisely what evidence supported the suggestion of failure.

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A short dip of growth below 4% could thus occur in the middle of a high-growth episode, but if such a dip was deep, or extended for several years, it would signify the end of one high-growth period, but might then be followed by a second high-growth period.

Thus the first section of my 2005 paper put forward the argument that the half-century from 1950 to 2000 had been “the greatest in history in terms of improvements in the health, prosperity and welfare of the world’s population” and that in the same terms the period 1975-2000 had been the best quarter-century in history. Table 1 of that paper cited world economic growth of 2.8%. with the low-income countries achieving 3.4%. In per capita terms it was 1.2% for the world, and 1.6% for the low-income countries. Now, in our new Table 1, covering 2000-2008 we find world GDP growing at 3.0%, and that of the low-income countries growing at 5.5%. The per capita numbers are 1.8% and 3.4% respectively. However good it was in 1975-2000, it was better yet in 2000-2008!!

Table 1. World Economic Growth 2000-2008			
	Growth rate (% per Year)		
	Populati on	GDP per Capita	Total GDP*
World	1.2	1.8	3.0
High income	0.7	1.5	2.3
High income: nonOECD	1.5	3.0	4.5
High income: OECD	0.6	1.5	2.1
Middle income	1.2	4.8	5.9
Low income	2.1	3.4	5.5
Least developed countries: UN classification	2.4	3.8	6.2
Heavily indebted poor countries (HIPC)	2.6	2.2	4.8
East Asia & Pacific	0.8	7.8	8.7
Euro area	0.5	1.4	2.0
Europe & Central Asia	0.1	5.7	5.8
Latin America & Caribbean	1.3	2.3	3.6
Middle East & North Africa	1.9	2.6	4.5
South Asia	1.6	5.0	6.6
Sub-Saharan Africa	2.5	2.3	4.8
Source: World Bank database			
* = column 1 + column 2			

These results were supported by Tables 2 and 3, the first dealing with the 10 most populous countries and the second focusing on what I called the growth champions (the

winners of the growth race, leaving out the very small countries). Among the most populous countries, the median growth rate was 4.5% (2.2 per capita) in 1975-2000; it jumped to 5.4% (3.7% per capita) in 2000-2008.

	Population, 2008 (millions)	Growth rate (% per Year)		
		Population	GDP per Capita	Total GDP*
China	1,324.7	0.6	9.3	9.9
India	1,140.0	1.5	5.5	7.0
United States	304.1	1.0	1.3	2.3
Indonesia	227.3	1.3	3.8	5.1
Brazil	192.0	1.2	2.4	3.6
Pakistan	166.1	2.3	2.4	4.7
Bangladesh	160.0	1.6	4.1	5.7
Nigeria	151.2	2.4	3.6	6.0
Russian Federation	142.0	-0.3	7.3	6.9
Japan	127.7	0.1	1.4	1.5
Total or average	3,935.0	1.2	4.1	5.3
Excluding China	2,610.3	1.2	3.5	4.7
World	6,697.3	1.2	1.8	3.0

Source: World Bank database
* = column 2 + column 3

There is no sign of slackening during the early years of the new century. In most parts of the world the pace of economic growth became even stronger and its spread among countries became even wider. This theme is explored in some detail in Table 4. Our Table 4 was built on the same procedures as were used to construct its counterpart (Table 6) in the 2005 monograph. That is, very small countries were left out, as well as those that emerged from the Soviet bloc. A few others were also excluded because key data were missing.

Table 3. Growth Champions, 2000-2008			
	Growth rate (% per Year)		
	Populati on	GDP per Capita	Total GDP*
China	0.6	9.3	9.9
Russian Federation	-0.3	7.3	6.9
Vietnam	1.2	6.2	7.4
India	1.5	5.5	7.0
Korea, Rep.	0.5	4.3	4.8
Poland	-0.2	4.3	4.2
Peru	1.3	4.2	5.5
Bangladesh	1.6	4.1	5.7
Indonesia	1.3	3.8	5.1
Thailand	1.0	3.8	4.7
World	1.2	1.8	3.0
Source: World Bank database			
* = column 1 + column 2			

The most notable difference that emerges in the new table is the great increase in the number of high-growth episodes among the African and “Other Asian” countries, as between the earlier study and this one. Whereas the other study found only 6 high-growth episodes in Africa and only 5 in “Other Asia” over a 25 year period, here we found 10 such episodes in Africa and 12 in “Other Asia” focusing on a mere 8-year span. The added countries include Bangladesh, Jordan, Mongolia, Myanmar, the Philippines and Sri Lanka in “Other Asia”, and Burkina Faso, Madagascar, Mozambique, Senegal, Tunisia, Uganda and Zambia in Africa. All in all, a very wide spectrum of countries in terms of size, location, traditions, specializations, and initial level of development. The fact that these and not some other countries generated high-growth episodes during the period under review would seem to stem from three possible sources -- a) greater dynamism in the productive sectors of these economics resulting from their enterprises finding productive investment opportunities and/or generating them via real cost

reductions, b) improvements in the policy framework within which these enterprises had to operate, thus creating more scope for the above activities, and c) good luck, stemming predominantly from favorable movements in the world prices of a country's major exports.

Analyzing The Growth Process

One of the great advances in economic understanding was the development in the late 1940s and early 1950s of a procedure for breaking up a growth rate into three main components -- a labor contribution, a capital contribution and the contribution variously designed as resulting from "technical advance", or from "improvements in total factor productivity," or from "real cost reduction". I prefer the latter term because it is more truly descriptive of the process, because it is more easily understood, and because it is the one that best captures the fact that real cost reduction can take on many different forms, and can develop through many different avenues.

In developing these components, we attribute a certain marginal product to the labor and capital that are added to the productive process during a period. Nearly always, this involves using the real wage as the measure of the marginal product attributed to labor, and using the real rate of return (gross of depreciation and taxes) as the measure of the marginal product of capital.

If \bar{w} is the average real wage, and L represents the employed labor force, then the labor contribution to the change in output (Δy) is equal to $\bar{w}\Delta L$. Obviously, then, labor's contribution to the growth rate ($\Delta y/y$) is equal to $\bar{w}\Delta L/y$. But this latter expression is equivalent to $(\bar{w}L/y)(\Delta L/L)$ -- obtained simply by multiplying by L both the numerator and denominator of $(\bar{w}\Delta L/y)$. This demonstrates that the labor

contribution can be expressed as the share of labor $s_L (= \bar{w}L / y)$ times the rate of growth of the employed labor force $(\Delta L/L)$.

Following a similar procedure we attribute the gross-of-depreciation rate of return $(\rho+\delta)$ to the increment to the capital stock (ΔK) . Here ρ is the net-of-depreciation rate of return attributed to the new investment of the period. There are many reasons why, in making such an attribution one should use the “normal” or “expected” real rate of return on capital. In this study we use a 10 percent rate of return for this purpose. This has been the rate most commonly used by the World Bank and many other development-oriented entities as the criterion rate to determine whether an investment project is worth undertaking. Thus we have $(\rho+\delta)\Delta K$ as the contribution of added capital to Δy , the increment of real GDP. Hence $(\rho+\delta)(\Delta K/y)$ is the capital contribution to the growth rate $(\Delta y/y)$.

Our analysis of high-growth episodes is summarized in Table 4 (corresponding to Table 6 in the earlier study).

The detailed messages from Table 4 are summarized in Figures 1a and 1b for the components of growth, Figures 2a and 2b for the comparison between the sources of growth in high-growth versus other periods for each of the countries covered, and finally, Figures 3a and 3b for the relationship between the rates of growth of exports and that of GDP for each high-growth episode.

In Figures 1a and 1b we see quite clearly how real cost reduction is once again the dominant source of growth. Figures 2a and 2b, in turn, reveal that real cost reduction is even more dominant in explaining the differences in the contributions of the three sources of growth as between high-growth and “other” (= non-high-growth years

within the period being analyzed) years. The bold-face entries in Table 4 attempt to summarize this information, region by region. Real cost reduction (RCR) accounted for about half the growth of the advanced countries in their high-growth periods (2.7% out of a median growth rate of 5.2%). For the Asian tigers RCR accounted for 3.6 points out of a median growth of 5.6%. For “Other Asia” this was 3.1 points out of 5.4; for Africa it was 2.6 points out of 5.9; and for Latin America it was 3.7 points out of a median growth rate of 6.4%.

Figure 1a. Components of Growth: High-Growth Episodes (Asian Tigers, Other Asian, OECD, 2000-2008)

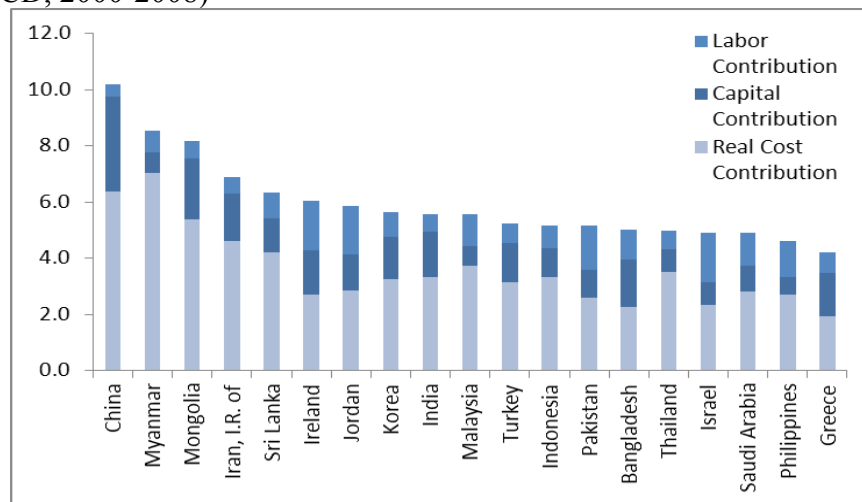


Figure 1b. Components of Growth: High-Growth Episodes (Latin America, Caribbean, Africa, 2000-2008)

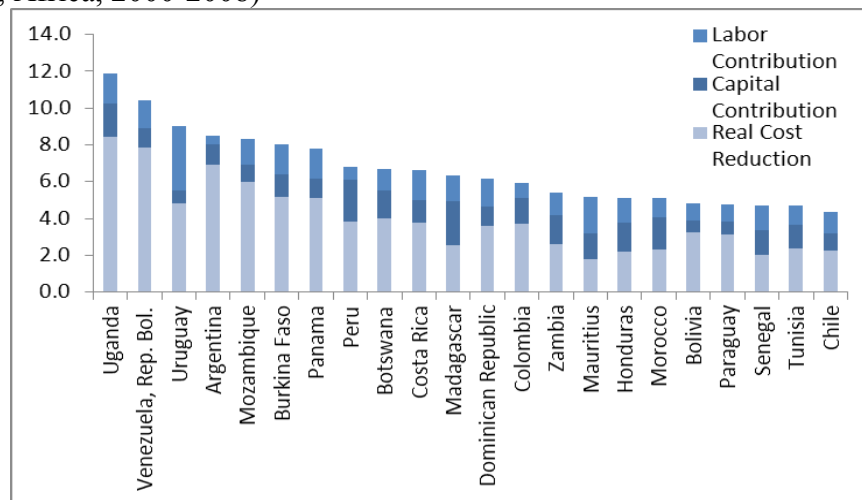


Table 4. High-Growth Episodes

	Time Period	Average GDP Growth (%)	Average Capital Cont. (%)	Average Labor Cont. (%)	Average Real Cost Red.	Average Export growth (%)
Advanced OECD Countries						
Greece	1999-2007	4.2	1.5	0.7	1.9	11.8
Ireland	1986-2007	6.0	1.6	1.7	2.7	10.8
Turkey	1999-2007	5.2	1.4	0.7	3.2	7.4
		5.2	1.5	0.7	2.7	10.8
		-2.5	0.8	0.0	-3.0	0.1
		7.3	0.6	0.1	6.6	7.3
Asian Tigers						
Korea	1998-2007	5.6	1.5	0.9	3.3	4.8
Malaysia	1998-2008	5.5	0.7	1.1	3.7	4.5
China	2001-2008	10.2	3.4	0.5	6.4	17.5
Thailand	1998-2007	5.0	0.8	0.7	3.5	7.7
		5.6	1.1	0.8	3.6	6.3
		0.1	1.3	0.3	-1.5	-2.9
		4.2	-0.3	0.5	3.9	-6.7
Other Asia						
Iran, I.R. of	2001-2007	6.9	1.7	0.6	4.6	15.8
Israel	2003-2008	4.9	0.8	1.8	2.3	7.0
Jordan	1991-2009	5.9	1.3	1.7	2.8	5.7
Saudi Arabia	2002-2008	4.9	0.9	1.2	2.8	14.5

Bangladesh	1973-2008	5.0	1.7	1.1	2.3	10.7
Myanmar	1991-2003	8.5	0.7	0.8	7.0	-7.6
Sri Lanka	2002-2008	6.3	1.2	0.9	4.2	0.7
India	1976-2009	5.6	1.6	0.6	3.3	9.0
Indonesia	1999-2008	5.2	1.0	0.8	3.3	3.5
Philippines	1999-2005	4.6	0.6	1.3	2.7	3.5
Pakistan	1999-2007	5.2	1.0	1.6	2.6	4.4
Mongolia	2001-2008	8.2	2.2	0.6	5.4	11.8
Median (High Growth)		5.4	1.1	1.0	3.1	6.4
Median (Other Episodes)		2.0	0.7	0.7	0.2	-1.4
Median of Differences		3.9	0.2	0.1	3.2	10.1

Table 4. High-Growth Episodes (continued)

	Time Period	Average GDP Growth (%)	Average Capital Cont. (%)	Average Labor Cont. (%)	Average Real Cost Red.	Average Export growth (%)
Africa						
Botswana	1995-2007	6.7	1.5	1.2	4.0	7.2
Madagascar	2002-2008	6.3	2.4	1.4	2.5	19.4
Mauritius	1980-2008	5.2	1.4	2.0	1.8	5.6
Morocco	2000-2008	5.1	1.8	1.0	2.3	8.9
Mozambique	1992-2007	8.3	0.9	1.4	6.0	17.5
Senegal	1994-2005	4.7	1.4	1.3	2.0	3.9
Tunisia	1986-2008	4.7	1.3	1.1	2.4	8.4

Uganda	1994-2008	11.9	1.8	1.6	8.4	17.4
Burkina Faso	1989-2006	8.0	1.3	1.6	5.1	9.8
Zambia	2000-2009	5.4	1.6	1.2	2.6	9.9
Median (High Growth)		5.9	1.4	1.4	2.6	9.4
Median (Other Episodes)		1.6	1.5	1.3	-0.2	-4.0
Median of Differences		3.5	0.2	0.0	2.9	8.9
Latin America-Caribbean						
Argentina	2002-2008	8.5	1.2	0.5	6.9	5.7
Bolivia	2003-2008	4.8	0.6	0.9	3.2	17.5
Chile	1999-2007	4.4	1.0	1.1	2.2	10.7
Colombia	2002-2007	5.9	1.4	0.8	3.7	7.5
Costa Rica	2002-2007	6.6	1.2	1.6	3.8	9.8
Dominican Republic	1991-2002	6.1	1.1	1.5	3.6	4.2
Honduras	1999-2008	5.1	1.6	1.3	2.2	8.6
Panama	2002-2007	7.8	1.1	1.6	5.1	11.8
Paraguay	2003-2008	4.8	0.7	0.9	3.1	6.8
Peru	2001-2008	6.8	2.3	0.7	3.8	15.7
Uruguay	2003-2008	9.0	0.7	3.5	4.8	12.4
Venezuela, Rep. Bol.	2003-2008	10.4	1.0	1.5	7.9	9.7
Median (High Growth)		6.4	1.1	1.2	3.7	9.7
Median (Other Episodes)		1.8	0.6	1.1	-0.6	3.1
Median of Differences		4.5	0.4	0.1	5.4	6.1

Table 4 also reports the results for “other episodes”. These are the years within the span 2000-2008 which were not part of a high-growth episode. Some countries experienced no “other episodes”, because their high-growth period incorporated the whole 2000-2008 span. Hence when we report what we call the “median of differences”, we are first calculating the difference for each of the countries that had an “other episode”, and then reporting in the median of these differences.

Figure 2a. Growth Difference: High Growth vs Other Episodes (Asian Tigers, Other Asian, OECD, 2000-2008. Same Country, Different Periods)

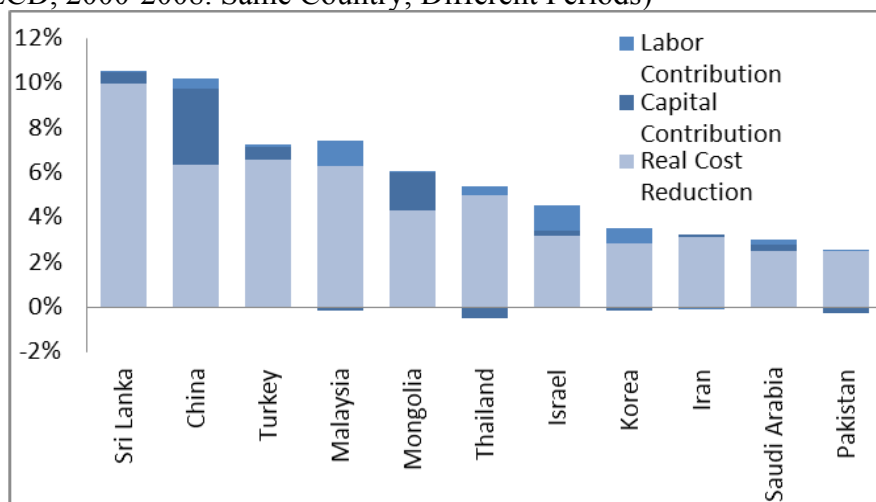


Figure 2b. Growth Difference: High Growth vs Other Episodes (Latin America, Caribbean, Africa, 2000-2008. Same Country, Different Periods)

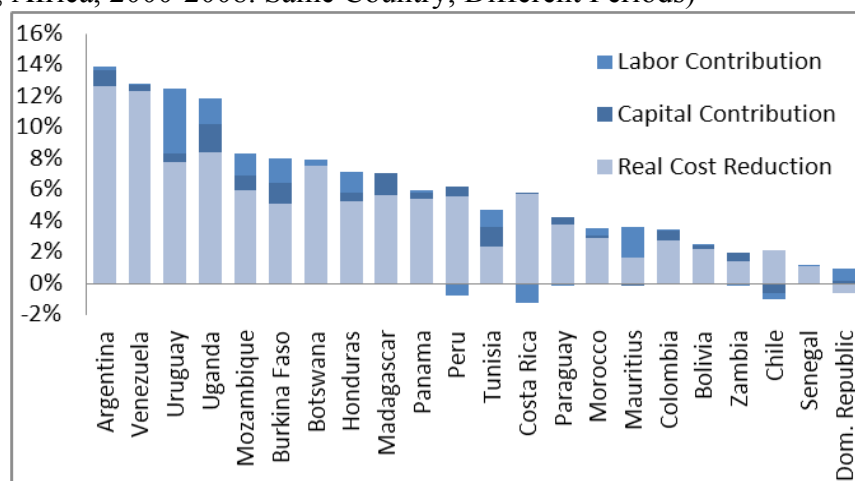


Table 4 also reports on the rate of growth of exports of each country. Exports are measured in real U.S. dollars, the deflator being the U.S. GDP deflator. As in the previous study, it is notable how often the rate of growth of exports exceeds that of GDP in high-growth episodes. This clearly speaks to the likely importance of openness to international trade as a conditioning factor that is conducive to economic growth. But I would like to warn readers not to jump to the conclusion that high-growth episodes are almost invariably “export-led”. For it is quite easy for a high-growth episode to have its origin in the nontradable sector of the economy (say because of major real cost reductions there), and yet end up with exports growing faster than GDP. The feature that makes this possible is a high (well over one) income elasticity of demand for imports. Thus GDP, propelled largely by real cost reduction in the nontradable sector of the economy, may grow by, say, 5%, yet consequent on this GDP growth, the demand for imports may increase by 10%. Unless this increase in import demand is financed by borrowing, it must be paid for by increased exports. The added demand from importers drives up the real price of foreign exchange, calling forth an increase in export supply that is sufficient to pay for the increase in imports.³

Figure 3a. Excess of Export Growth over GDP Growth: High Growth Episodes, 2000-2008 (Asian Tigers, Other Asian, OECD)

³This hypothesis was tested by Jie Yang in her 2007 Ph.D. dissertation at UCLA. She found that in countries where a growth episode was propelled by real cost reduction in the export sector, exports tended to grow faster than GDP, but the real price of the dollar tended to fall. In contrast, when the propelling force was real cost reduction in the nontradable sector, the real price of the dollar tended to rise (for the reason explained above). This did not necessarily lead to export growing faster than GDP, but the data revealed that this is what in fact occurred most of the time, even when the driving force of growth was real cost reduction in the nontradable sector.

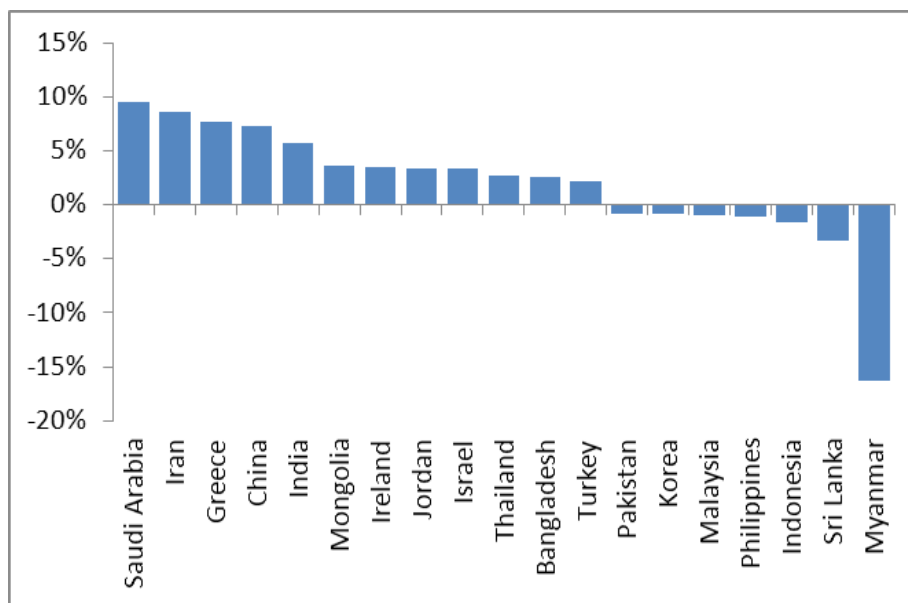
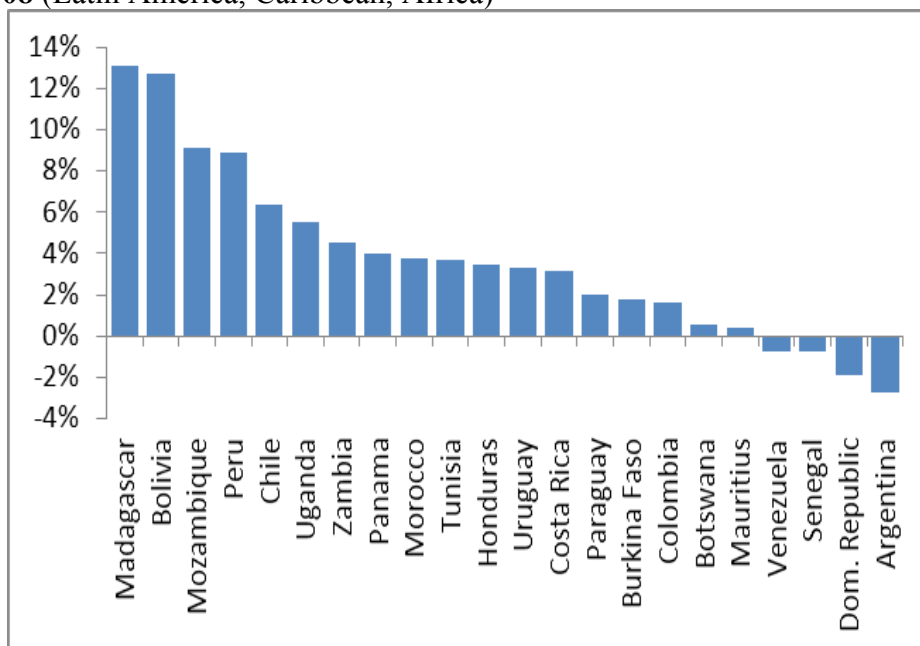


Figure 3a. Excess of Export Growth over GDP Growth: High Growth Episodes, 2000-2008 (Latin America, Caribbean, Africa)



Concluding Remarks

The biggest messages of the earlier paper were:

1. That real cost reduction was the most important component of most economic growth rates, regardless of whether they deal with national economies, with sectors of those economies, with industries within those sectors, or with individual enterprises within those industries.
2. That the second most important component was what we have called the “capital contribution”, which consists of net investment (expressed as a fraction of output) times the expected gross-of-depreciation rate of return. This, too, applies at all levels, from the national economy all the way down to the individual enterprise.
3. Since both the search for ways to reduce real costs and the search for investment opportunities are natural and essential parts of managerial and entrepreneurial activity, it is clear that the individual productive unit (farm, restaurant, store, financial institution, manufacturing establishment) is where these two key components of the growth process are concentrated.
4. Therefore, policy changes are by themselves highly unlikely to “create” growth. Instead they operate to “permit” it or to “inhibit” it. The great challenge to government is that of creating a policy environment which gives appreciable scope for the forces of growth to operate, rather than stifling or inhibiting those forces.
5. The main ways in which policy can favor growth include improving economic efficiency by reducing the number and degree of distortions (many of them the legacies of past policies) in the economy. Each such removal or reduction of a distortion produces a “blip” in the growth rate as the country’s economy moves, say, from 85 to 87 percent efficiency.

6. The list of growth-inducing reforms includes liberalizing international trade in order 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 policy 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.
7. 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.

The above conclusions are confirmed and reinforced by the evidence presented in this paper.

Appendix I -- Notes on Methodology

A. 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. One can use this approach at an aggregate level, as suggested above, but one can also apply it 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.

Breakdown of the Capital Contribution to Growth

	<u>Amount of Net Investment</u>	<u>Gross of Depreciation Rate of Return</u>	<u>Contribution To Growth</u>
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% ($= 3,200/20,000$) times a weighted average gross-of-depreciation rate of return of 10%. This capital contribution could be further broken down into 0.8% from corporate investment, 0.3% from non-corporate investment, 0.3% from housing investment and 0.2% from public infrastructure investments.

I quite intentionally 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 the capital invested in the nation's public buildings and public road network would typically neither directly counted nor imputed. This is why a low (4%) rate of return is assigned to public infrastructure investments in the above table. This rate is not intended to reflect the true economic rate of productivity of such investments. It aims instead at capturing just that part of the return which is 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 the way in which 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 can be expressed, as we do, by $(\rho+\delta)(\Delta K/y)$. Here 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 to note here is that ΔK , the net increment to the capital stock typically includes both public and private sector investment. The story of the above table then applies. In that table the gross rate of return to corporate investment is 20%; that to business investment (corporate plus non-corporate) is 18.3% ($= 220/1200$); that to

“private” investment, including housing, is 12.7% ($= 280/2200$); yet the rate of return that one should apply to ΔK in order to arrive at the capital contribution to growth is only 10%. Whatever is the aggregate rate of return that is used (or implicit in the use of s_k in a growth accounting analysis), this implies a much higher rate of return to private investment.

These figures refer to net rather than gross investment. Thus, the data of the text table above could have come from gross corporate investment of 1500 with depreciation of 700, from gross non-corporate investment of 700 with depreciation of 300, from gross housing investment of 1800 with depreciation of 800 and from gross infrastructure investment of 1400 with depreciation of 400.

The exercises in growth analysis presented in this paper are summarized in Tables A1 through A42. They assume that the net-of-depreciation, gross-of tax rate of return, over the economy as a whole, is 10% and that the average depreciation rate applicable to new investment is 5% per year. As a further check on the reasonableness of our simple example we can note that it would take a capital stock of 44,000 to produce a total depreciation figure of 2200 (at a 5% rate). This in turn implies that reproducible capital (i.e., not counting land), would represent 220% of a year’s GDP, yielding a quite reasonable ratio of reproducible capital to output of 2.2.

B. Exploring Successful Growth Episodes

The figures in Table 4 were derived from the basic data of the International Monetary Fund’s International Financial Statistics, summarizing the national accounts of member countries. Using these data we applied a single, consistent methodology to all except the smallest countries, and also excepting Russia and the 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.⁴

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%. This is thought of as representing a net rate of return of 10% plus a depreciation rate of 5%, but it can equally well be thought of as any combination of the two that adds up to 15%. The above depreciation element applies to the contribution of new investment to the 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, to which an assumed depreciation rate is then applied. 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% of the gross investment of each of the past 10 years, plus 1 1/2% of the gross investment of each of the past 20 years.⁵

⁴This is an admittedly rough approximation, but some such convention is necessary; otherwise many countries would have to be excluded. Readers can see by examining the results of 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 wages and salaries, data on which are usually readily available. The difficulty arises from getting information on the income of non-incorporated 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.

Appendix 2. Data

Table A1. Components of Growth and Export Performance (%)	
Greece, 1999-2007	
	High Growth (1999-2007)
GDP growth	4.2
Capital Contribution	1.5
Labor Contribution	0.7
Real Cost Reduction	1.9
Export growth	11.8
Export growth - GDP growth	7.6

Table A2. Components of Growth and Export Performance (%)	
Ireland, 1986-2007	
	High Growth (1986-2007)
GDP growth	6.0
Capital Contribution	1.6
Labor Contribution	1.7
Real Cost Reduction	2.7
Export growth	10.8
Export growth - GDP growth	4.8

This can be thought of applying a 10% straight line depreciation rate to each year's investment in machinery and equipment, and a 3% straight line 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% 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. This procedure 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-a-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.

Table A3. Components of Growth and Export Performance (%)
Turkey, 1999-2008

	High Growth (1999-2007)	Other	High Growth vs Other
GDP growth	5.2	-2.0	7.3
Capital Contribution	1.4	0.8	0.6
Labor Contribution	0.7	0.6	0.1
Real Cost Reduction	3.2	-3.5	6.6
Export growth	7.4	0.1	7.3
Export growth - GDP growth	2.2	2.1	0.1

Table A4. Components of Growth and Export Performance (%)
Korea, 1998-2008

	High Growth (1998-2007)	Other	High Growth vs Other
GDP growth	5.6	2.2	3.4
Capital Contribution	1.5	1.6	-0.1
Labor Contribution	0.9	0.2	0.7
Real Cost Reduction	3.3	0.4	2.8
Export growth	4.8	28.9	-24.1
Export growth - GDP growth	-0.8	26.7	-27.5

Table A5. Components of Growth and Export Performance (%)
Malaysia, 1998-2008

	High Growth (1998-2008)
GDP growth	5.5
Capital Contribution	0.7
Labor Contribution	1.1
Real Cost Reduction	3.7
Export growth	4.5
Export growth - GDP growth	-1.0

Table A6. Components of Growth and Export Performance (%) China, 2001-2008	
	High Growth (2001-2008)
GDP growth	10.2
Capital Contribution	3.4
Labor Contribution	0.5
Real Cost Reduction	6.4
Export growth	17.5
Export growth - GDP growth	7.3

Table A7. Components of Growth and Export Performance (%) Thailand, 1998-2008			
	High Growth (1998-2007)	Other	High Growth vs Other
GDP growth	5.0	0.1	4.9
Capital Contribution	0.8	1.3	-0.5
Labor Contribution	0.7	0.3	0.4
Real Cost Reduction	3.5	-1.5	5.0
Export growth	7.7	-2.9	10.6
Export growth - GDP growth	2.7	-3.0	5.7

Table A8. Components of Growth and Export Performance (%) Iran, 1999-2008			
	High Growth (2001-2007)	Other	High Growth vs Other
GDP growth	6.9	3.7	3.2
Capital Contribution	1.7	1.6	0.1
Labor Contribution	0.6	0.6	0.0
Real Cost Reduction	4.6	1.5	3.1
Export growth	15.8	-6.4	22.2
Export growth - GDP growth	8.9	-10.1	19.0

Table A9. Components of Growth and Export Performance (%)
Israel, 1999-2008

	High Growth (2003-2008)	Other	High Growth vs Other
GDP growth	4.9	0.4	4.5
Capital Contribution	0.8	0.6	0.2
Labor Contribution	1.8	0.6	1.1
Real Cost Reduction	2.3	-0.9	3.2
Export growth	7.0	-3.1	10.2
Export growth - GDP growth	2.1	-3.5	5.6

Table A10. Components of Growth and Export Performance (%)
Jordan, 1991-2009

	High Growth (1991-2009)
GDP growth	5.9
Capital Contribution	1.3
Labor Contribution	1.7
Real Cost Reduction	2.8
Export growth	5.7
Export growth - GDP growth	-0.1

Table A11. Components of Growth and Export Performance (%)
Saudi Arabia, 1999-2008

	High Growth (2002-2008)	Other	High Growth vs Other
GDP growth	4.9	1.8	3.1
Capital Contribution	0.9	0.6	0.3
Labor Contribution	1.2	0.9	0.2
Real Cost Reduction	2.8	0.3	2.5
Export growth	14.5	8.9	5.6
Export growth - GDP growth	9.6	7.0	2.5

Table A12. Components of Growth and Export Performance (%)
Bangladesh, 1973-2008

	High Growth (1973-2008)
GDP growth	5.0
Capital Contribution	1.7
Labor Contribution	1.1
Real Cost Reduction	2.3
Export growth	10.7
Export growth - GDP growth	5.7

Table A13. Components of Growth and Export Performance (%)
Myanmar, 1991-2003

	High Growth (1991-2003)
GDP growth	8.5
Capital Contribution	0.7
Labor Contribution	0.8
Real Cost Reduction	7.0
Export growth	-7.6
Export growth - GDP growth	-16.1

Table A14. Components of Growth and Export Performance (%)
Sri Lanka, 1999-2008

	High Growth (2002-2008)	Other	High Growth vs Other
GDP growth	6.3	-4.2	10.6
Capital Contribution	1.2	0.7	0.5
Labor Contribution	0.9	0.8	0.1
Real Cost Reduction	4.2	-5.8	10.0
Export growth	0.7	-9.4	10.0

Export growth - GDP growth	-5.7	-5.1	-0.5
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**Table A15. Components of Growth and Export Performance (%)
India, 1976-2009**

	High Growth (1976-2009)
GDP growth	5.6
Capital Contribution	1.6
Labor Contribution	0.6
Real Cost Reduction	3.3
Export growth	9.0
Export growth - GDP growth	3.5

**Table A16. Components of Growth and Export Performance (%)
Indonesia, 1999-2008**

	High Growth (1999-2008)
GDP growth	5.2
Capital Contribution	1.0
Labor Contribution	0.8
Real Cost Reduction	3.3
Export growth	3.5
Export growth - GDP growth	-1.6

**Table A17. Components of Growth and Export Performance (%)
Philippines, 1999-2005**

	High Growth (1999-2005)
GDP growth	4.6
Capital Contribution	0.6
Labor Contribution	1.3
Real Cost Reduction	2.7
Export growth	3.5
Export growth - GDP growth	-1.1

Table A18. Components of Growth and Export Performance (%)
Pakistan, 1999-2008

	High Growth (1999-2007)	Other	High Growth vs Other
GDP growth	5.2	2.9	2.3
Capital Contribution	1.0	1.3	-0.3
Labor Contribution	1.6	1.5	0.1
Real Cost Reduction	2.6	0.1	2.5
Export growth	4.4	3.3	1.0
Export growth - GDP growth	-0.8	0.5	-1.3

Table A19. Components of Growth and Export Performance (%)
Mongolia, 1999-2008

	High Growth (2001-2008)	Other	High Growth vs Other
GDP growth	8.2	2.1	6.1
Capital Contribution	2.2	0.5	1.7
Labor Contribution	0.6	0.6	0.0
Real Cost Reduction	5.4	1.0	4.4
Export growth	11.8	0.3	11.4
Export growth - GDP growth	3.6	-1.8	5.4

Table A20. Components of Growth and Export Performance (%)
Botswana, 1995-2008

	High Growth (1995-2007)	Other	High Growth vs Other
GDP growth	6.7	-1.3	8.0
Capital Contribution	1.5	1.5	0.0

Labor Contribution	1.2	0.8	0.4
Real Cost Reduction	4.0	-3.6	7.6
Export growth	7.2	-16.8	24.0
Export growth - GDP growth	0.5	-15.5	16.1

**Table A21. Components of Growth and Export Performance (%)
Madagascar, 1999-2008**

	High Growth (2002-2008)	Other	High Growth vs Other
GDP growth	6.3	-0.6	7.0
Capital Contribution	2.4	1.0	1.4
Labor Contribution	1.4	1.5	-0.1
Real Cost Reduction	2.5	-3.2	5.7
Export growth	19.4	-8.0	27.5
Export growth - GDP growth	13.1	-7.4	20.5

**Table A22. Components of Growth and Export Performance (%)
Mauritius, 1980-2008**

	High Growth (1980-2008)
GDP growth	5.2
Capital Contribution	1.4
Labor Contribution	2.0
Real Cost Reduction	1.8
Export growth	5.6
Export growth - GDP growth	0.4

**Table A23. Components of Growth and Export Performance (%)
Morocco, 1999-2008**

	High Growth (2000-2008)	Other	High Growth vs Other
GDP growth	5.1	1.6	3.5

Capital Contribution	1.8	1.6	0.2
Labor Contribution	1.0	0.6	0.4
Real Cost Reduction	2.3	-0.6	2.9
Export growth	8.9	8.0	0.9
Export growth - GDP growth	3.8	6.4	-2.6

**Table A24. Components of Growth and Export Performance (%)
Mozambique, 1992-2007**

	High Growth (1992-2007)
GDP growth	8.3
Capital Contribution	0.9
Labor Contribution	1.4
Real Cost Reduction	6.0
Export growth	17.5
Export growth - GDP growth	9.1

**Table A25. Components of Growth and Export Performance (%)
Senegal, 1994-2008**

	High Growth (1994-2005)	Other	High Growth vs Other
GDP growth	4.7	3.6	1.1
Capital Contribution	1.4	1.4	0.0
Labor Contribution	1.3	1.3	0.0
Real Cost Reduction	2.0	0.9	1.1
Export growth	3.9	0.0	3.9
Export growth - GDP growth	-0.8	-3.6	2.9

**Table A26. Components of Growth and Export Performance (%)
Tunisia, 1986-2008**

	High Growth (1986-2008)
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GDP growth	4.7
Capital Contribution	1.3
Labor Contribution	1.1
Real Cost Reduction	2.4
Export growth	8.4
Export growth - GDP growth	3.7

**Table A27. Components of Growth and Export Performance (%)
Uganda, 1994-2008**

	High Growth (1994-2008)
GDP growth	11.9
Capital Contribution	1.8
Labor Contribution	1.6
Real Cost Reduction	8.4
Export growth	17.4
Export growth - GDP growth	5.5

**Table A28. Components of Growth and Export Performance (%)
Burkina Faso, 1989-2006**

	High Growth (1989-2006)
GDP growth	8.0
Capital Contribution	1.3
Labor Contribution	1.6
Real Cost Reduction	5.1
Export growth	9.8
Export growth - GDP growth	1.8

**Table A29. Components of Growth and Export Performance (%)
Zambia, 1999-2009**

	High Growth (2000-2009)	Other	High Growth vs Other
GDP growth	5.4	3.5	1.9
Capital Contribution	1.6	1.0	0.6
Labor Contribution	1.2	1.3	-0.1
Real Cost Reduction	2.6	1.2	1.4
Export growth	9.9	1.1	8.9
Export growth - GDP growth	4.6	-2.4	7.0

**Table A30. Components of Growth and Export Performance (%)
Argentina, 1999-2008**

	High Growth (2002-2008)	Other	High Growth vs Other
GDP growth	8.5	-5.4	13.9
Capital Contribution	1.2	0.1	1.0
Labor Contribution	0.5	0.3	0.2
Real Cost Reduction	6.9	-5.8	12.7
Export growth	5.7	43.4	-37.6
Export growth - GDP growth	-2.8	48.7	-51.5

**Table A31. Components of Growth and Export Performance (%)
Bolivia, 1999-2008**

	High Growth (2003-2008)	Other	High Growth vs Other
GDP growth	4.8	2.3	2.5
Capital Contribution	0.6	0.5	0.2
Labor Contribution	0.9	0.9	0.1
Real Cost Reduction	3.2	1.0	2.2
Export growth	17.5	13.7	3.9
Export growth - GDP growth	12.7	11.3	1.4

Table A32. Components of Growth and Export Performance (%)
Chile, 1999-2008

	High Growth (1999-2007)	Other	High Growth vs Other
GDP growth	4.4	3.2	1.2
Capital Contribution	1.0	1.6	-0.6
Labor Contribution	1.1	1.5	-0.3
Real Cost Reduction	2.2	0.1	2.2
Export growth	10.7	-1.3	12.0
Export growth - GDP growth	6.3	-4.5	10.8

Table A33. Components of Growth and Export Performance (%)
Colombia, 1999-2008

	High Growth (2002-2007)	Other	High Growth vs Other
GDP growth	5.9	2.5	3.4
Capital Contribution	1.4	0.8	0.6
Labor Contribution	0.8	0.8	0.0
Real Cost Reduction	3.7	0.9	2.8
Export growth	7.5	0.6	6.9
Export growth - GDP growth	1.6	-1.9	3.5

Table A34. Components of Growth and Export Performance (%)
Costa Rica, 1999-2008

	High Growth (2002-2007)	Other	High Growth vs Other
GDP growth	6.6	2.1	4.5
Capital Contribution	1.2	1.2	0.0
Labor Contribution	1.6	2.8	-1.2
Real Cost Reduction	3.8	-2.0	5.7
Export growth	9.8	-3.8	13.6
Export growth - GDP growth	3.1	-5.9	9.0

Table A35. Components of Growth and Export Performance (%)
Dominican Republic, 1991-2008

	High Growth (1991-2002)	Other	High Growth vs Other
GDP growth	6.1	5.8	0.3
Capital Contribution	1.1	0.9	0.2
Labor Contribution	1.5	0.8	0.7
Real Cost Reduction	3.6	4.2	-0.6
Export growth	4.2	3.1	1.1
Export growth - GDP growth	-1.9	-2.7	0.7

Table A36. Components of Growth and Export Performance (%)
Honduras, 1999-2008

	High Growth (1999-2008)
GDP growth	5.1
Capital Contribution	1.6
Labor Contribution	1.3
Real Cost Reduction	2.2
Export growth	8.6
Export growth - GDP growth	3.5

Table A37. Components of Growth and Export Performance (%)
Panama, 1999-2008

	High Growth (2002-2007)	Other	High Growth vs Other
GDP growth	7.8	1.8	6.0
Capital Contribution	1.1	0.6	0.4
Labor Contribution	1.6	1.5	0.1
Real Cost Reduction	5.1	-0.3	5.4
Export growth	11.8	2.5	9.2

Export growth - GDP growth	4.0	0.7	3.3
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Table A38. Components of Growth and Export Performance (%)
Paraguay, 1999-2008

	High Growth (2003-2008)	Other	High Growth vs Other
GDP growth	4.8	0.6	4.2
Capital Contribution	0.7	0.2	0.5
Labor Contribution	0.9	1.1	-0.1
Real Cost Reduction	3.1	-0.6	3.8
Export growth	6.8	7.1	-0.3
Export growth - GDP growth	2.0	6.5	-4.5

Table A39. Components of Growth and Export Performance (%)
Peru, 1999-2008

	High Growth (2001-2008)	Other	High Growth vs Other
GDP growth	6.8	1.3	5.5
Capital Contribution	2.3	1.6	0.6
Labor Contribution	0.7	1.4	-0.8
Real Cost Reduction	3.8	-1.7	5.6
Export growth	15.7	-0.3	16.0
Export growth - GDP growth	8.9	-1.7	10.5

Table A40. Components of Growth and Export Performance (%)
Uruguay, 1999-2008

	High Growth (2003-2008)	Other	High Growth vs Other
GDP growth	9.0	-3.4	12.5
Capital Contribution	0.7	0.1	0.6
Labor Contribution	3.5	-0.6	4.1
Real Cost Reduction	4.8	-2.9	7.8

Export growth	12.4	6.3	6.1
Export growth - GDP growth	3.3	9.7	-6.4

**Table A41. Components of Growth and Export Performance (%)
Venezuela, 1999-2008**

	High Growth (2003-2008)	Other	High Growth vs Other
GDP growth	10.4	-2.4	12.8
Capital Contribution	1.0	0.6	0.4
Labor Contribution	1.5	1.4	0.1
Real Cost Reduction	7.9	-4.5	12.3
Export growth	9.7	9.6	0.1
Export growth - GDP growth	-0.8	11.9	-12.7

**Table A42. Components of Growth and Export Performance (%)
United Kingdom, 1999-2008**

	Other
GDP growth	1.7
Capital Contribution	0.8
Labor Contribution	0.3
Real Cost Reduction	0.7
Export growth	2.6
Export growth - GDP growth	0.8

**Table A43. Components of Growth and Export Performance (%)
United States, 1999-2008**

	Other
GDP growth	1.9
Capital Contribution	0.9
Labor Contribution	0.2
Real Cost Reduction	0.7

Export growth	2.6
Export growth - GDP growth	0.7