Slow Growth in Latin America: Common outcomes, common causes?[1]

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1. **Houston, Houston, we have a problem**

Latin America is growing again. In the period 2002-2005 the major countries in the region will have seen significant increases in total GDP.[2] Of the 8 countries largest economies in the region, 3 grew faster than 5 percent per annum, 3 exceeded 4 percent and the worst performers grew at 3 percent. Underpinning this performance was the fast growth in exports and the large improvement in external financial conditions. In the 2002-2005 period, of the 8 countries, 5 saw export receipts in dollars grow over 20 percent per annum, while the worst performer –Mexico– managed to expand exports at 9 percent (Table 2). Figure 1 shows the large decline in the average spread of the Global Emerging Markets Bond Index (EMBI-G), which includes 32 non-industrial countries of which 12 are Latin American. The current index is back to levels not seen since before the East Asian crisis.

In its most recent report dated August 2005, the United Nations Economic Commission for Latin America (ECLAC) forecasted that Latin America and the Caribbean will grow 4.3 percent in 2005 and 4 percent in 2006. If these predictions come true, the region will complete 4 consecutive years of growth, accumulating an increase of 10 percent in income per capita between 2003 and 2006.

ECLAC is not alone in its optimism. Earlier, in its World Economic Outlook dated April 2005, the International Monetary Fund had predicted 4.1 percent for Latin America in 2005, and 3.7 percent in 2006. The Fund writes that "the strength of the recovery in Latin America has continued to exceed expectations." (p. 37)

That Latin America should be growing at a time of record high commodity prices, record low international interest rates, and robust global demand, is not surprising. What is surprising is that the region is not growing more in this environment of the fastest world growth in 30 years. Indeed, according to the same IMF World Economic Outlook, the region will post the slowest average growth in 2005-06 of any developing region. Developing Asia will grow by 7.4 and 7.1 in each of those two years, according to the Fund. Even Africa, at 5.1 and 5.4 percent, will amply outgrow Latin America. And this is even though recent Latin growth is overstated by the ongoing recoveries in Argentina, Uruguay and Venezuela, countries that experienced large absolute declines in output earlier this decade.

This is surprising, since conditions starting in 2002 have been very favorable to growth in Latin America. First, economies started from a recession that left them with ample under-utilized resources. Second, they faced very favorable external conditions in terms of exports. Finally, capital markets could not have been more supportive, with country risk indicators declining very significantly.

Politicians and citizens all over Latin America would like to think that the recent expansion is the beginning of a new period of sustained growth. But the opposite may

[2] Table 1 shows the performance of the 8 largest Latin American economies from 1994 to 2005. We use UBS projections for 2005.

well be true: 2003-06 could be a passing blip in an otherwise mediocre growth performance. Yes, for Latin America has not grown that much in the recent (and not so recent) past.

Go back to 1998, the last good year before the 1999 recession. Since that year no country has grown at 4 percent, 2 countries grew above 3 percent, 4 more countries managed to grow over 2 percent and 2 did not even reach this threshold (Table 1). The picture does not change much if we go back to 1994 and look at the following 11 years. Here we find that no country grew at 5 percent, 2 countries managed to exceed 4 percent (Chile and Peru), 4 more managed growth rates of over 2 percent (but less than 3) and 2 more did not even get there.

So far, we have been looking at total GDP growth. Table 3 shows the same information in terms of GDP per worker. In the period 1998-2005 half the countries had declines in GDP per worker and the best performer – Chile – barely reached 1.5 percent. The picture does not change much if we go back to 1994.

Or let us go back as far as 1988. That was a year in which the Brady Plan was decide but not yet implemented. Most countries were still in a debt crisis and the Washington Consensus reforms were yet to be implemented. The unweighted average inflation rate in the 26 Latin American and Caribbean countries stood at 474 percent. Growth in the previous 8 years had averaged less than 2 percent. Most countries implemented major reforms. By 2003 inflation had been brought down to 10 percent on average for 26 countries, tariffs had been slashed, state-owned enterprises had been privatized, financial sectors liberalized and reformed.

Nonetheless, performance over the following 15 years was less good than over the 1960-1975 period. Table 4 below shows that with the exception of Chile and Belize, all countries exhibited a decline in the overall rate of growth, with the average country slowing down by 2 percent.

Latin America's recent performance is also very far from its own peak performance. In Table 5 we identify the fastest 15-year period of growth in GDP per worker since 1960. The typical country reached its peak between 1963-1978 and averaged 2.9 percent. Of these, 7 countries exceeded Chile's recent performance. Relative to this benchmark, the typical country had a growth rate 2.6 percent below their record rate. Hence, the slowdown is really very significant.

Another way of seeing this is to compare performance across decades. Figure 2 shows growth in Latin America in the 1960s, 70s, 80s and in 1991-2003. We see there than Latin growth was higher in this latter period than in the "lost decade" of the 80s, but substantially below the growth in the 1960s and 70s.

Why doesn't Latin America grow more? And what can be done about it? Those are the questions to which this paper attempts to provide tentative answers.

In Section 2 we analyze some standard explanations for Latin America's mediocre performance, and find them wanting. Section 3 then sketches the rudiments of an alternative approach –one that stresses the importance of identifying the most binding constraints to growth. Section 4 then provides some preliminary evidence that this most binding constraint may vary quite a bit across the countries of the region. Section 5 sketches a method of growth diagnostics to identify those constraints, and argues that there are at least 3 different syndromes that can cause the low-growth disease in Latin America, requiring in turn very different policies or cures. Section 6 concludes.

2. **Sorting through explanations**

What could explain broad-based decline in growth if we compare, say 1988-2003 with 1960-75?

Citizens and workers

A first answer is the decline in the growth of population. As shown in Table 6, all countries with the exception of Belize and Haiti exhibited declines in the rate of population growth. However, the declined averaged only 0.7 percent, much less than the 2 percent average decline in growth.

Therefore, when we look at GDP per capita (Table 7), the deceleration is still there, although not as large. Only Chile significantly accelerated its performance in terms of GDP per capita growth. 6 countries had broadly similar growth rates while 16 countries saw decelerations of over 1 percent. The average country saw a decline of 1.2 percentage points. This is something that still needs an explanation.

GDP per capita is not a good measure of the efficiency with which the economy uses the resources at its disposal, given that much of the population is composed of dependent children. During a period of declining population growth dependency ratios decline as the labor force grows faster than total population. Table 8 compares the evolution in the number of workers per capita. It shows that in the period 1988-2003 this variable increased significantly, averaging 0.8 percent per annum and representing an acceleration of 0.7 percent on average vis a vis the 1960-1975 period.

GDP per worker is a better measure of the efficiency with which the economy uses its productive resources. In Table 9 , which shows rates of growth of GDP per worker, again we observe a very large decline in performance in 1988-2003 versus the previous period. On average, the decline in GDP growth per worker has been as large as the fall in total GDP growth. Only Chile accelerated its growth rate of GDP per worker and only Costa Rica and Guyana had similar performance in both periods. It is striking that 12 countries saw growth decelerations of over 2 percent, 8 of which experienced decelerations of more than 3 percent.

The rest of the world

An alternative explanation of why Latin America grew less in 1988-2003 than in 1960-75 is simple: the world as a whole grew less in the latter period. Table 10 shows data for the 36 fastest growing countries in terms of GDP per worker in the two periods[3]. The last country in the table is the United States, which means that all countries not in the table widened their gap vis a vis the United States. Notice that Latin America's star performer in 1988-2003 –Chile – ranks at number 11, well below not just China and Vietnam but also middle-to-high-income countries such as Ireland, Thailand, Korea and Singapore. Among the 36 countries listed, only 4 are Latin American (Costa Rica, Panama and the Dominican Republic), meaning that all others widened their productivity gap with the US.[4] The message is clear: given conditions in 1988-2003, even the strong Latin American performers grew less than their counterparts in other regions of the world.

Another way of seeing this is to compare performance across groups of countries for the same decade. Figure 2 shows that in 1991-2003 Latin America grew less (in per-capita terms) than the OECD countries and than the nations of emerging Asia. The relative gap in performance is small than in earlier decades, but it is still there.

Urbanization, agriculture and productivity

An alternative hypothesis could be that in the past, much of the growth was taking place thanks to urbanization and the shift of the labor force from low productivity agricultural activities in rural areas to more productive urban activities. This shift has slowed down or ended in the past decade-and-a-half. This could be behind the slowdown.

First, let us document the shift in labor from agriculture to non-agricultural activities in the two 15 year periods we are comparing[5]. For the countries shown in Table 11, in the period between 1965 and 1980, employment in agriculture declined from 47.9 percent in 1965 to 36.7 percent by 1980, a difference of 11.2 percentage points. Between 1988 and 2002 it declined on average from 31.4 percent to 23.3 percent, a difference of 8 percentage points. This shows that the process has been quite continuous, although the rate of transformation declined somewhat. Of the 19 countries shown in the table, only 4 (Colombia, Honduras, Haiti and Jamaica) had a faster decline in the share of agricultural employment in the second period.

It is also the case that on average agricultural employment has a lower average productivity than non-agricultural employment, although this gap has been closing over time. Table 12 shows the evolution of agricultural productivity per worker as a share of

[3] We exclude all countries with less than 2 million inhabitants. Data is from World Development Indicators (2005).
[4] Moreover, of these 4 Latin countries, only Chile grew faster in 1988-2003 than in 1960-75. The others 3 grew less and two –Costa Rica and Panamá—grew substantially less.
[5] We change the dates of comparison slightly because we lack data on agricultural output and employment for many countries before 1965 and after 2002.

non-agricultural productivity. In all countries, the gap in agricultural productivity has been closing, although this has tended to happen more quickly in the recent period.

We are now in a position to decompose the evolution in the productivity per worker into three elements: first, the change in the productivity per worker in agriculture; second, the growth in labor productivity in non-agricultural activities and the effects of shifting labor out of agriculture. The effect of the shift is calculated by multiplying the change in the labor share in agriculture times the difference in initial output per worker in the two sectors as a share of initial national output per worker. The results appear in Table 13.

For the period between 1965 and 1980, the total growth in GDP per worker of 1.7 percent originated from a rise in agricultural productivity of 1.9 percent, an increase in non-agricultural productivity of barely 0.3 percent and a compositional shift effect of 1.2 percent. By contrast, in the 1988-2002 period, the total growth in GDP per worker represented only 0.1 per cent on average. This can be decomposed into an increase of 1.7 percent in agricultural productivity, a decline of a whopping 0.8 percent in non agricultural productivity and a positive shift effect of 0.7 percent. The deceleration in the total rate of productivity growth between the two periods amounted to a fall of 1.6 percent per annum and was due to a decline in agricultural productivity growth of barely 0.2 percent, a decline in non-agricultural productivity growth of 1.1 percent and a fall in the shift effect of 0.6 percent.

This all suggests that the decline in total GDP per worker can only partially be explained by reduction in the contribution provided by the shift of labor out of agriculture. The dominant explanation is the decline in non-agricultural productivity growth. In fact, in the 1988-2002 period, this sector exhibited negative growth in 14 out of 19 countries. 8 out of those 14 had growth declines faster than 1 percent per annum. Only two countries had non-agricultural productivity growth above 1 percent: Chile and Guyana. Growth was between zero and one in Costa Rica, El Salvador and the Dominican Republic.

Could it be education?

The fall in non-agricultural labor productivity contrasts with the fact that workers have been endowed with rising levels of education. Not only has the average years of schooling of the labor force increased, but it has in fact accelerated over time between the first and the second 15-year periods we have been considering. According to the Barro-Lee dataset, average years of schooling of the population over 15 years of age grew by 16.9 percent per decade on average in the period between 1960 and 1975 and rose by 21 percent in the following 15 years (Table 14). The Barro-Lee dataset stops in 1990. To see what happened to educational effort during the 1990s we look at secondary school enrollment. Table 15 shows an average increase from 54.2 in 1990 to 75.6 in 2000. The poor growth performance of Latin America becomes even more puzzling if we consider the educational effort that was made.

What should have been the contribution of education to growth? Consider the following table (Table 16) constructed using household survey data for a selection of Latin

American countries as well as Thailand, Taiwan and the USA. Each country has two observations, one typically around 1983 and the other around 1998. We calculate the number of years of schooling of the population over 25 and the rates of return to that education controlling for experience and experience squared. On average, the years of schooling of the labor force increased by 1.3 years per decade. The measured rate of return to that schooling averaged 11.7 percent in the earlier period and 10.9 percent in the second period.

In the 9th column of that table we calculate how much output per worker should have increased as a consequence of the rise in schooling, assuming that the initial returns to schooling had remained constant and assuming that total factor productivity and physical capital per worker had not changed. The average for Latin America suggests that output per worker should have increased by 1.6 percent per annum as a consequence of the measured educational effort. This is significantly higher than the equivalent numbers for Taiwan, Thailand and the USA. The last column reproduces the actual rise in GDP per worker. With the exception of Chile, Costa Rica and Panama, output per worker increased less than would have been expected given the observed educational effort, indicating that something negative elsewhere must explain the poor growth performance. Note that in both the United States and Thailand, GDP per worker increased more than would have been expected given their educational effort.

Is it bad policies?

It is also hard to argue that the problem is bad policies. Table 17 presents Eduardo Lora's index of structural reforms. The index covers trade liberalization, financial reform, privatization, tax reform and labor market reform. We see in the table a great wave of reform taking place between 1985 and 1999. Lora's index of reform, calculated as an average for 17 countries in Latin America and the Caribbean, went from 0.34 to 0.58 in that period.[6] Change was fastest between 1989 and 1994 -an increase of 0.12 points took place out of a total of 0.24 for the entire period. Reforms slowed down after then, but in most countries there has been little backsliding. In some areas reform was deep and lasting: for instance, average inflation in the 26 Latin American countries went from 474 percent in 1988 to 10.2 percent in 2003.

Standard neo-classical growth theory would predict that an improvement in policy fundamentals should accelerate the rate of growth as the economy converges to a higher trend. But down on the ground, how much growth did all this reforming effort purchase? The question remains controversial, and empirical answers vary. But a growing number of studies seem to be saying the same: the growth payoff from reform was not large.

The prevailing view on the growth effects of reforms was very optimistic early on. Three papers representative of that view were Easterly, Loayza and Montiel (1997), Fernández-

[6]Lora (2001) computes region-wide indices in the five areas --trade, finance, taxation, privatization and labor-- normalized so that zero is the lowest rating in any country at any time in the sample, and one the highest. Therefore the levels of the index are rather hard to interpret, but the changes in the index over time offer a good measure of change in these areas.

Arias and Montiel (1997) and Lora and Barrera (1997). These papers had a common methodology. They added policy variables or indices to the standard cross-country growth regressions and then, using the estimated coefficients and the values of the policy variables, computed a forecast of the growth impact of reform. Lora and Barrera (1997), for instance, using (an earlier version of) the indices of reform described above, argued that reforms applied until the mid-1990s had accelerated Latin America's growth rate by 1.9 percentage points (or up to 2.2 percentage points once the impact of macroeconomic stabilization policies was included). Easterly, Loayza and Montiel (1997) also estimated 2.2 percent, while the paper by Fernández-Arias and Montiel (1997) yielded a lower estimated of 1.6 -with the effect of macro stabilization included in these figures, so that the impact of structural reform alone was in fact smaller.

With the passage of time, however, this optimism has tended to wither. For one thing, using new data and methods, estimates of the growth impact of reform have fallen. For instance, Lora and Barrera (2001), using the updated reform index of Lora's (2001), found that (contrary to the claim in their own 1997 paper) reforms had only a temporary effect on growth. Their new estimates implied that in 1991-93, the period of fastest reform, reforms caused growth to accelerate by 1.3 percentage points per year. But when the reform process decelerated the growth effect dropped substantially, and in the period from 1997 to 1999 reforms accounted for only 0.6 percentage points of additional growth (relative to a situation in which no additional reforms had been undertaken).

Loayza, Fajnzylber and Calderón (2002) computed the contribution of a set of structural factors (education, financial depth, trade openness, public infrastructure, and the size of government) on the change in per capita growth between the 1980s and the 1990s. Their results, which appear in Table 4, are not of the sort that drives reform advocates wild with excitement. The contribution of structural factors to the growth change in the average Latin American country between the dismal 80s and the so-so 1990s is 1.4 percent.[7] And this average is pulled up by high figures in countries such as Haiti (2.24), Nicaragua (2.56) and El Salvador (2.21) that were coming out of civil strife and economic chaos.[8]

Figures for nations that reformed extensively are sobering: Argentina (1.07), Bolivia (1.34), Brazil (0.88), Chile (1.67) and Mexico (1.51). In other words, moving away from the distorting, inward-looking and often chaotic policies of the 1980s seems to have given Argentina barely one additional point per year of growth in the 1990s.[9] And note that these are transitory, not permanent, gains: they are estimated for a neoclassical model, so the gains should vanish as the economy converges to its long run steady state in which only technological progress drives growth.

[7]This figure, of course, includes reforming and non-reforming countries.
[8]Haiti never quite came out of that state, which makes the figure surprising
[9]The figure is from Loayza, Fajnzylber and Calderón (2002).

3. **Distortions, reforms and economic growth**

None of the hypotheses we explored in the previous section seem to explain the region's growth performance. Changes in population growth and in labor force participation, the end of the shift from the countryside to the city, slower world growth, lack of education, bad policies –these hypotheses have trouble explaining the full extent of the Latin American growth slowdown of the last 25 years.

Perhaps the pitfall is in looking for a single common cause for what may be quite different growth problems across Latin America. If that is so, then we need a framework for carrying out a growth diagnostics and identifying different obstacles to growth in different countries. Next we sketch a diagnostic framework presented in a more fully-fleshed out version in Hausmann, Rodrik, and Velasco (2004), and take a first pass at applying it to Latin America.

Growth: the basics

Start from the elementary proposition that growth is increasing in the expected returns to accumulating human or physical assets. In turn, these expected returns by private agents are a function of three things: the amount of assets they have (the saving/investment effort), the productivity of those assets, and the proportion that the agents can appropriate of the output generated by the assets. We call the third of these the appropriability factor. Appropriability of returns has to do not only with expected taxation, but also with other forms of loss, such as those generated by surprise inflation, a banking crisis, corruption, extortion, crime or poor enforcement of property rights and contract. Consequently, the expected return to accumulating assets is given by:

Expected returns = (savings/investment effort) x (appropriability) x (productivity)

There are three things to stress about this relationship. Note first that the three terms enter multiplicatively. In principle they are not substitutes but complements. This means that the increase in growth to be obtained by increasing any of the three terms depends on the level of the other two. For instance, the payoff to raising the saving/investment effort depends crucially on the productivity of the cumulable factor and how much of the fruits of investment can be appropriated by the investor. In the extreme, if one of these factors is zero the total will be zero, independently of the effort in the other two areas.

Second, each of the three factors is in turn a function of fundamental determinants (preferences and technology) and of "distortions" encompassing both government and market failures: high tax rates, policy-induced risks, externalities and spillovers, and the like. In Hausmann, Rodrik and Velasco (2004) we sketch a growth model in which the relationship between rates of return and various wedges can be seen explicitly. A policy reform, in this context, is nothing but the removal of one or more of these distortions.

Third, there is little reason to expect the relationship between each factor and the distortions that affect it to be linear. In a standard model, those relationships come from the various first order conditions of the private sector, which in general are not linear. This means that the effect of a policy reform on growth need not be linear, even if we hold all other distortions and factors constant. Initial conditions matter. For instance, lowering a tax on accumulation from 30 to 15 percent may well have large growth effects, while lowering it from 3 to 1.5 percent need not.

The upshot is that different policy changes can have dramatically different effects on growth, depending on the initial level of the policy being changed and potentially on all other fundamental factors and distortions in the economy. By the theory of the second best, there can't even be much certainty that removing one distortion at a time, leaving the others in place, will raise growth or welfare.

Empirical issues

The idea that growth may be impeded by a few and not by many constraints is consistent with the findings on growth accelerations in Hausmann, Pritchett and Rodrik (2004). There they define a growth acceleration as a date in which the rate of growth of an economy accelerated by at least 2 percentage points to a level of at least 3.5 percent per capita sustained for at least 8 years. Using the World Penn Tables (WPT), they identify 83 such instances in the period 1957-1992[10]. This means that on average any given country has about a 25 percent chance of experiencing a growth acceleration in any given decade. This is a much higher frequency than would be expected if growth accelerations really required the laundry list of macroeconomic, structural and institutional reforms that are now seen as necessary to trigger higher levels of growth. It is more consistent with the idea that if policies remove some binding constraint, significant growth can be unleashed.

Moreover, many growth accelerations are not sustained beyond the first 8 years. This points to the following idea: higher growth can be *triggered* by relaxing the most binding constraint. However, as this constraint becomes less binding, growth starts to hit other constraints and if these are not removed, they may bring the episode to an end. Hence, once growth is triggered by relaxing the binding constraint, progress in other areas becomes more important to *sustain* growth.

This framework also has implications for how we should measure the impact of policies on growth. The standard procedure is to run a cross-country regression with the standard factors plus proxies for policies and so-called structural factors. Then the impact of policies depends on the size and sign of the corresponding coefficient. But these coefficients represent the average value across a large set of countries. Our framework suggests there is no reason to expect that the marginal effect say, of a given policy

[10] They need 8 years of data before and after any given year in order to assess whether an acceleration has taken place. Since the PWT data start in 1950 (with few observations until the 1960s) and end in 2000, the pre-1957 and post-1992 periods don't have enough information to identify an acceleration.

change on growth should be the same for the country in question as for the set of countries on average.[11] This is not a problem if the objective is to analyze the effects of policies on average; but it is a problem if the objective is to extract policy lessons for a particular country. As Dixit (2005) has said: "The question policy prescribers must address is not 'What creates success on average across countries?' but 'What is going wrong in this country and how can we put it right?"'

Another concern with cross-country growth regressions is that coefficients may be estimated imprecisely. A big issue, naturally, has been endogeneity.[12] More closely related to the main argument of this paper is another econometric pitfall: non-linearity. The overwhelming majority of empirical exercises looks for a linear relationship between policies (or policy changes) and subsequent growth (or growth acceleration). But our simple framework above suggests that making this assumption may be very misleading.

As Rodriguez (2005) emphasizes, there are two obvious limitations of using a linear framework to carry out that kind of evaluation: "In the first place, a linear framework rules out the possibility that the effect of a change in the variable of interest may differ according to the level taken by the variable... In the second place, the linear framework rules out the possibility that the effect of certain variables may depend on the levels of other variables (i.e., that the effect of openness may depend on whether the economy's initial comparative advantage lies in manufactures or in agricultural goods)." After conducting tests that decisively reject the linearity assumption, Rodriguez (2005) goes on to argue that absent linearity (and non-separability), standard estimates of the effects of policies on growth are quite unreliable.

Policy implications

Given this framework relating distortions and growth, how should policymakers proceed?

One way to eliminate all ambiguities and uncertainties with regard to the consequences of reform strategies is simultaneously to eliminate all distortions. If all the wedges are tackled and eliminated simultaneously, none of the issues we have highlighted above remains relevant. Wholesale reform is guaranteed to improve welfare. The best possible economic growth rate is achieved by eliminating all obstacles that stand in its way.

But notice what this strategy requires. It requires us not only to have complete knowledge of all prevailing distortions, it also necessitates that we have the capacity to remove them all in their entirety. This is the technically correct, but practically impossible strategy.

[11] Helpman (2004) makes this point in a different context.

[12] The discussion on endogeneity in growth regressions has focused on outcome variables such as investment and trade ratios, where the concern has been that such outcome variables may be caused by (or jointly determined with) incomes. More recently, Rodrik (2005) has emphasized that by their very logic policies must be endogenous, and that this endogeneity severely limits what cross-country regressions can tell us about the relationship between policy reforms and growth.

A second strategy, which seems to us to characterize the prevailing approach today, is to ignore the basic economics of the framework outlined above and to simply go for whatever reforms seem to be feasible, practical, politically doable, or enforceable through conditionality. This is a laundry-list approach to reform that implicitly relies on the notions that (i) any reform is good; (ii) the more areas reformed, the better; and (iii) the deeper the reform in any area, the better.

Our framework shows why this approach, even if practical, is faulty in its economic logic. The principle of the second-best indicates that we cannot be assured that any given reform taken on its own can be guaranteed to be growth or welfare-promoting, in the presence of multitudes of economic distortions. Moreover, growth or welfare need not be increasing in the number of areas that are reformed—except in the limiting case of wholesale reform, as discussed above. And even if the reforms that are undertaken turn out to have a positive effect, they can amount to an inefficient use of scarce political capital: perhaps other –even smaller– reforms undertaken elsewhere could have provided a bigger effect for the same reform buck.

If it is impractical to remove all distortions at once, an alternative approach is instead to focus on eliminating or reducing the biggest distortions in the economy. This approach sounds plausible but has two severe shortcomings. First, it does require us to have a complete list of distortions, even those that do not take the form of explicit taxes or government interventions. Distortions that arise from market failures or imperfect credibility, for example, are unlikely to show up on our radar screen unless we have reason to look for them.

Moreover, this method does not guarantee that the reforms with the biggest impacts on economic growth or welfare will be the ones undertaken first. It may well turn out that the highest "tax" is on some activity with very limited impact. As we saw above, the size of the growth impact of a reform depends not only on the size of the distortion being removed, but on the sign and size of other distortions. For example, there may be very high labor taxes that discourage human capital supply, yet their removal could have miniscule effects on output and welfare if the economy is constrained not by human capital supply but demand.

Our preferred approach, explained and advocated in Hausmann, Rodrik and Velasco (2004) and also in Dixit (2004), is to go for the reforms that alleviate the most binding constraints on growth, and hence produce the biggest growth bang for the reform buck. Rather than utilize a spray-gun approach, in the hope that we will somehow hit the target, focus on the bottlenecks directly.

Identifying the bottlenecks that impede growth is, of course, the challenge. Whether these binding constraints can be effectively identified is a practical and empirical matter. To that issue we now turn.

4. **Looking for distortions in Latin America**

Note that since the factors determining rates of growth are complements, a restriction in one of them will express itself in a high marginal return on that factor, but will cause a low or depressed return on the other factors. Hence, a binding constraint can be potentially identified by looking at the pattern of marginal returns. The binding constraint should have a very high actual or shadow price, while the returns on the other assets are depressed.[13] Shadow prices are relevant if there is a concern about potential externalities or other market failures.

Moreover, the preceding sections suggests that these marginal returns should depend on the initial size and location of distortions. How large are these distortions in Latin America? How much does their size vary both across sectors and across countries? Tackling these questions helps identify those sectors or activities where the binding constraints to growth may be. It also helps assess how much homo or heterogeneity there is in the causes behind low growth in different countries of the region.

Wedges and their impact

With that purpose in mind, consider the following set of marginal returns and their determinants. We have in mind a model in which output is made with a production function that involves physical capital, unskilled human capital and skilled human capital, with a non-unitary elasticity of substitution between these two factors.[14] In turn, demand for each of these inputs can be distorted by externalities or tax wedges. Given profit maximization, factor returns are

$$\frac{w_s^m}{w_u^m} = \delta_h \left(\frac{h_s}{h_u} \right)^{\sigma-1} \tag{1}$$

$$r^m = \delta_k \frac{\alpha y}{p_k k} \tag{2}$$

where in the first expression w_s^m / w_u^m is the skill premium, h_s is the stock of skilled human capital, h_u the stock of skilled human capital, $(1-\sigma)^{-1}$ the elasticity of substitution in production between the two kinds of human capital and $\delta_h > 0$ a summary of distortions affecting human capital. In the second expression, r^m is the return to physical capital, which depends on α, the share of physical capital, the output capital ratio y/k, the relative price of capital p_k and $\delta_k > 0$ a summary of distortions affecting physical capital. In all cases the superscript "m" indicates a "market" return.

[13] Extreme forms of complementarity may cause poverty traps in which all returns are low because all factors are low. This story is plausible, and needs to be considered, although it is somewhat unlikely in practice.

[14] See Velasco (2005) for details.

In the absence of distortions these factor returns would be

$$\frac{w_s^n}{w_u^n} = \left(\frac{h_s}{h_u}\right)^{\sigma-1} \tag{3}$$

$$r^n = \frac{\alpha y}{p_k k} \tag{4}$$

where the superscript "n" denotes "no distortion." We can think of these as the social rates of return.

It follows from these two sets of equations that

$$\frac{w_s^m / w_u^m}{w_s^n / w_u^n} = \delta_h \tag{5}$$

and

$$\frac{r^m}{r^n} = \delta_k \tag{6}$$

If the L.H.S. ratio is far from one in a given market, then the market for that factor is very distorted. Note that if δ_h is smaller than one we have that skilled human capital is more heavily distorted or "taxed" than is unskilled human capital, and vice versa. Note also that δ_k is smaller than one if physical capital is negatively distorted or "taxed" in net terms. Recall that these coefficients are a summary of all distortions, including official taxes, *de facto* taxes (such as confiscation or theft) and externalities or spillovers. They also include distortions on the demand for and the supply of each input. So demand and supply distortions cannot be "identified" separately with this approach.

But if one can construct the ratios on the LHS one has a proxy for the size of total distortions in a given factor market. The market returns w_s^m / w_u^m and r^m can be measured directly, while the social returns w_s^n / w_u^n and r^n must be constructed using stocks of the different kinds of capital and assumed values for the relevant coefficients. That is what we do next.

A few calibrations

Identify "skilled" as possessing tertiary education and "unskilled" as lacking such training. The ratio h_s / h_u is then equivalent to the share of population with tertiary education over the share without, and comes from IADB (2004). The substitution parameter σ is set to 0.286, following Katz and Murphy (1992). These data, using (3), yield w_s^n / w_u^n.

Stocks of physical capital, relative prices of capital and levels of output we take from Klenow and Rodríguez-Clare (2004). That plus the standard assumption that $\alpha = 1/3$, all plugged into (4), yield r^n.

The market return premium w_s^m / w_u^m comes from Behrman, Birdsall and Szekely (2000), who in turn compile and combine 79 household surveys from 18 Latin American countries over the period 1980-1998.

Finally, the "market" interest rate r^m is the most difficult to compute, given Latin American countries' notorious macroeconomic instability. Since these are small open economies from a financial point of view, the relevant interest rate ought to be the world interest rate plus the country-specific risk premium. To approximate it I take the EMBI yield for each country averaged over all the years it has been available since 1994, eliminating those years that De Gregorio and Lee (2004) define as crisis years.[15] For Bolivia, the only country in the group that does not have a bond yield included in the EMBI, I use the 3-month yield on Bolivian Treasury Bills.

The resulting ratios appear in Figures 3 and 4. Consider first the behavior of the relative skill premium, depicted in Figure 3. Two things are striking. The first is that for all countries except Venezuela and Chile (and Argentina, almost), the ratio is below 1, suggesting that the skill premium is lower than it should be given the relative supplies of both factors. In turn, this means that the market for skilled human capital is more heavily taxed or distorted than that for unskilled human capital. Only for Chile is the ratio substantially above one, reflecting a large observed skill premium that cannot be fully explained by relative factor supplies.[16] It is this abnormally large premium, parenthetically, that goes a long way in explaining Chile's notoriously unequal distribution of income.

The second feature of Figure 3 that is worth remarking on is the wide dispersion of values across countries. They range from 0.49 for Ecuador to 1.17 for Chile, showing wide variation in the extent of relative distortion of both sectors. This also suggests very different potential for economic reform across sectors and countries.

Next consider the market for physical capital. Ratios depicted in Figure 4 again are overwhelmingly below 1 (all except for Argentina's), suggesting that physical capital is negatively distorted or taxed in net terms. Put differently, countries have too little capital given the interest rates they have. The most extreme example of this phenomenon is Chile (again an outlier), which enjoys very low interest rates by regional standards but does not have a correspondingly higher capital-output ratio to show for it. One

[15] We took out the following years. a) if the crisis ocurred in the first 9 months of year *t*, we took out year *t*; b) if the crisis ocurred in the last 3 months of year t, we took out year *t+1*; and c) in addition, we always took out the year following that taken out according to (a) and (b) above.

[16] And this skill premium has been rising over time. If one uses the most recent Mincer coefficient reported for Chile in IPES (2004) to construct the skill premium, the figure rises from 1.17 to 1.28.

interpretation for this is that physical capital investment is particularly heavily taxed or distorted in Chile.

Figure 4 also shows wide dispersion in the ratios across countries. Figures range from 0.13 for Chile to 0.71 for Ecuador and 1.23 for Argentina (far and away an outlier in the other direction). So again the relative extent of distortion in the sector seems to vary a great deal within Latin America. Notice from equation (4) that these ratios depend quite crucially on the relative price of capital, taken as exogenous here. This relative price can also range quite widely, from 1.02 in Uruguay to 1.97 in El Salvador, the country where capital is dearest in the Hemisphere. Explaining these latter differences is an important task in itself, not undertaken here.

These ratios are subject to several caveats. One is that the cross-country variation in variables such as the interest rate may be exaggerated by short-term macro volatility. We have tried to correct for this by taking averages across all available data points and taking out crisis years, but too much extraneous variability may still remain. A second objection is that in the presence of costs of adjustment, relations such as (1) and (2) only hold in steady state, and countries may vary in how close or far away from their respective steady states they are.[17] A third, is that these ratios depend quite crucially on the relative price of capital, taken as exogenous here. This relative price can also range quite widely, from 1.02 in Uruguay to 1.97 in El Salvador, the country where capital is dearest in the hemisphere. Explaining these differences is an important task in itself, not undertaken here.[18]

So there may be other reasons, aside from distortions, why the ratios $\frac{w_s^m / w_u^m}{w_s^n / w_u^n}$ and $\frac{r^m}{r^n}$ are different from one. But as a first cut at the data, the large cross-country variation in figures 3 and 4 does suggest one should think twice before assigning the same reform priority across countries in Latin America.

In the model above, total factor productivity A is not a choice variable, and therefore one cannot measure the extent of distortions in the market for technology or "productivity." But Klenow and Rodríguez-Clare (2004) have done exactly that. They build a model in which each country's A relative to the world level is determined by the country's efforts in technology adoption, which they identify with a broad concept of R&D. A country's R&D investment is the sum of that performed by firms, who undertake R&D together with accumulation of physical capital to maximize the present value of their future stream of profits. Finally, there is an externality, in that a firm's A increases not only thanks to its own R&D but also thanks to R&D performed by other firms in the economy. The firm's decision about how much to invest is determined by a dynamic optimization

[17] Assuming that the economy is at a steady state is standard in this literarature. See for instance Kleenow and Rodriguez-Clare (2004). Growth regressions are also based on a linear approximation that is only valid near the steady state.

[18] Bacha and Bonelli (2004) emphasize the role of the relative price of investment goods in explaining Brazil's path of capital accumulation.

problem, which yields two first order conditions: one for investment in physical capital, and one for R&D. These first-order conditions contain the relevant distortions (including externalities and tax wedges) and can be used to infer, via calibration, the size of distortions in different countries.

Figure 5 summarizes their findings for Latin America, expressed as the implied "tax" on R&D activity that is needed to reconcile the measured A with that implied by their calibration. Results once again show wide variation in the implied distortion, ranging from taxes of 154 per cent in Peru and 124 percent in Mexico to subsidies of 53 percent in El Salvador, 26 percent in Uruguay and 24 percent in Chile. If an implied tax is present, Klenow and Rodríguez-Clare conclude a country has an "R&D shortfall." If an implied subsidy is present, the country is said to have an "accumulation shortfall." As Figure 5 makes clear, both cases are well represented in Latin America, with substantial quantitative variation.

Again, there are reasons other than taxes why the measured A could be different from that implied by the calibration. One is that the conditions used for the calibration only hold in steady state. Another is that Klenow and Rodríguez-Clare (2004) allow for a production function with only capital and labor, while other factors such as natural resources may also be important. So countries may exhibit a high measured (but misleading) TFP as a result of their large endowment of natural resources.[19] But the wide variation shown in Figure 5 calls for caution in applying the same medicine –for instance, to promote R&D– to countries that may well be suffering from very different diseases.

Using the OECD as a benchmark

The exercises so far show whether a country has a larger skill premium, interest rate or TFP than it should have, given its factor endowment and assumed technological parameters. But they are silent on whether the stocks of cumulable factors –and by implication the skill premium, interest rate or TFP level– are in some sense the "right" ones. One way to see this is to compare national figures to a plausible benchmark, for instance the OECD.

Suppose there is a comparison group or country (OECD for short) that makes output with the same technology as the home country, but with no externalities or distortions of any kind. Then factor rewards in the OECD would be given by the conditions

$$\frac{w_s^*}{w_u^*} = \left(\frac{h_s^*}{h_u^*}\right)^{\sigma-1} \tag{7}$$

$$r^* = \frac{\alpha y^*}{p_k^* k^*} \tag{8}$$

Note asterisks denote the OECD. Using these two equations plus (5) and (6) we have

[19] Rodríguez-Clare (2005) discusses this and other issues, emphasizing the case of Chile. For that country, taking account of the role of natural resources reduces the implied R&D subsidy from 24 to 9 percent.

$$\frac{w_s^n / w_u^n}{w_s^* / w_u^*} = \left(\frac{h_s / h_u}{h_s^* / h_U^*} \right)^{\sigma - 1} \tag{9}$$

$$\frac{r^n}{r^*} = \frac{y}{y^*} \frac{p_k^* k^*}{p_k k} \tag{10}$$

When these ratios are large, so are the social returns to an activity, compared to what they are in the OECD.

Figure 6 shows expression 9 plotted for the same sample of Latin American countries. The ratio ranges from a low 1.03 for Venezuela and 1.05 for Argentina, which are at almost OECD levels, to a high of 2.79 for Brazil and 2.39 for El Salvador. The room for increasing the share of the population with tertiary education, and thereby reducing the skill premium, varies hugely across nations of the region.

Figure 7 shows a plot for expression (10). All countries but two have ratios above one, suggesting in most economies of Latin America there is room for capital deepening. But the actual figures are again quite heterogeneous, ranging from 0.82 for Mexico and 0.92 for Brazil to 1.52 for El Salvador, 1.56 for Chile and 1.75 to Uruguay. Notice that again these ratios depend on the relative price of capital, which is quite different in various Latin American countries than in the OECD.

Finally, Figure 8 shows the ratio A / A^*, where both quantities are calculated in the standard way –that is, as residuals computed using the production function and values for the factors of production. Productive Chile appears with an *A* that is 0.79 of the OECD's; Uruguay is closely behind with 0.78, followed by El Salvador with 0.77 and Argentina with 0.74. At the other end of the spectrum, Peru and Bolivia's *As* are only 0.42 of the rich countries', and Ecuador's is 0.54. This measure shows substantial variation across nations of the region yet one more time.

5. **Growth diagnostics in practice**

At the start of this paper we argued that the decline in growth in Latin America is pretty broad-based. We then argued that countries seem to have very different patterns in terms of the observed distortions. Paraphrasing Tolstoy: "Every low-growth country is stagnating in its own way".

Or alternatively: "All healthy people have something in common; sick people need not." There are many ways to get sick and many ways to die. The list of ailments is probably an open set and there is little point in having a definitive closed classification.

How then to put together a method of growth diagnostics? We have argued so far that:

- If there are many distortions present, some are probably more important than others in preventing growth. That one key distortion (or set of distortions) we term the binding constraint to growth.

- Since the factors determining rates of growth are complements, a restriction in one of them will express itself in a high marginal return on that factor and a low return on the other factors.

We have presented evidence on marginal returns across Latin American countries today, and argued that they provide clues as to where to look for those binding constraints. But those are clues, not definitive evidence. Or, to return to the medical analogy, they are symptoms. The Oxford English Dictionary (OED) defines "to diagnose" as "to distinguish and determine the nature of a disease from its symptoms." But observing a symptom is not the same as diagnosing the disease. Aside from the fact that the symptoms may be mis-measured, two difficulties present themselves:

- A disease (a particular binding constraint) may have more than one symptom (more than one misaligned marginal return). For instance, high expropriation risk should result in high *ex post* returns for those plant or equipment investments which are lucky enough not to be expropriated. But it should also result in low marginal returns on assets (such as human capital and infrastructure) that are complements with plant and equipment in production.

- A symptom (a given misaligned relative price) may be associated with more than one disease (or binding constraint). For instance, a high wage premium on skilled labor may result from restrictions on supply (too few universities or technical institutes are allowed) or from incentives to demand (wage subsidies or investment subsidies that shift out the demand for skilled labor for every real wage).

Dixit (2005) has helpfully argued that this amounts to a problem of Bayesian inference, not unlike that faced by medical doctors. Clinicians make headway by identifying a "syndrome," which the OED defines as "a concurrence of several symptoms in a disease." A syndrome is useful for diagnosing a disease, Dixit points out, if

- It is very unlikely to occur when the underlying cause or disease is any other disease. That is, the probability of the disease in question, conditional on observing the syndrome, is close to 1.

- It is very likely to occur when the disease in question is present. That is, the probability of the disease in question, conditional on observing some other syndrome, is close to 0.

Then, a process of diagnostics boils down to identifying a syndrome that satisfies as closely as possible these two conditions. Below we describe three syndromes that are helpful –we hope—in analyzing the Latin American growth experience and identifying binding constraints.

In addition, if a factor is identified as the binding constraint, we should observe the following:

- *Hippopotamus vs. camel*: whatever growth does take place, it should take the form of activities that are least intensive in the binding constraint. To illustrate, consider the reasons why there are so few animals in the Sahara. If it is because of lack of water, you should expect the few animals you do find to be camels rather than hippopotami, because of the different water intensities of their lifestyles. For example, if bad financial intermediation is the source of problems, you should expect growth to take place within (bank-centered?) conglomerates, so as to create an internal capital market.

- *Variation over time*: changes in the binding constraint should have very high effects on growth. For instance, if limited access to foreign finance is the postulated constraint, then periods when Latin America becomes the "flavor of the month" in Wall Street, and capital flows in with little regard to domestic circumstances, should result in sharp growth accelerations.

In what follows we illustrate the approach by describing a set of syndromes that are likely to be present in some Latin American countries. We describe these syndromes by listing the symptoms they might generate.

The predatory state

One of the fundamental public goods is the set of property rights that allow private entities to mobilize resources and expect to appropriate the return. If there is anything growth economists agree on, it is that without reasonable guarantees on property rights there can be no asset accumulation or investment in new technologies, and hence no growth.

In some countries, institutions are so weak that even rights over already existing property cannot be guaranteed: countries in semi-permanent conflict, where banditry is widespread and the monopoly on the use of force by the state has withered –failed states, in the currently fashionable phrase. Of the countries in the Americas, only Haiti and perhaps one or two other nations are in this situation or near it. There, investment is low because the investor cannot be guaranteed the fruits of his effort.

Macro risk can have analogous effects, even in countries with functioning states and reasonably advanced institutions. We know from ample experience in the region that in the event of currency or banking crises, ex-post wealth redistributions between debtors and lenders can be sizeable. If the probability of such an event is high, then those endowed with savings will be reluctant to invest at home. Argentina is probably the poster child for this kind of situation, but it is certainly not alone in the region in its repeated vulnerability to macro calamities.

In some other countries the situation is more subtle: what binds is the inability to deal with the allocation of new property rights as opportunities arise. For instance, Ecuador took 10 years to authorize the construction of a pipeline needed to develop major oil findings. Bolivia has been unable to agree on a framework to exploit gas. Next door, Peru has been attracting massive investments in mining and gas, not because of a different or better geology, but because it has had the capacity to put in place the needed contractual framework for those investments to take place.

In the same vain as Ecuador and Perú, Venezuela has been sitting on enormous reserves of oil and gas, which it has neither developed through it's the state-owned company, not allowed others to come in. The country's share of conventional global oil reserves has increased from 3.7 percent in 1984 to 6.5 percent in 2004. It has discovered even larger amounts of non-conventional oils and has developed the technology to produce it at low cost. And yet, the country's share in world oil production and in OPEC has declined by 20 percent. Next door, Trinidad and Tobago with smaller gas reserves, has tripled its gas production through projects that export Liquified Natural Gas (LNG), while at the same time Venezuela has seen a decline in gas production by 13 percent and has yet to develop the fields that are contiguous to those of Trinidad and Tobago. This is indicative that high return investments do in fact exist, but that the institutional arrangements to make those projects feasible has not been put in place.

By contrast, there are countries in Latin America where the ability to define and defend new forms of ownership has facilitated significant investments. Chile was able to authorize major road projects in downtown Santiago as private concessions, while sorting out the complex ownership and access issues involved.

What are the symptoms one would associate with this syndrome? The core problem is that there are very high return investment opportunities that cannot be developed because the ownership system to accompany those opportunities cannot be put in place. Hence, we should observe high ex-post returns in at least some activities that were not expropriated, or that did not fall prey to the consequences of a macro blowup. Second, we should also observe that savings exist, but that they are not invested locally but abroad, perhaps in the form of capital flight. Third, if expropriation or macro risk is unevenly distributed across sectors or activities, we should observe high (or at least higher) investment and profits precisely in those privileged enclaves. For instance, companies engaged in joint ventures with state enterprises, which are therefore protected of political intromission, should have above-normal ex-post returns.

Venezuela is probably the clearest example of this situation. While its share of global energy reserves has been rising, its share of energy production has declined by more than a third over the last 7 years. Instead, it has been challenging the legitimacy of all private oil and mining concessions and contracts. It has created a generalized uncertainty over the future of property rights. As a consequence, in spite of negative real interest rates and ample bank liquidity private investment remains stunted. In spite of capital controls, private capital flight averaged 9 percent of GDP per annum between 2002 and 2004 for a

total of 26.6 billion dollars[20]. This suggests that in Venezuela there are ample available savings. However, the social organization necessary to get economic activity going has not been provided.

The over-committed state

Assume a state that has gone overboard taking on financial responsibilities. These may come from very generous pension systems, very high levels of public employment, bailouts of banks or state-owned enterprises, etc. The government finances are fragile. Given the generous government commitments, tax rates are high and distortionary. As a consequence, the informal sector is large and growing as it attempts to avoid the taxman. A large share of national income accrues to the government which saves nothing and, in addition, borrows to fill a hefty deficit.

Interestingly, this description is not sufficient to characterize the binding constraint. For example, taxes could be so high that expected after-tax returns are low, depressing investment demand and leaving an environment of low interest rates. Call this the *over-taxing state*. Alternatively, the infrastructure may be so insufficient that social returns to investment would be too low, also leaving an environment of low interest rates. Call this the *under-investing state*. Or investment is kept low because the financing needs of the government are so large that they deplete whatever after-tax savings the private sector can muster, leaving an environment of very high interest rates. Call this the *over-borrowing state*.

The appropriate policy strategy will be highly dependent on which of the three of the above cases applies. Consider the case of Brazil. Its general government tax revenue ratio is the highest in the region by far, in spite of the fact that it relies little on taxation of natural resources (Figure 9). At over 45 percent, such a revenue base can only be achieved by imposing very high tax rates. Since distortions tend to be proportional to the square of the rate, the environment in Brazil must be rife with tax distortions. Should we conclude from here that Brazil is a case of an over-taxing state?

For this to be the case, the binding constraint must be the impact of taxation on investment demand. In that case, people would not invest because there are very few projects that are profitable on an after-tax basis. Low investment demand would go with low interest rates. However, as Figure 10 shows, Brazil has had exorbitant average real interest rates in 1988-2003, about 4 times the Latin American average. In spite of this, its investment ratio is average for the region and exceeds domestic savings, as shown by the fact that the country had on average a current account deficit (Table 18). Furthermore, we know that Brazil had a couple of balance of payments crises, indicating that it ran out of foreign sources of finance.

[20] We calculate capital flight as the current account surplus plus the net capital inflows to the public sector minus the international reserve accumulation by the Central Bank. This is equivalent to the sum of net private capital outflows plus errors and omissions. Data are from the Banco Central de Venezuela (2005).

This implies that, in spite of the depressing effect of the tax structure on investment, demand for capital goods still exceeded the available supply of savings. In order to keep investment from exceeding available savings and igniting inflation, the Central Bank of Brazil has set the overnight rate above 19 percent, (over 12 percent real). At these rates, most economies would go into recession. But in Brazil, given expected returns, interest rates must be kept that high so that investment does not outstrip available savings. This suggests that the return to investment is high in spite of the high taxes and that investment is constrained by available savings.

Why are savings not higher in Brazil? One explanation is that with the government taking in 45 percent of GDP and having negative gross savings, it is hard for the rest of the economy to save enough out of after-tax income to fund the projects that the private sector finds profitable at reasonable interest rates.

Assume now that the spending commitments of the government cannot be cut. Should Brazil lower its tax rates in order to encourage investment, while allowing a larger fiscal deficit? Or should it maintain high and distortionary taxes in order to limit fiscal dis-saving? In the case of Brazil the answer seems to be the latter. While high taxes limit appropriability, that is not the binding constraint in Brazil. Greater public savings would create space for private investment and for lower interest rates. The latter may in fact improve the fiscal balance and the debt dynamics, creating the potential for a virtuous circle. Hence, in the case of Brazil, the situation seems to be that of an over-borrowing state, in spite of very high tax revenue.

One can imagine a situation where this would not be the case. India is a case in point. It is running fiscal deficits in excess on 9 percent of GDP. Its debt to GDP ratio – at over 80 percent – and its debt to tax revenue ratio – at 441 percent – are worse than those of countries with serious financial difficulties, such as Argentina, Brazil or Turkey. And yet, the country's current account is essentially in balance and the government is able to place long term debt in the domestic market at nominal rates around 7 percent (about 3 to 4 percent in real terms). By contrast, given the economy's demand for infrastructure, public investments appears to have rates of return which exceed the cost of borrowing. In the case of India, large fiscal deficits show no signs of financially crowding out private investment. By contrast, relaxing the infrastructure constraint seems to crowd in private investors.

Barbados may be a different case altogether. It has a low interest rate, averaging less than 8 percent real for the 1988-2003 period, well below the Latin American average. The country enjoys ample access to international finance: its current account shows a lot of action, moving from a surplus of 9 percent of GDP in 1992 to a deficit of 6.6 percent in 2002, with little movement in interest rates. Hence, there is no evidence of a savings constraint. Yet investment averages barely 15.7 percent of GDP, more than 4 percentage points less than Brazil, a country that faced much more limited access to finance.

In Barbados this low investment effort generated a growth rate of GDP of barely 1 percent in 1990-2003. During this period, the government of Barbados collected 38.2

percent in government revenues, a performance only second to that of Brazil. Under such a constellation of outcomes, the hypothesis that investment is depressed by high taxes has a greater ring of truth. Barbados may well be an over-taxing state: investment is low not because of a financial crowding out but because, given the economic opportunities of the island and its ambitious tax system, very few projects are profitable on an after-tax basis.

In the *under-investing state* the government is unable to mobilize the resources needed to supply the complementary public goods that the economy needs. This creates the possibility that the returns to private investment are low because of an inadequate supply of complementary public goods.

To check for the possible presence of this ailment, we look at the share of general government expenditure as a share of GDP, which tends to be upward sloping, at least after a certain level of income (Figure 11).

Relative to the international experience, several countries in Latin America have particularly low expenditures as shares of GDP (Figure 12). This may not be a problem if expenditures are well chosen, but obviously, it makes it more likely that critical complements may be under-provided. Whether this is the case would require more detailed information.

Hence, an over-committed state may create quite different binding constraints on growth: it may starve an economy of its savings, its infrastructure or its profitability. Which one of the three is critical will depend on the specific context. We must look for additional symptoms in order to identify the binding constraint and the appropriate focus of policy.

Good state, bad projects: looking for those killer applications

In the late 1990s the telecommunications industry went on a shopping spree in order to buy the licenses and the backbone capacity to exploit the new 3G technology. The idea was that the new technology would transform the way consumers and businesses use telecommunications and this would dramatically increase traffic which would require a rapid expansion of so-called backbone capacity in the network. The boom in demand would come from new so-called 'killer applications' that would emerge from the many new IT start-ups that were exploring ways to fulfill consumer and business needs. In the end, the capacity was built, but the applications that were developed were more a whimper than a bang. The only thing they 'killed' was the solvency of the telecom operators, many of whom ended in bankruptcy.

The lesson of this experience is clear. You need some balance between backbone or infrastructure capabilities, on the one hand, and 'killer applications' that use that capability, on the other. Major progress in only one of the levers may end up badly.

The metaphor is applicable to the issue of economic reform. Political order, macroeconomic stability and an adequate business environment constitute the backbone

or infrastructure for economic activity. One of the assumptions behind recent reform efforts has been that killer applications would naturally emerge to exploit the new and improved economic environment. We have argued at the start that this may not have occurred –at least not at the rate predicted by growth models.

Coming up with new killer applications is more difficult than may seem at first sight. Producing new things is different from producing more of the same. New products involve unknown costs. Entrepreneurs must find out whether given a country's endowments, institutions and relative prices, a particular new good can be made at a profit. They will have to confront the fact that since the good is new, complementary upstream or downstream activities may not exist. In addition, there are no workers in the market with experience in producing those goods. After an innovator works successfully around these constraints, he is likely to be copied by others, who will try to benefit from his findings.

This is the same problem faced by innovators at the technological frontier and is addressed there through intellectual property rights. In the context of a developing country, what counts as a killer application is not something necessarily new to the world, but something that is new to the country, even if it is just an imitation of that which already exists elsewhere. For the typical developing country, innovators are really imitators of activities that already exist in the world. For them, patents are not an option. They are in the business of finding out if shirts, coffee, electronic assembly, call center services or fresh-cut flowers can be profitably produced and sold. These activities are not patentable. But if successful, they are bound to be copied, implying that innovators create a positive externality for which they are not compensated. Therefore, in equilibrium the market supplies too little innovation.

The process of development involves a transformation of the productive structure from one type of goods to more sophisticated kinds of goods. After all, the difference between rich countries and poor countries is not just that the former produce more of the same per worker than the latter. It is also that they produce different things.

One way to make this evident is by looking at the export package of countries. Hausmann and Rodrik (2005) calculate for each product the weighted income per capita of the country that typically exports that good. They then use these implied incomes for each product to calculate the weighted income of the whole export basket of a country. They call this the income per capita implicit in a country's exports, or EXPY for short.

Figure 13 presents EXPY and the income per capita of the different countries for the year 1994. Clearly, richer countries produce export baskets more similar to those of other rich countries. This also implies that as countries become rich, they also change their pattern of specialization. Interestingly, the bulk of the Latin American countries are well below the regression line, some of them very significantly so, as can be seen more clearly in Figure 14.

Hausmann and Rodrik (2005) show that the current level of EXPY is predictive of future growth. Put differently, countries tend to converge to an income level that is first expressed in the goods they learn to export. Those are the killer applications that allow the economy to redeploy its resources towards higher productivity activities.

One can imagine a pathology associated with obstacles to self-discovery. Suppose a country is specialized in activities that being exported by poorer countries who are taking a rising share of the market (helped maybe by their lower average incomes). This will create downward pressure on the growth of exports and GDP. The country undergoes structural reforms to create a better backbone in order to sustain more sophisticated, higher-income activities. But the killer applications fail to materialize, maybe because the market does not supply enough entrepreneurship and because the discovery process is inherently haphazard.

How to diagnose such a situation? This would tend to occur when a country's exports are stagnating, maybe because they face international headwinds as increased global competition and low international prices limits their profitability. With low export growth, aggregate demand growth is low. Interest rates may well be low, but this triggers little investment and credit expansion, because the real returns to capital are low. The growth that does take place is often related to changes in domestic demand and worsening external balance that is sooner or later checked by its own dynamic.

An example of such a case is El Salvador, a country that has undergone a dramatic improvement in its backbone: it has gone from civil war to a functioning democracy where all parties play according to the constitutional rules. Its prudent macro management has made it investment grade. It has a very open trade and investment framework, made stronger now through CAFTA. It has dollarized its financial system. Interest rates are rock bottom and its well supervised financial system quite liquid. And yet, after some recovery in the early 1990s, the country shows lackluster growth.

One explanation is that the country's traditional export activities face serious headwinds. They have declined to less than a third of their last peak, which happened in 1997 (figure 15). For a while, the maquila sector was able to compensate these adverse dynamics. In the context of the Caribbean Basin Initiative (CBI) the country was given special access to the US market and this prompted a very rapid increase in the newly "discovered" maquila exports. However, with the end of the Multi-Fiber Agreement and increased international competition, maquila have also stagnated since 2001. The country seems to have the backbone, but the dearth of killer applications is preventing its use and endangering its political survival.

In such a case, relaxing the self-discovery constraint becomes central. If new profitable activities were to emerge, the country would have the institutional and financial infrastructure to exploit them. But entrepreneurs have yet to identify these activities.

This contrasts with the case of Peru, where macro policies are not as good (expressed for example in an average EMBI Global spread of 498 in the 2000-2005 period vis à vis El

Salvador's 302) and where the political and institutional setting has been quite weak and unpredictable. Yet the country has been able to find important new activities in mining, gas, modern agriculture (artichokes, asparagus, paprika) and in high-end cotton textiles. Peru may have a weaker backbone, but the killer applications have appeared at a faster pace, sustaining greater investment and growth.

6. **Conclusions**

Latin American is growing today, under tremendously auspicious international conditions. But nothing guarantees that the region will grow again once commodity prices fall back to earth and interest rates recover to normal levels. And if performance in the recent past (before 2003) is a good predictor of future performance, we have reasons to worry. Latin American growth in the 1990s was lackluster, in spite of pro-market reforms.

The most common explanation for this performance has been simple: reforms, while wide-ranging, were not enough. This line of argumentation is obviously correct for some nations in the Hemisphere (Paraguay may be an example): little was done, little growth ensued. But it soon runs into the objection that even some poster nations for reform, such as El Salvador, have also grown relatively little.

A focus on reform in general faces another problem: it begs the question of exactly *which* reforms are both necessary and sufficient to ignite growth. A list of 20 priorities (including everything from strengthening pre-school education to fighting corruption, and from stimulating venture capital to revamping health institutions) is no priority at all. But, alas, that is what countries often get from their external advisors.

Moreover, the presumption that the list of reform priorities is the same for all countries looks increasingly unfounded. A cursory look at growth theory reveals that, starting from a situation of multiple distortions, the growth payoff of some reforms (i.e., removing some distortions) is sure to be vastly superior to the growth payoff of other reforms. Much depends on what is initially distorted, and by how much. A simple example: a country with highly profitable domestic investment projects and no access to international capital markets will benefit tremendously from any relaxation, however small, of barriers to capital inflows; by contrast, a nation with highly distorted domestic investment markets and a scarcity of good projects will gain little from gaining access to an additional 100 million dollars in Wall Street loans.

And there is growing evidence that the empirical connection between broad-ranging reform packages and growth is weak. This is not to say no reforms can do the trick. The question is which ones.

In this paper we have provided preliminary evidence suggesting that much of Latin America is suffering from a common symptom (insufficient growth) but likely several different diseases. The degree to which markets for physical capital, human capital and technology are distorted seems to vary widely across countries in the region.

And the structure of marginal returns that coexists with insufficient asset accumulation is also quite varied: in some economies, given the assets they have, we find very high interest rates and/or wage premia; in others the opposite is true. This all suggests that there is no one medicine (or set of reforms) that is guaranteed to cure the disease and get a sustained expansion growing again.

Rather, we have to proceed as medical doctors do and sharpen our diagnostic tools. In diagnosing disease, doctors rely on identifyng syndromes –groups of symptoms that likely have a common cause or correspond to a given disease. There is no reason why economists cannot do the same. Here we have sketched three kinds of syndromes affecting countries in the region. Each is composed of a set of symptoms or indicators, consisting of both constellations of returns (prices) and patterns of savings and investment (quantities). The underlying diseases are quite different. In one case – caricaturing somewhat—lack of property rights is the problem, calling for a strategy that involves institutional reform. In a second set of cases, an overcommitted state may over-tax, over-borrow or under-invest, creating different binding constraints on growth that call for different fiscal solutions. In a third instance lack of new productive ideas creates low demand for investment and some form of industrial policy is the likely answer.

Much of the policy debates around the Washington Consensus involved the search for an accord on how to use *each* policy instrument in *all* countries at *all* times. We have argued that this is not useful. Instead, it will be more beneficial to develop the diagnostic tools and the statistical systems that would allow policymakers to identify the binding constraints to growth in *each* country and in *each* period and focus on policies that could relieve those constraints. This approach has yet to provide many of the answers, but it does change the type of questions we should be asking.

References

Acemoglu, D., S. Johnson, and J. Robinson 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91(5): 1369-1401.

Acemoglu, Daron, Simon Johnson, James Robinson, and Yunyong Thaicharoen. 2003. "Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth." *Journal of Monetary Economics* 50 (1): 1231-1294.

Bacha, E. and R. Bonelli, "Accounting for Brazil's Growth Experience," manuscript, Catholic University of Rio de Janeiro, March 2004.

Barro, R. J. (1991). "Economic Growth in a Cross Section of Countries." *Quarterly Journal of Economics* 56(2): 407-43.

Barro, R. J. (1996). "Democracy and Growth." *Journal of Economic Growth*, Vol. 1 No. 1: 1-27.

Barro, R.J. (1999a). "Determinants of Economic Growth: Implications of the Global Experience for Chile." *Cuadernos de Economía* 36 (107).

Barro, R.J. (1999b). "Notes on Growth Accounting." *Journal of Economic Growth* Vol. 4 No. 2: 119-137.

Benhabib, Jess and Mark Spiegel, 1994, "The role of human capital in economic development: Evidence from cross national aggregate data," *Journal of Monetary Economics*.

Behrman, Jehre, Nancy Birdsall and Miguel Székely, "Economic Reform and Wage Differentials in Latin America," manuscript, University of Pennsylvania, August 6, 2000.

di Tella, Rafael, "Corruption: A Dangerous Obsession." Paper presented to the Colloquium on Latin American Growth, Yale University, 2004.

Dixit, Avinash, "Evaluating Recipies for Development Success," manuscript, Princeton University, April, 2005

Dollar, D., and A. Kraay, "Institutions, Trade, and Growth," *Carnegie-Rochester Conference Series on Public Policy*, 2002.

Easterly, W., N. Loayza, and P. Montiel. 1997 "Has Latin America's Post-Reform Growth Been Disappointing?" *Journal of International Economics* 43(3-4): 387-408.

Escaith, H. and S. Morley. 2001. “El efecto de las reformas estructurales en el crecimiento económico de la América Latina y el Caribe: Una estimación empírica.” *El Trimestre Económico* 68: 469-513.

Fernández Arias, E. and P. Montiel. 1997. “Reform and Growth in Latin America: All Pain, No Gain?” Research Department Working Paper N. 351. Washington, DC, United States: Inter-American Development Bank.

Frankel, Jeffrey, and David Romer, “Does Trade Cause Growth?” *American EconomicReview*, June 1999, 89(3), 379-399.

Frankel, Jeffrey and A. Rose, “Currency Crashes in Emerging Markets: An Empirical Treatment.” *Journal of International Economics* 41, no. 3/4, 351-366, 1996.

Glaeser, Edward, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2004. “Do Institutions Cause Growth?” *Journal of Economic Growth 9 (2): 271-303.*

Hall, Robert, and Chad I. Jones, “*Why Do Some Countries* Produce So Much More Output per Worker than Others?” Quarterly Journal of Economics, 114, 1, February 1999, 83-116.

Hausmann, R., L. Pritchett and D. Rodrik, “Growth Accelerations.” Manuscript, Kennedy School of Government, Harvard University, revised October 2004.

Helpman, E., *The Mistery of Economic Growth*. Cambridge: Harvard University Press, 2004.

Jones, Chad. 1995. “R&D-Based Models of Economic Growth.” *Journal of Political Economy*. August.

Katz, Lawrence F. and Murphy, Kevin M. “Changes in Relative Wages, 1963-1987: Supply and Demand Factors.” *Quarterly Journal of Economics*, 1992, (1), pp. 35-78.

Klenow, P. and Andres Rodríguez-Clare, “Externalities and Growth.” Forthcoming in the *Handbook of Economic Growth*, Philippe Aghion and Steven Durlauf (eds.), North Holland Press, Amsterdam, 2005.

Levine, Ross, and David Renelt. 1992. “Sensitivity Analysis of Cross-Country Growth Regressions.” *American Economic Review 82(4):942-963.*

*Loayza, N. P. Fajnzylber and C. Calde*rón, “Economic Growth in Latin America and the Caribbean: Stylized Facts, Explanations and Forecasts”, Working Paper, The World Bank, 2002

Lora, E. and F. Barrera. 1997. “Una década de reformas estructurales en América Latina: El crecimiento, la productividad y la inversión, ya no son como antes.” Research

Department Working Paper N. 350. Washington, DC, United States: Inter-American Development Bank.

McMillan, John. 2003. *Reinventing the Bazaar*. New York: Norton.

Mauro, Paolo. "Corruption and Growth." *Quarterly Journal of Economics* Volume 110, Issue 3, August 1995.

Pritchett, Lant. 2001. "Where has all the education gone?" *World Bank Economic Review* v.15, n 3, pp 367-391.

Qian, Yingyi. 2003. "How Reform Worked in China." In Dani Rodrik, ed., *In Search of Prosperity: Analytical Narratives on Economic Growth*. Princeton, NJ: Princeton University Press.

Rodríguez, Francisco and Dani Rodrik (2000), "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence," in *NBER Macroeconomics Annual 2000, B. Bernanke and K. Rogoff (eds.), MIT press, pp. 261-325.*

Rodríguez-Clare, Andres, "Identifying R&D Shortfalls in LDCs." Manuscript, IADB, May 2005.

Rodrik, Dani, A. Subramanian and F. Trebbi, "Institutions Rule." NBER Working Paper 9305, November 2002.

Sachs, J., A. Tornell and A. Velasco, "Financial Crises in Emerging Markets: The Lessons from 1995." *Brookings Papers on Economic Activity*, No. 1, 1996.

Spiegel, Mark, 1994, "Determinants of long-run productivity growth: A selective survey with some new empirical results," mimeo.

Table 1. GDP growth 1994-2005

	Argentina	Brazil	Chile	Colombia	Ecuador	Mexico	Peru	Venezuela
94-98	3.6%	2.6%	6.9%	2.8%	2.6%	2.5%	4.3%	2.6%
98-05	0.4%	2.5%	3.6%	2.0%	2.4%	2.8%	3.2%	1.2%
98-02	-4.9%	2.1%	2.3%	0.5%	1.2%	2.8%	2.2%	-2.1%
02-05	8.1%	3.0%	5.3%	4.1%	4.1%	3.0%	4.6%	5.9%
94-05	1.6%	2.5%	4.8%	2.3%	2.5%	2.7%	3.6%	1.7%

Source: National sources for 1994-2004 and UBS estimates for 2005.

Table 2. Rate of growth of exports (in current US $)

	Argentina	Brazil	Chile	Colombia	Ecuador	Mexico	Peru	Venezuela
94-98	13.3%	4.1%	8.9%	6.3%	2.3%	17.9%	5.8%	2.4%
98-05	5.8%	12.3%	12.8%	7.2%	14.1%	8.6%	13.1%	17.2%
98-02	-0.7%	4.2%	2.7%	1.9%	4.6%	8.2%	7.6%	10.9%
02-05	15.1%	24.0%	27.7%	14.8%	28.1%	9.1%	20.9%	26.2%
94-05	8.5%	9.2%	11.4%	6.9%	9.6%	11.9%	10.4%	11.6%

Source: National sources for GDP for 1994-2004, labor force estimates from World Development Indicators (2005) and UBS estimates for GDP in 2005.

Table 3. Growth in GDP per worker

	Argentina	Brazil	Chile	Colombia	Ecuador	Mexico	Peru	Venezuela
94-98	1.7%	0.8%	4.8%	0.1%	-0.3%	0.0%	1.2%	-0.4%
98-05	-1.5%	1.0%	1.5%	-0.5%	-0.3%	0.3%	0.3%	-1.5%
98-02	-6.7%	0.7%	0.2%	-2.0%	-1.5%	0.2%	-0.7%	-4.8%
02-05	6.0%	1.7%	3.1%	2.0%	1.4%	0.4%	1.7%	2.9%
94-05	0.0%	1.1%	2.7%	-0.4%	-0.3%	0.3%	1.4%	-1.5%

Source: National sources for GDP for 1994-2004, labor force estimates from World Development Indicators (2005) and UBS estimates for GDP in 2005.

Table 4. GDP growth
(annual rates of growth)

	1960-1975	1988-2003	Difference
Argentina	3.6%	1.8%	-1.8%
Belice	5.9%	6.7%	0.9%
Bolivia	3.7%	3.5%	-0.2%
Brazil	7.5%	1.9%	-5.6%
Barbados	4.7%	0.8%	-3.9%
Chile	2.3%	5.8%	3.6%
Colombia	5.4%	2.8%	-2.6%
Costa Rica	6.0%	4.8%	-1.3%
Dominican Republic	6.8%	4.2%	-2.6%
Ecuador	5.7%	2.2%	-3.6%
Guatemala	5.5%	3.7%	-1.9%
Guyana	3.5%	2.8%	-0.7%
Honduras	4.4%	3.0%	-1.4%
Haiti	1.1%	-0.9%	-2.0%
Jamaica	3.8%	1.7%	-2.1%
Mexico	6.6%	3.0%	-3.5%
Nicaragua	6.2%	2.5%	-3.6%
Panama	6.8%	4.5%	-2.3%
Peru	5.2%	2.0%	-3.2%
Paraguay	5.1%	2.1%	-3.0%
El Salvador	5.3%	3.8%	-1.5%
Trinidad & Tobago	4.1%	3.4%	-0.6%
Uruguay	1.4%	1.2%	-0.2%
Venezuela	4.4%	0.1%	-4.3%
Average	4.8%	2.8%	-2.0%

Table 5. The fastest 15-year period of growth in GDP per worker since 1960

country	End-Year	Maximum	1988-03	Difference
Argentina	1978	2.3%	0.0%	2.3%
Belize	1980	4.5%	2.8%	1.6%
Bolivia	1976	1.8%	0.9%	0.9%
Brazil	1980	4.8%	0.0%	4.8%
Barbados	1975	3.9%	-0.4%	4.3%
Chile	1998	4.8%	3.5%	1.3%
Colombia	1978	2.7%	-0.1%	2.8%
Costa Rica	1979	2.6%	1.9%	0.7%
Dominican Republic	1980	3.9%	1.6%	2.2%
Ecuador	1981	3.4%	-0.8%	4.2%
Guatemala	1977	3.2%	0.4%	2.7%
Guyana	1978	1.6%	1.3%	0.3%
Honduras	1978	2.6%	-0.4%	3.0%
Haiti	1980	2.2%	-3.0%	5.2%
Jamaica	1975	2.2%	0.4%	1.8%
Mexico	1975	3.1%	0.2%	2.8%
Nicaragua	1975	2.7%	-0.9%	3.6%
Panama	1975	3.6%	1.9%	1.7%
Peru	1975	2.5%	-0.9%	3.5%
Paraguay	1981	4.6%	-0.7%	5.3%
El Salvador	1976	1.8%	0.9%	0.9%
Trinidad & Tobago	1982	2.4%	1.6%	0.8%
Uruguay	1998	2.3%	0.2%	2.1%
Venezuela	1976	0.8%	-2.9%	3.7%
Average	**1979**	**2.9%**	**0.3%**	**2.6%**

Table 6. Population growth

	1960-1975	1988-2003	Difference
Argentina	1.6%	1.0%	-0.5%
Belice	2.3%	2.8%	0.5%
Bolivia	2.4%	2.2%	-0.2%
Brazil	2.7%	1.4%	-1.3%
Barbados	0.4%	0.4%	0.0%
Chile	2.1%	1.5%	-0.6%
Colombia	2.8%	1.9%	-0.9%
Costa Rica	3.5%	2.2%	-1.3%
Dominican Republic	3.0%	1.6%	-1.4%
Ecuador	3.0%	1.9%	-1.1%
Guatemala	2.8%	2.6%	-0.2%
Guyana	1.7%	0.3%	-1.5%
Honduras	3.2%	2.8%	-0.3%
Haiti	1.7%	2.1%	0.3%
Jamaica	1.4%	0.8%	-0.7%
Mexico	3.2%	1.6%	-1.6%
Nicaragua	3.2%	2.7%	-0.5%
Panama	2.9%	1.8%	-1.1%
Peru	2.9%	1.8%	-1.0%
Paraguay	2.5%	2.4%	0.0%
El Salvador	3.2%	1.9%	-1.3%
Trinidad & Tobago	1.2%	0.6%	-0.7%
Uruguay	0.7%	0.7%	-0.1%
Venezuela	3.5%	2.1%	-1.4%
Average	2.4%	1.7%	-0.7%

Table 7. GDP per capita
(annual rates of growth)

	1960-1975	1988-2003	Difference
Argentina	2.0%	0.8%	-1.3%
Belice	3.4%	3.8%	0.3%
Bolivia	1.3%	1.3%	0.0%
Brazil	4.7%	0.5%	-4.2%
Barbados	4.3%	0.4%	-3.9%
Chile	0.2%	4.3%	4.1%
Colombia	2.6%	0.9%	-1.7%
Costa Rica	2.4%	2.5%	0.1%
Dominican Republic	3.7%	2.6%	-1.2%
Ecuador	2.7%	0.3%	-2.4%
Guatemala	2.6%	1.0%	-1.6%
Guyana	1.7%	2.5%	0.8%
Honduras	1.2%	0.2%	-1.0%
Haiti	-0.6%	-2.9%	-2.3%
Jamaica	2.3%	0.9%	-1.4%
Mexico	3.3%	1.4%	-1.9%
Nicaragua	2.8%	-0.2%	-3.0%
Panama	3.8%	2.7%	-1.2%
Peru	2.3%	0.2%	-2.1%
Paraguay	2.6%	-0.3%	-2.9%
El Salvador	2.1%	1.9%	-0.1%
Trinidad & Tobago	2.8%	2.9%	0.0%
Uruguay	0.7%	0.6%	-0.1%
Venezuela	0.8%	-2.0%	-2.8%
Average	**2.3%**	**1.1%**	**-1.2%**

Table 8. Workers per capita
(annual percentage change)

	1960-1975	1988-2003	Difference
Argentina	-0.2%	0.7%	0.9%
Belice	-0.2%	0.9%	1.1%
Bolivia	-0.4%	0.3%	0.7%
Brazil	0.5%	0.5%	0.0%
Barbados	0.4%	0.9%	0.5%
Chile	-0.2%	0.8%	1.0%
Colombia	-0.1%	0.9%	1.0%
Costa Rica	0.4%	0.6%	0.2%
Dominican Republic	0.9%	0.9%	0.0%
Ecuador	-0.3%	1.1%	1.4%
Guatemala	0.1%	0.6%	0.5%
Guyana	0.5%	1.2%	0.7%
Honduras	-0.2%	0.6%	0.8%
Haiti	-0.9%	0.1%	1.0%
Jamaica	0.1%	0.5%	0.4%
Mexico	0.2%	1.1%	0.9%
Nicaragua	0.1%	0.7%	0.6%
Panama	0.2%	0.7%	0.6%
Peru	-0.3%	1.1%	1.4%
Paraguay	0.1%	0.4%	0.3%
El Salvador	0.4%	1.0%	0.6%
Trinidad & Tobago	0.5%	1.2%	0.7%
Uruguay	-0.2%	0.4%	0.6%
Venezuela	0.2%	0.9%	0.7%
Average	**0.1%**	**0.8%**	**0.7%**

Table 9. GDP per worker
(annual rate of growth)

	1960-1975	1988-2003	Difference
Argentina	2.2%	0.0%	-2.2%
Belice	3.6%	2.8%	-0.8%
Bolivia	1.7%	0.9%	-0.7%
Brazil	4.1%	0.0%	-4.1%
Barbados	3.9%	-0.4%	-4.3%
Chile	0.4%	3.5%	3.1%
Colombia	2.6%	-0.1%	-2.7%
Costa Rica	2.0%	1.9%	-0.1%
Dominican Republic	2.8%	1.6%	-1.1%
Ecuador	3.0%	-0.8%	-3.8%
Guatemala	2.6%	0.4%	-2.1%
Guyana	1.2%	1.3%	0.1%
Honduras	1.5%	-0.4%	-1.9%
Haiti	0.3%	-3.0%	-3.3%
Jamaica	2.2%	0.4%	-1.8%
Mexico	3.1%	0.2%	-2.8%
Nicaragua	2.7%	-0.9%	-3.6%
Panama	3.6%	1.9%	-1.7%
Peru	2.5%	-0.9%	-3.5%
Paraguay	2.4%	-0.7%	-3.2%
El Salvador	1.7%	0.9%	-0.8%
Trinidad & Tobago	2.3%	1.6%	-0.6%
Uruguay	0.9%	0.2%	-0.7%
Venezuela	0.6%	-2.9%	-3.5%
Average	**2.3%**	**0.3%**	**-1.9%**

Table 10. The 36 fastest growing countries in terms of GDP per worker in the 1988-20033 period and their growth in the 1960-1975 period

	country	1960-1975	1988-2003
1	China	2.1%	7.6%
2	Viet Nam		5.1%
3	Ireland	4.0%	5.1%
4	Mozambique		4.1%
5	Thailand	4.2%	4.1%
6	Korea	4.6%	4.0%
7	Singapore	5.8%	3.7%
8	Uganda		3.7%
9	India	1.6%	3.5%
10	Malaysia	3.5%	3.5%
11	**Chile**	**0.4%**	**3.5%**
12	Mali		2.5%
13	Sri Lanka	1.8%	2.5%
14	Bangladesh	-0.3%	2.5%
15	Sudan	0.3%	2.4%
16	Indonesia	2.9%	2.2%
17	Nepal	0.9%	2.2%
18	Norway	2.8%	2.2%
19	Burkina Faso	1.9%	1.9%
20	**Panama**	**3.6%**	**1.9%**
21	Portugal	4.8%	1.9%
22	Austria	4.7%	1.9%
23	**Costa Rica**	**2.0%**	**1.9%**
24	Hong Kong	5.0%	1.9%
25	United Kingdom	2.0%	1.8%
26	Iran, I.R. of		1.8%
27	Australia	1.9%	1.8%
28	Finland	3.7%	1.8%
29	Netherlands	2.9%	1.8%
30	Spain	5.8%	1.7%
31	Tunisia		1.7%
32	Denmark	2.1%	1.7%
33	Germany		1.7%
34	**Dominican Republic**	**2.8%**	**1.6%**
35	Belgium	3.8%	1.6%
36	United States	1.5%	1.6%

Table 11. Shares of employment in agriculture

	Shares of employment in agriculture				Differences	
country	1965	1980	1988	2002	65-80	88-02
Argentina	18.2%	12.9%	12.3%	9.6%	5.3%	2.7%
Brazil	51.2%	36.7%	25.9%	15.6%	14.5%	10.3%
Chile	27.3%	20.9%	19.2%	15.2%	6.4%	4.0%
Colombia	48.6%	40.5%	29.2%	19.2%	8.1%	10.0%
Costa Rica	53.7%	36.6%	28.3%	20.3%	17.1%	8.0%
Dominican Republic	54.9%	32.5%	26.2%	15.4%	22.5%	10.9%
Ecuador	55.3%	39.7%	34.5%	24.4%	15.6%	10.1%
Guatemala	63.5%	53.9%	52.6%	45.1%	9.6%	7.5%
Guyana	35.0%	26.7%	22.5%	16.8%	8.3%	5.6%
Honduras	69.8%	57.2%	44.6%	30.7%	12.6%	13.9%
Haiti	77.3%	72.1%	72.9%	60.6%	5.1%	12.3%
Jamaica	36.8%	31.1%	25.8%	19.9%	5.7%	5.9%
Mexico	49.4%	36.3%	29.5%	20.0%	13.1%	9.4%
Nicaragua	57.0%	39.5%	30.6%	18.8%	17.5%	11.9%
Peru	50.3%	40.2%	37.0%	29.0%	10.1%	7.9%
Paraguay	52.0%	44.8%	40.3%	34.7%	7.2%	5.6%
El Salvador	59.3%	43.5%	37.5%	28.2%	15.8%	9.4%
Uruguay	19.9%	16.7%	14.7%	12.4%	3.2%	2.2%
Venezuela	29.7%	14.6%	12.3%	7.5%	15.1%	4.8%
Average	**47.9%**	**36.7%**	**31.4%**	**23.3%**	**11.2%**	**8.0%**

Table 12. GDP per worker in agriculture as a share of GDP per worker in non-agricultural activities

					Percentage increase	
country	**1965**	**1980**	**1988**	**2002**	**65-80**	**88-02**
Argentina	25.3%	27.2%	34.5%	50.7%	7.6%	46.8%
Brazil	9.4%	8.5%	15.5%	33.1%	-10.1%	114.1%
Chile	28.2%	35.8%	47.1%	42.6%	26.8%	-9.5%
Colombia	25.1%	29.4%	45.6%	53.6%	16.9%	17.4%
Costa Rica	9.8%	15.5%	24.2%	32.2%	57.6%	33.2%
Dominican Republic	19.5%	41.9%	44.0%	63.5%	114.7%	44.1%
Ecuador	20.8%	21.7%	31.7%	32.9%	4.5%	3.8%
Guatemala	16.5%	21.3%	23.3%	27.3%	29.1%	17.1%
Guyana	43.8%	54.1%	81.3%	135.8%	23.5%	67.0%
Honduras	9.3%	11.1%	17.8%	31.8%	19.6%	78.8%
Haiti	12.9%	12.4%	10.8%	16.7%	-3.8%	55.4%
Jamaica	14.5%	16.3%	20.3%	24.2%	12.2%	19.4%
Mexico	8.2%	8.5%	11.3%	16.0%	3.6%	41.0%
Nicaragua	13.7%	23.6%	33.4%	79.9%	72.4%	139.3%
Peru	9.4%	9.3%	13.6%	23.3%	-1.3%	71.4%
Paraguay	25.5%	22.9%	30.5%	42.0%	-10.2%	37.9%
El Salvador	10.5%	19.6%	22.5%	23.3%	87.0%	3.3%
Uruguay	32.1%	33.6%	39.9%	49.6%	4.7%	24.3%
Venezuela	7.7%	22.0%	32.2%	52.3%	184.4%	62.1%
Average	**18.0%**	**22.9%**	**30.5%**	**43.7%**	**33.6%**	**45.6%**

Table 13. Productivity Growth in Agricultura vs. Non-agriculture

	Agriculture			Non-agriculture			Composition shift			Total		
	1965-1980	1988-2002	Difference	1965-1980	1988-2002	Difference	1965-1980	1988-2002	Difference	1965-1980	1988-2002	Difference
Argentina	1.9%	2.1%	0.2%	1.4%	-0.6%	-2.1%	0.3%	0.1%	-0.2%	1.9%	-0.4%	-2.3%
Brazil	2.3%	4.7%	2.4%	3.0%	-0.8%	-3.8%	1.6%	0.8%	-0.8%	4.8%	0.1%	-4.7%
Chile	2.3%	2.5%	0.3%	0.7%	3.3%	2.6%	0.4%	0.2%	-0.2%	1.2%	3.6%	2.4%
Colombia	2.7%	0.0%	-2.8%	1.7%	-1.2%	-2.8%	0.7%	0.5%	-0.2%	2.7%	-0.2%	-2.9%
Costa Rica	3.0%	3.0%	0.1%	-0.1%	0.9%	1.0%	1.9%	0.6%	-1.4%	2.0%	1.7%	-0.3%
Dominican Republic	6.4%	3.6%	-2.8%	1.1%	1.0%	-0.1%	2.3%	0.6%	-1.7%	3.9%	2.0%	-1.9%
Ecuador	1.6%	-1.6%	-3.2%	1.3%	-1.9%	-3.2%	1.6%	0.7%	-0.9%	3.3%	-0.9%	-4.2%
Guatemala	3.1%	0.6%	-2.4%	1.3%	-0.5%	-1.8%	1.3%	0.8%	-0.5%	2.9%	0.6%	-2.3%
Guyana	0.8%	4.8%	4.0%	-0.6%	1.0%	1.6%	0.5%	0.1%	-0.4%	0.2%	1.5%	1.3%
Honduras	0.8%	2.1%	1.3%	-0.4%	-2.1%	-1.7%	2.2%	1.3%	-0.8%	1.9%	-0.5%	-2.4%
Haiti	0.6%	-2.6%	-3.2%	0.8%	-5.6%	-6.4%	1.2%	2.5%	1.3%	2.2%	-3.0%	-5.3%
Jamaica	-0.8%	1.1%	1.9%	-1.5%	-0.2%	1.4%	0.5%	0.4%	-0.1%	-1.0%	0.4%	1.3%
Mexico	1.4%	1.9%	0.5%	1.2%	-0.6%	-1.7%	1.4%	0.8%	-0.6%	2.8%	0.3%	-2.4%
Nicaragua	-0.7%	4.3%	5.0%	-4.3%	-2.0%	2.2%	2.0%	0.8%	-1.3%	-2.0%	-0.9%	1.1%
Peru	-0.3%	2.0%	2.3%	-0.2%	-1.9%	-1.7%	1.1%	0.7%	-0.4%	1.0%	-1.0%	-2.1%
Paraguay	2.4%	0.9%	-1.5%	3.2%	-1.4%	-4.6%	0.7%	0.5%	-0.3%	4.1%	-0.7%	-4.9%
El Salvador	1.7%	0.3%	-1.4%	-2.5%	0.0%	2.5%	2.0%	0.8%	-1.2%	-0.3%	1.0%	1.4%
Uruguay	2.2%	1.5%	-0.8%	1.9%	-0.1%	-2.0%	0.2%	0.1%	-0.1%	2.2%	0.1%	-2.1%
Venezuela	4.7%	0.9%	-3.8%	-2.3%	-2.5%	-0.2%	1.2%	0.3%	-1.0%	-1.1%	-2.2%	-1.1%
Average	**1.9%**	**1.7%**	**-0.2%**	**0.3%**	**-0.8%**	**-1.1%**	**1.2%**	**0.7%**	**-0.6%**	**1.7%**	**0.1%**	**-1.6%**

Table 14. Years of schooling of the over-15 population

Year	1960	1975	1990	Percent increase per decade	
Argentina	5.3	6.3	8.1	12.9%	18.5%
Bolivia	5.4	4.7	4.9	-8.0%	2.1%
Brazil	2.9	3.0	3.8	3.2%	17.5%
Chile	5.2	5.7	6.7	6.1%	11.6%
Colombia	3.2	4.3	4.7	22.5%	5.6%
Costa Rica	4.0	5.1	5.6	17.6%	5.2%
Dominican Republic	2.7	3.5	4.4	19.6%	16.5%
Ecuador	3.2	4.6	5.9	25.8%	18.9%
Guatemala	1.5	1.9	3.0	17.5%	36.3%
Guyana	4.5	4.9	5.7	5.7%	10.8%
Honduras	1.9	2.6	4.2	25.5%	36.8%
Haiti	0.8	1.2	2.9	35.5%	77.6%
Jamaica	2.5	3.8	4.7	29.7%	16.9%
Mexico	2.8	3.9	6.7	26.6%	43.0%
Nicaragua	2.3	3.0	3.7	20.5%	14.8%
Panama	4.6	5.0	7.9	5.4%	35.4%
Peru	3.3	4.6	6.2	25.0%	22.0%
Paraguay	3.6	4.4	5.0	12.8%	10.0%
El Salvador	2.0	2.9	3.5	28.2%	13.2%
Trinidad & Tobago	4.6	5.6	7.2	14.3%	17.4%
Uruguay	5.4	6.2	7.1	10.2%	9.5%
Venezuela	2.9	3.6	5.0	16.1%	23.1%
Average	**3.4**	**4.1**	**5.3**	**16.9%**	**21.0%**

Table 15. Secondary school enrollment

Country	Year	
	1990	**2000**
Argentina	71.1	96.7
Belize	43.9	70.7
Bolivia	36.7	80.0
Brazil	38.4	105.3
Chile	73.5	85.5
Colombia	49.8	69.8
Costa Rica	43.0	60.5
Ecuador	55.3	57.7
Guyana	78.7	88.0
Jamaica	65.3	83.3
Mexico	53.3	73.5
Nicaragua	40.4	54.0
Panama	61.4	67.1
Peru	67.4	86.0
Paraguay	30.9	59.9
El Salvador	26.4	53.9
Suriname	52.1	71.5
Trinidad & Tobago	80.4	82.3
Uruguay	81.3	98.0
Venezuela	34.7	68.6
Average	**54.2**	**75.6**

Table 16. Years of schooling of the population over 25 and the rates of return to schooling

country	Initial year	Years of schooling	Return to schooling	Final Year	Years of Schooling	Return to Schooling	Increase in years of schooling per decade	Expected increase in output per worker	Actual change in GDP per worker 1988-2003
Argentina	1980	7.93	8.0%	1998	9.84	9.1%	1.06	0.9%	0.0%
Brazil	1981	4.04	14.2%	1998	6.00	13.4%	1.15	1.6%	0.0%
Chile	1987	8.20	11.9%	1998	9.80	12.3%	1.46	1.8%	3.5%
Costa Rica	1981	5.97	11.2%	1998	7.68	9.8%	1.01	1.1%	1.9%
Honduras	1989	4.06	14.5%	1998	5.15	9.3%	1.21	1.8%	-0.4%
Mexico	1984	5.11	11.9%	1996	6.98	12.6%	1.56	1.9%	0.2%
Panama	1979	6.62	10.1%	1998	9.19	12.7%	1.35	1.4%	1.9%
Peru	1986	6.69	16.1%	1997	8.58	12.9%	1.72	2.8%	-0.9%
Uruguay	1981	7.23	9.0%	1998	9.31	8.4%	1.23	1.1%	0.2%
Venezuela	1981	5.75	10.3%	1998	7.92	8.7%	1.28	1.3%	-2.9%
Average	1983	6.16	11.7%	1998	8.04	10.9%	1.30	1.6%	0.4%
Taiwan	1978	7.11	6.9%	1996	9.37	6.7%	1.26	0.9%	n.a.
Thailand	1988	5.71	13.7%	1998	6.01	19.2%	0.30	0.4%	4.1%
USA	1984	12.51	10.8%	1998	13.14	12.0%	0.45	0.5%	1.6%

Table 17. Lora Index of Structural Reforms

	1985-88	1988-1991	1992-1994	1995-1997	1998-1999
Argentina	33.0%	38.2%	59.1%	60.0%	61.0%
Bolivia	34.3%	42.5%	47.8%	67.7%	69.5%
Brazil	28.7%	39.8%	46.9%	53.2%	59.5%
Chile	50.4%	56.6%	56.6%	58.3%	59.6%
Colombia	35.4%	39.3%	53.3%	53.6%	56.1%
Costa Rica	37.4%	42.2%	44.6%	53.7%	55.7%
Dominican Republic		38.4%	43.8%	44.5%	54.5%
Ecuador	31.5%	35.0%	46.7%	53.7%	53.2%
Guatemala	36.6%	43.9%	46.2%	50.9%	58.1%
Honduras		35.4%		49.3%	52.6%
Jamaica	43.4%	49.8%	54.4%	56.6%	65.9%
Mexico	31.3%	40.6%	49.8%	51.4%	50.6%
Nicaragua			57.4%	59.2%	60.8%
Peru	30.0%	30.5%	52.5%	61.8%	65.1%
Paraguay	35.2%	38.5%	55.3%	56.3%	56.5%
El Salvador	35.1%	37.0%	47.2%	49.1%	56.9%
Trinidad & Tobago	51.9%	54.6%	56.9%	63.5%	62.8%
Uruguay	35.3%	36.5%	43.8%	45.4%	46.9%
Venezuela	27.5%	29.9%	44.2%	49.4%	51.5%
Average	**36.1%**	**40.5%**	**50.4%**	**54.6%**	**57.7%**

Table 18. Real interest rate, current account[21] and investment rate[22]. Average 1988-2003

Country	Real Interest Rate	Current Account Balance	Investment Rate
Suriname	-18.1	1.1	17.1
Venezuela	-2.1	3.8	17.0
Guyana	0.0	-14.2	28.4
Bahamas, The	4.6	-6.8	
Mexico	6.4	-3.2	19.1
Barbados	7.3	-0.2	16.3
El Salvador	7.4	-2.1	16.1
Guatemala	7.5	-4.6	15.4
Honduras	8.1	-5.3	23.3
Panama	8.9	-2.0	20.2
Trinidad & Tobago	9.1	1.7	19.7
Jamaica	9.5	-4.4	27.2
Chile	9.7	-2.4	22.8
Costa Rica	10.3	-4.4	19.2
Haiti	10.9	-1.6	18.8
Colombia	12.6	-1.5	17.2
Argentina	13.0	-1.1	17.3
Belice	13.6	-8.0	24.0
Dominican Republic	14.0	-2.7	22.8
Paraguay	16.3	-0.8	21.7
Bolivia	28.4	-5.3	15.9
Ecuador	30.3	-3.2	19.7
Nicaragua	34.8	-25.8	25.6
Uruguay	41.3	-0.7	13.3
Brazil	57.3	-1.6	20.1
Average	13.6	-3.8	19.9

[21] As a share of GDP.
[22] As a share of GDP.

Figure 1. EMBI Global December 1997 – July 2005.

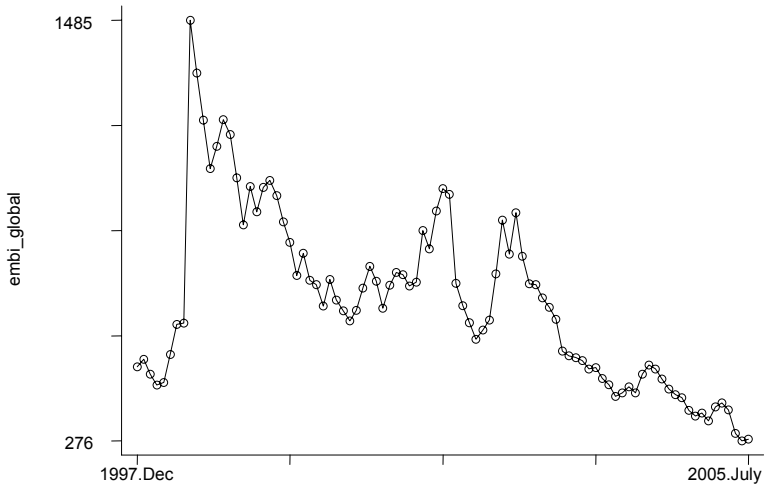
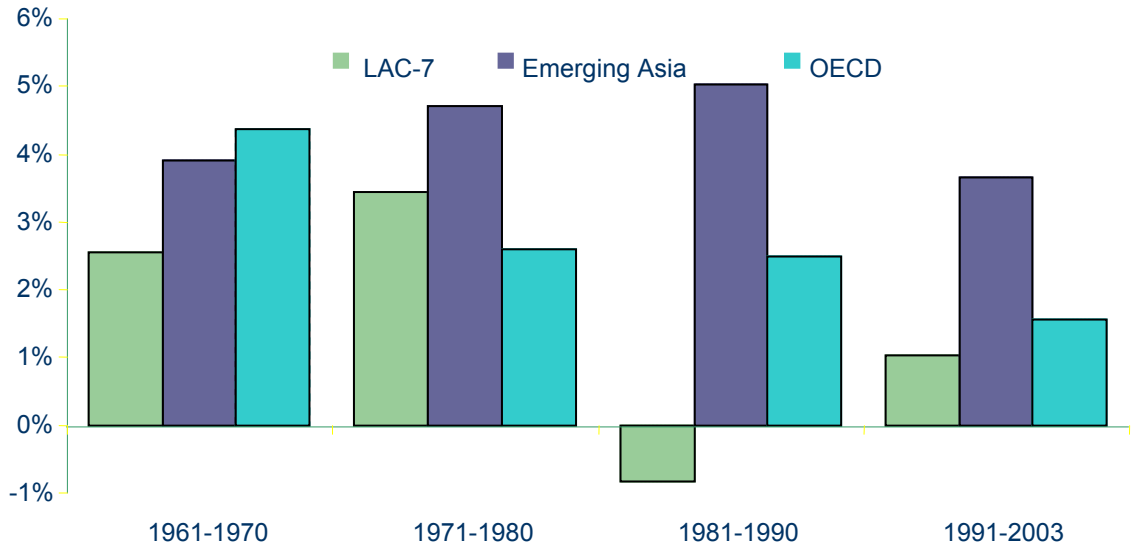


Figure 2
GDP per capita annual growth
in Latin America and the world



Notes: Regional GDP per capita. Asia includes Indonesia, Korea, Malaysia, Philippines and Thailand.

Source: WDI, World Bank.

Figure 3.

Figure 6: Measure of Distortions in Human Capital Markets:
$(w^m_s/w^m_u) / (w^n_s/w^n_u)$

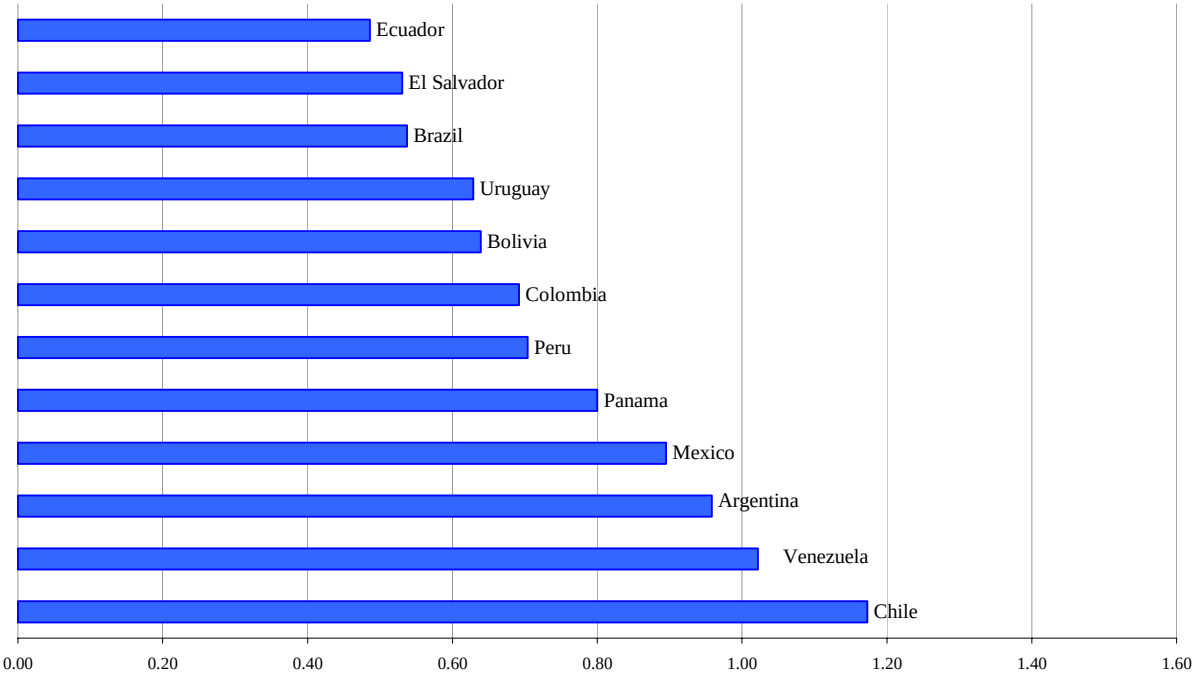
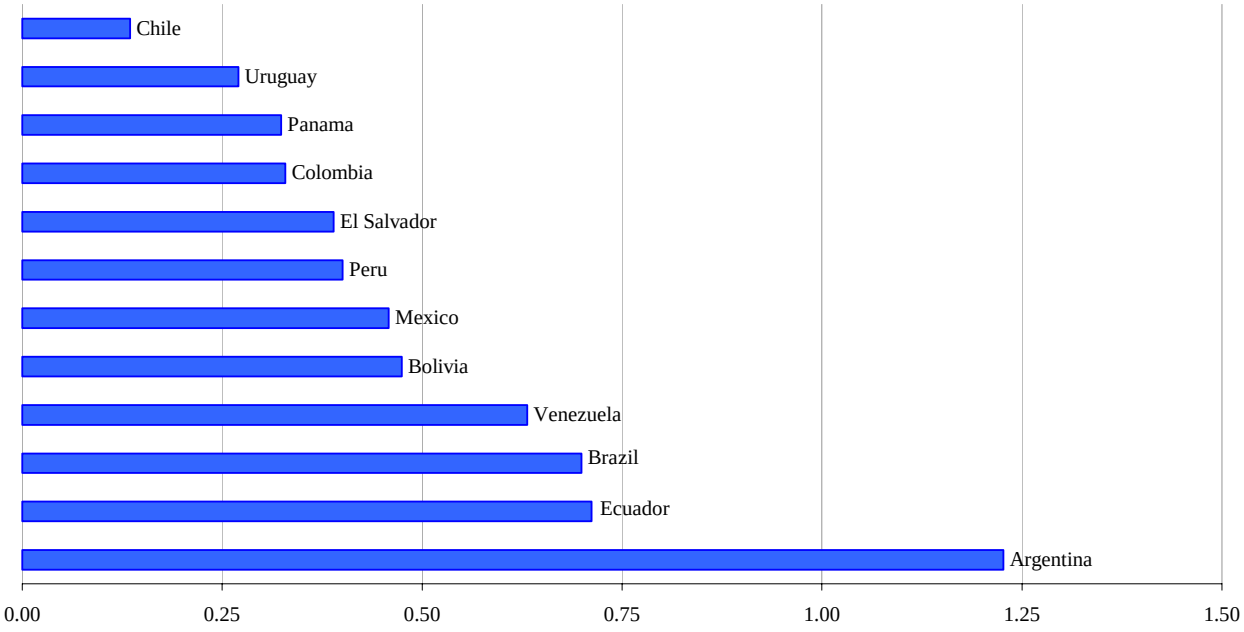


Figure 4.

Figure 7: Measure of Distortions in Physical Capital Markets:
r^m/r^n



r^m: EMBI (stripped spread) + 10-year US T-Bill - US inflation rate.
Bolivia: 3-month T-bill Rate - US inflation rate
r^n: $\underline{\alpha y}$
(pk)

Figure 5. Implied R& D Tax Rates

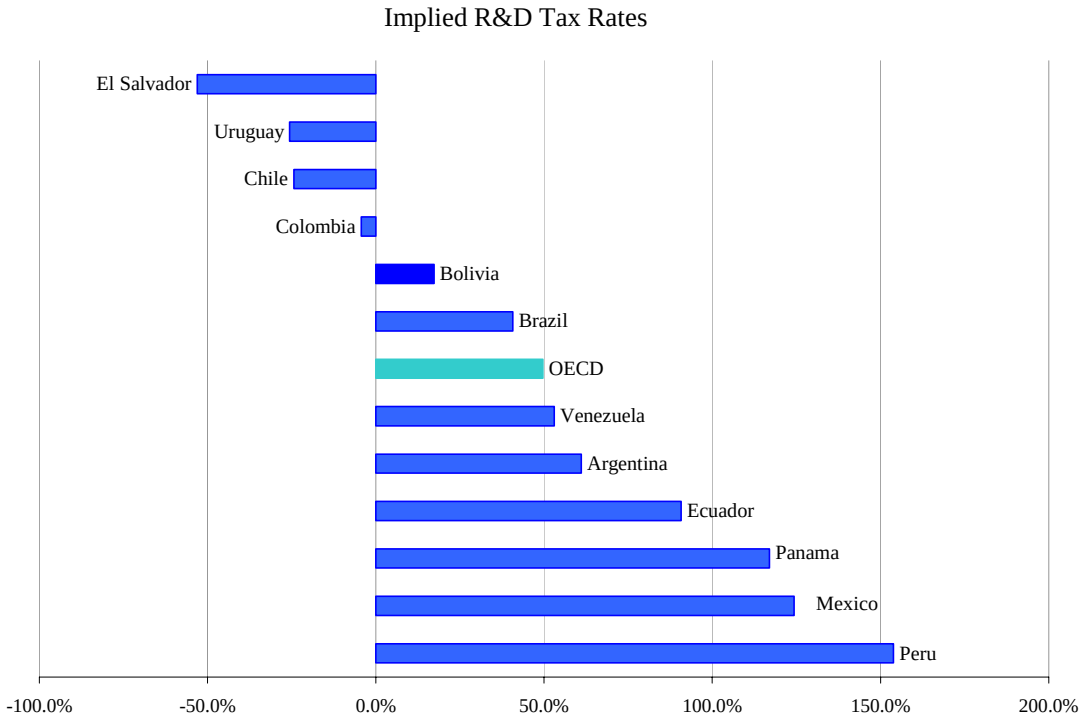


Figure 6.

Figure 9: Cross Country Comparison
Human Capital Markets: $((h_s/h_u) / (h^*_s/h^*_u))^{\sigma-1}$

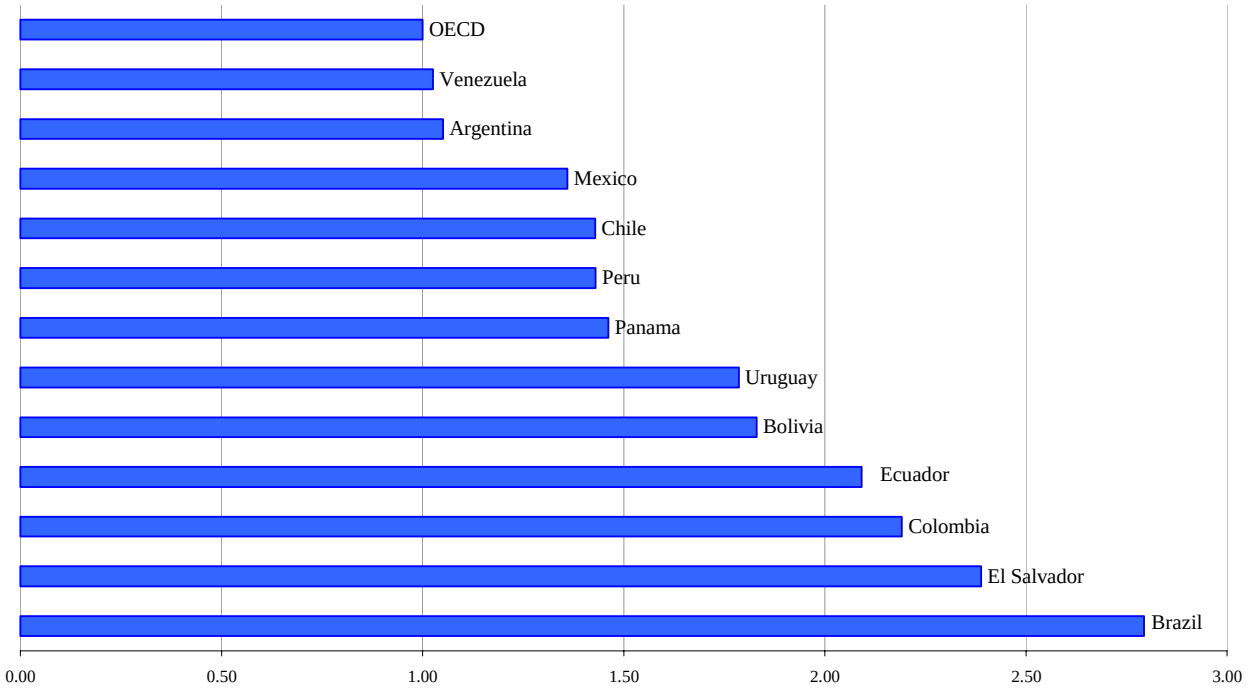


Figure 7.

Figure 10: Cross Country Comparison: Physical Capital Markets
(y/y*)(k*/k)(p*/p)

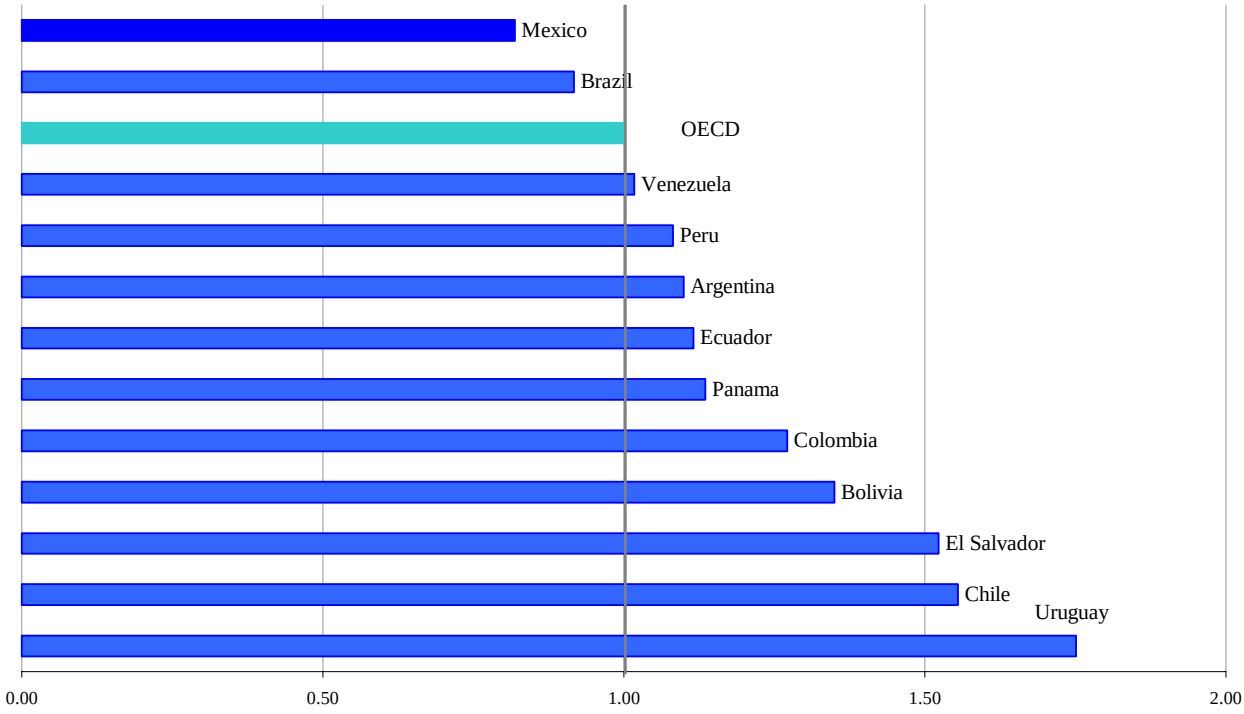


Figure 8.

Cross Country Comparision: Technology Markets
A/A*

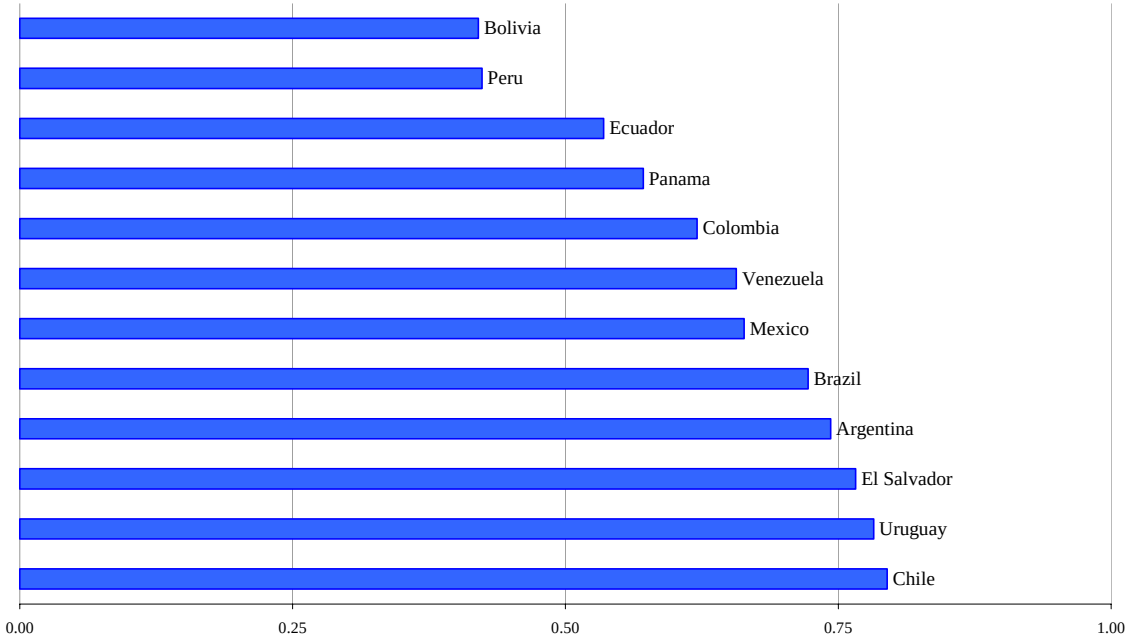


Figure 9: General Government Revenue as a share of GDP, 2003

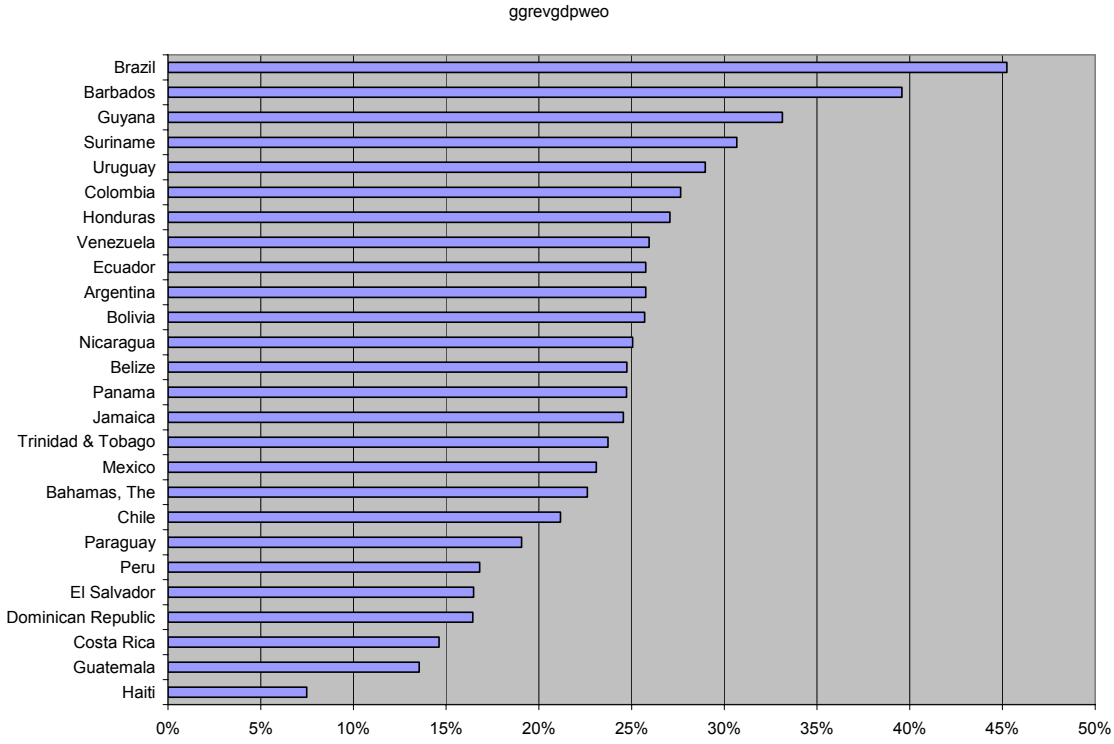


Figure 10. Real Interest Lending Rates: Average 1988-2003.

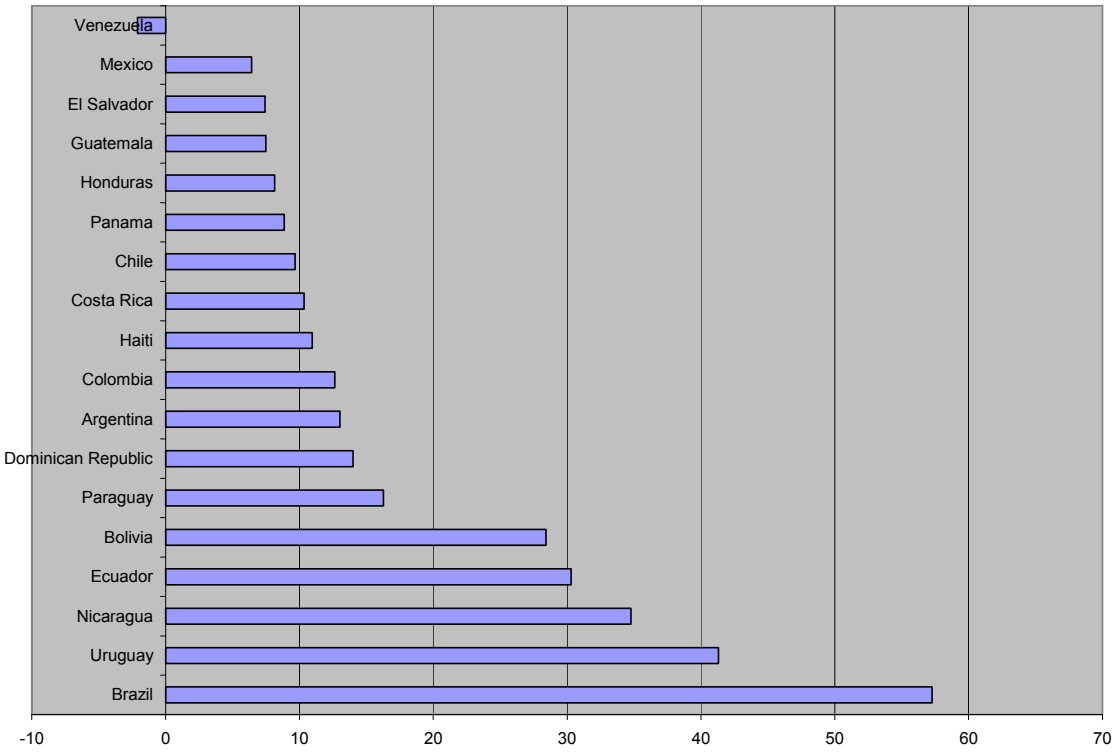


Figure 11. General government expenditure as a share of GDP, 2003.

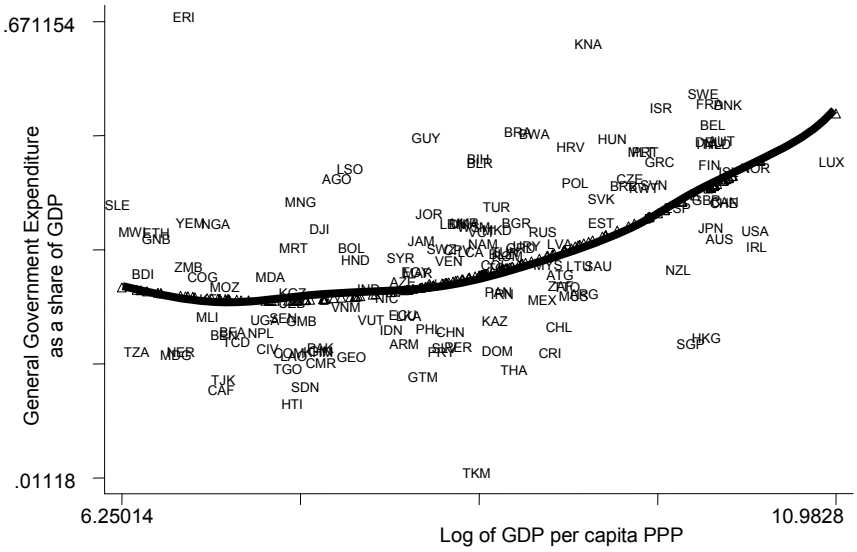


Figure 12. Latin America: General government expenditure as a share of GDP, 2003.

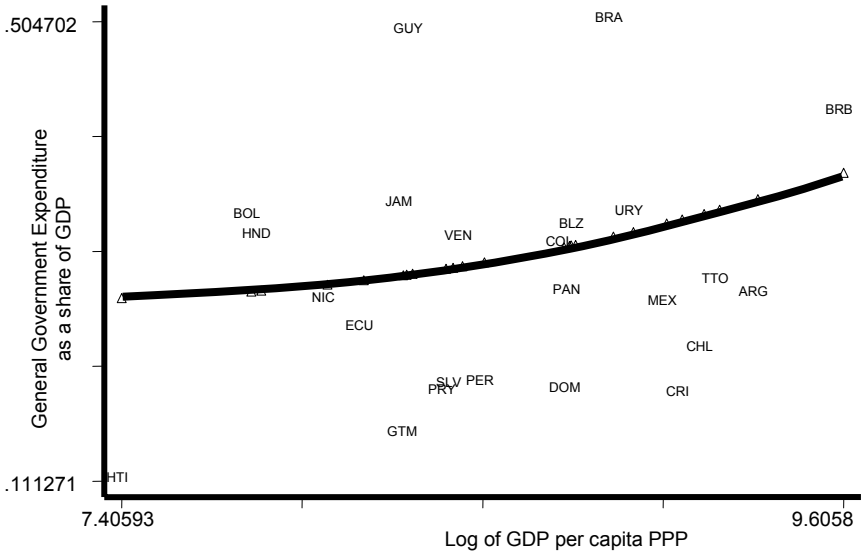


Figure 13. Implied income in the export basket of countries, 2003

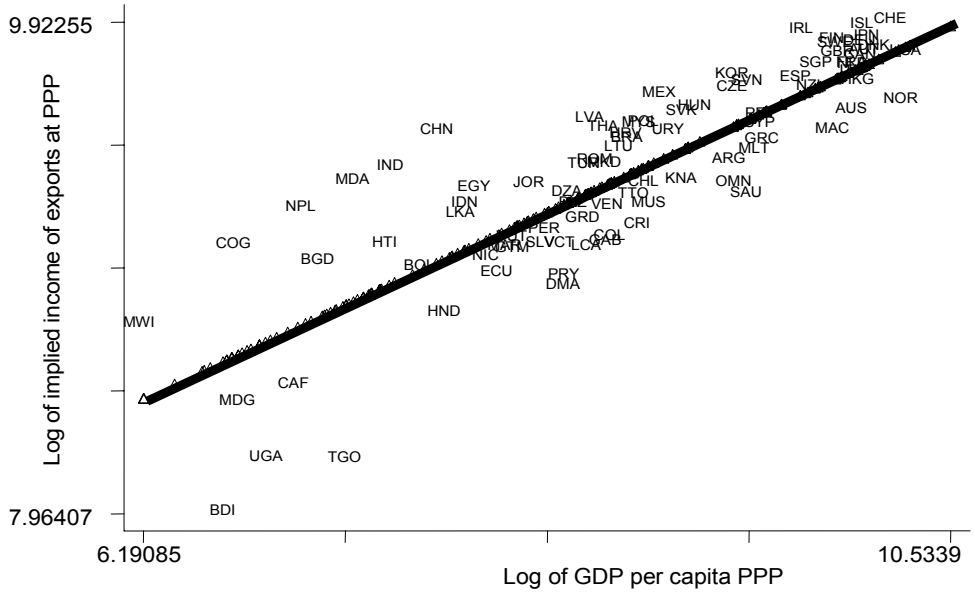


Figure 14. Latin America: Implied income in the export basket of countries, 2003

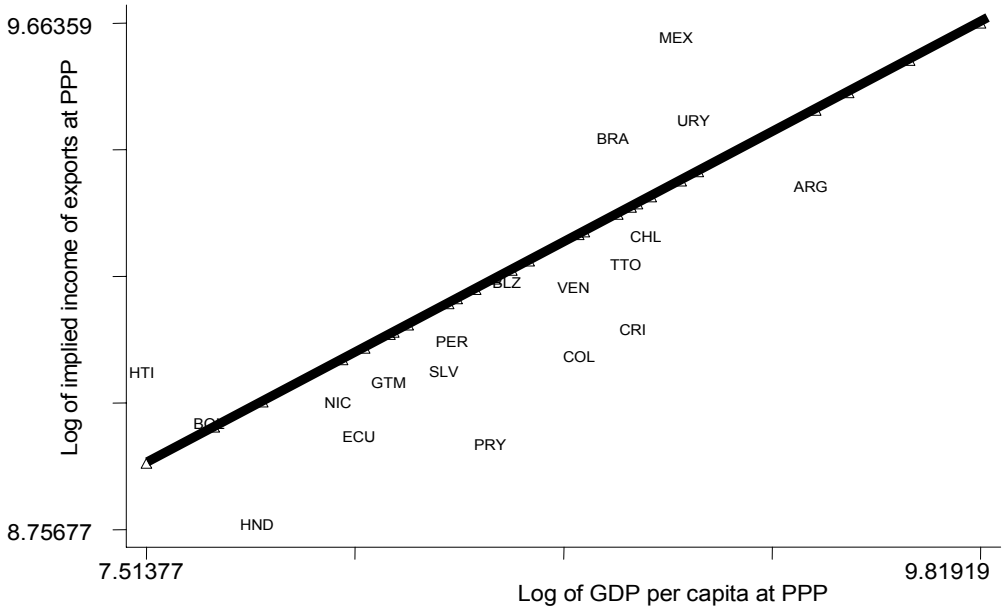


Figure 15: El Salvador --Traditional and Maquila Exports 1995-2004