

# Growth, Productivity and Competitiveness in Latin America

Criticizing the obsession with competitiveness in developed countries, Paul Krugman argued several years ago that it is not countries that compete with one another, but rather the businesses in those countries that compete.<sup>1</sup> Confusing countries with companies leads to the mistaken notions that a nation's economic strength is measured by its foreign trade surplus, that imports are undesirable because they displace domestic employment, or that low wages in poor countries are a threat to the growth of rich countries.

Concern over competitiveness has increased even more in recent years in developing countries. But Krugman's warnings have not been forgotten. The mercantilist concept of competitiveness is giving way to a more comprehensive vision of the environment in which companies must operate, including the quality of macroeconomic management, the availability of financial resources, infrastructure services and human capital, and the innovative capacity of firms and research centers. An economy is now understood to be more competitive when the business environment is conducive to the sustained growth of productivity and per capita income, in a context of integration into the world economy.

Strictly speaking, the term "competitiveness" is inadequate to encompass all the areas it is said to cover. Usage has made it a synonym for the more precise term—"productivity," which is the capacity to generate value, whether at the micro or aggregate level. As we will see in this chapter, countries compete primarily with themselves to be more competitive: as a rule, a country grows more rapidly if it succeeds in creating a business environment better than the one that would be expected for its own income level. As one might expect, the availability and quality of productive factors, the level of technology, and organizational ability are best in

wealthier countries. But regardless of its level of development, any country that is able to improve these variables expands its economic potential.

To judge by the results, Latin America and the Caribbean exhibit serious problems of competitiveness. In the 1990s, average growth of the countries in the region was just 3.3 percent, a rate much lower than that of other groups of developing countries, such as East Asia (5.1 percent), the Middle East (4.0 percent), or the rest of Asia (5.2 percent). When population growth is taken into account, the average income of Latin Americans rose only 1.5 percent a year over the past decade, lower not only than several regions of the developing world, but even than countries that are more mature demographically, such as the developed countries and those of Eastern Europe. If the comparison is limited solely to the working population, the average income generated by each worker in Latin America grew at a rate of only 0.7 percent a year during the 1990s. Only the countries of the Middle East and Africa had more modest growth in average labor productivity. Elsewhere in the world, worker incomes rose by more than 1.7 percent a year, and in East Asia and the rest of Asia, by some 3 percent a year (Table 1.1).

At the same time, Latin America's growth and productivity indicators improved by 2 percent, a significant improvement over the previous decade. No other region of the world had a comparable gain, undoubtedly because the slump of the "lost decade" of the 1980s was easy to improve upon. Even prior to the "lost decade," however, Latin America's performance was not outstanding in comparative terms. Indeed, during the

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<sup>1</sup> Krugman (1994).

**Table 1.1 Growth, Productivity and Factor Accumulation***(In percent)*

	GDP growth and productivity						Factor accumulation							
	GDP		Per capita GDP		Per worker GDP		Investment rate		Capital stock		Labor force		Years of education	
	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s
Developed countries	2.69	2.55	2.17	1.99	1.59	1.68	22.38	19.93	2.84	2.49	1.11	0.88	0.87	0.86
East Asia	5.93	5.13	4.02	3.30	3.23	2.72	28.85	32.32	8.47	7.96	2.71	2.41	2.56	2.49
Middle East	2.97	3.98	0.08	1.25	-0.23	0.19	22.98	23.58	4.75	3.69	3.19	3.76	5.14	3.31
Eastern Europe	3.80	3.48	3.10	2.77	3.21	2.26	23.52	23.18	5.01	3.83	0.59	1.22	1.70	0.85
Latin America	1.33	3.34	-0.68	1.50	-1.40	0.74	18.70	19.19	2.63	3.71	2.73	2.59	1.93	1.48
Rest of Asia	4.77	5.15	2.75	3.49	2.50	2.86	22.15	21.94	5.93	5.31	2.28	2.28	2.99	1.75
Africa	3.04	3.15	0.19	0.52	0.28	0.41	18.55	21.43	4.76	3.31	2.75	2.76	3.40	2.90

Note: All figures are annual growth rates, except the investment rate, which is gross fixed investment as a percentage of GDP. All data are countries' simple averages. Source: Appendix 1.1.

second half of the 20th century all regions of the world except Africa surpassed Latin America in per capita growth. Accordingly, the region fell from second place in terms of average per capita income in the 1950s, surpassed only by the developed countries, to fifth place in the 1990s, ahead only of the poor countries of Asia and Africa.<sup>2</sup>

From an accounting standpoint, economic growth can be viewed as the result of accumulating factors of production and using those factors productively. Total growth is simply the weighted sum of these sources of growth.<sup>3</sup> Latin America's modest economic growth is due both to the low rate of accumulation of productive factors and to a very poor performance in productivity. Indeed, because Latin America has had low investment rates over the last two decades, capital stocks have grown at modest rates: 2.6 percent annually in the 1980s and 3.7 percent in the 1990s. Both rates are lower than those elsewhere in the developing world. Moreover, even though the labor force grew at similarly high rates in the 1980s and the 1990s, the rate of increase in education slowed in the past decade and was substantially less than in the countries of the Middle East and East Asia. With no changes in productivity, the rates of accumulation of productive factors would have made it possible to sustain a growth of no more than 4 percent. But to make things worse, total factor productivity fell 0.6 percent annually.<sup>4</sup> It should be noted that total factor productivity also fell elsewhere in the developing

world, but it continued to rise at a vigorous pace in the developed world (Table 1.2).<sup>5</sup>

A rather widespread drop in productivity in a time of such rapid technological change like the 1990s, when production and trade opportunities expanded so dynamically, may seem paradoxical. But the paradox diminishes when it is noted that what actually happened was that the productivity gaps grew between the wealthy countries, where productivity did increase, and the poor countries, where it fell (Figure 1.1). This happened also within Latin America, where only a handful of countries

<sup>2</sup> For a more detailed analysis of the development patterns of Latin America in comparison with the other regions of the world see IDB (2000, Chapter 1).

<sup>3</sup> The contribution of factors of production to growth is usually weighted according to its estimated participation in total income, under the assumption that the production function has the Cobb-Douglas form. Although arbitrary, this is a simple assumption. Other alternative forms are discussed in Hall and Jones (1999).

<sup>4</sup> Note that although average productivity of labor rises, total factor productivity may fall if labor is combined with a greater quantity of physical and human capital, and if the product per worker increases, but not at a pace sufficient to compensate proportionally for this increased capital.

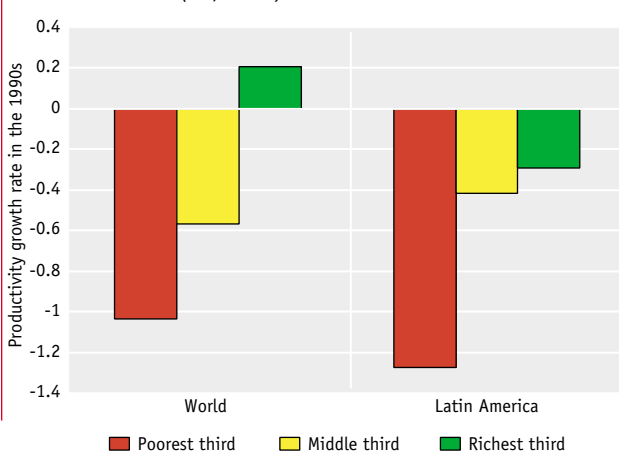
<sup>5</sup> The conclusion that total productivity of factors fell in Latin America but rose in the developed world in the 1990s is borne out if different coefficients are used in weighting productive factors in a range between 0.3 and 0.7; if instead of the capital depreciation rate of 6 percent, lower depreciation rates are used; or if the human capital index used by Hall and Jones (1999) is employed. See a summary of alternative calculations in Appendix 1.1.

**Table 1.2 Growth Decomposition**  
(Annual rates in percent)

Region	Contribution of:									
	GDP growth		Capital		Labor force		Education		Total factor productivity	
	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s	1980s	1990s
Developed countries	2.69	2.55	0.95	0.83	0.74	0.59	0.58	0.58	0.43	0.56
East Asia	5.93	5.13	2.82	2.65	1.81	1.61	1.70	1.66	-0.40	-0.80
Middle East	2.97	3.98	1.58	1.23	2.13	2.51	3.43	2.21	-4.17	-2.00
Eastern Europe	3.80	3.48	1.67	1.28	0.39	0.82	1.14	0.57	0.60	0.82
Latin America	1.33	3.34	0.88	1.24	1.82	1.73	1.29	0.98	-2.65	-0.62
Rest of Asia	4.77	5.15	1.98	1.77	1.52	1.52	1.99	1.17	-0.72	0.69
Africa	3.04	3.15	1.59	1.10	1.83	1.84	2.27	1.94	-2.65	-1.71

Note: All data are countries' simple averages.  
Source: Appendix 1.1.

**Figure 1.1 Increasing Productivity Gaps**  
(In percent)

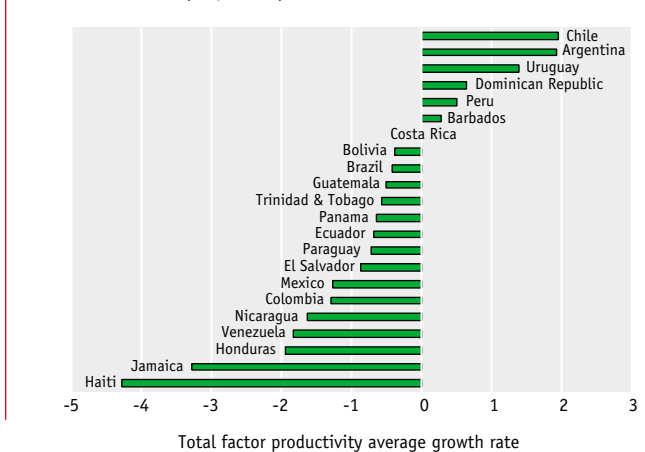


Source: IDB calculations. See Appendix 1.1.

had productivity gains, most notoriously Chile, Argentina and Uruguay, which are among the most developed within the region (Figure 1.2).

The reason for the productivity decline in most countries may have been that technological changes could be assimilated only by those countries that had a labor force sufficiently educated to take advantage of them. Figure 1.3 sustains this hypothesis, which is also supported more rigorously in econometric analyses.<sup>6</sup> In countries without sufficient education, the new technologies may have raised productivity of some types of

**Figure 1.2 Productivity Growth in the 1990s**  
(In percent)



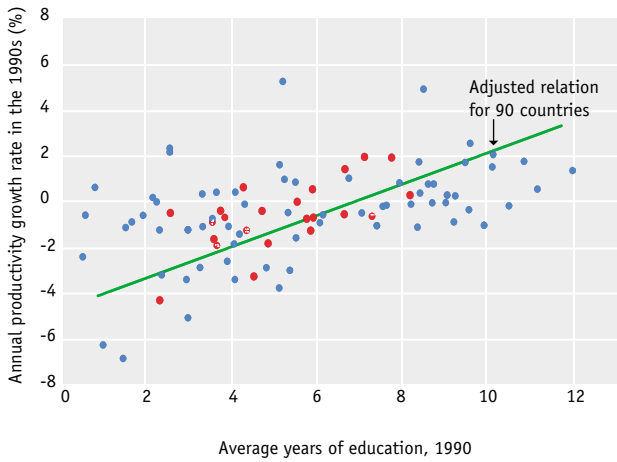
Source: IDB calculations.

human capital while rendering others obsolete or underused. Deficiencies in training systems and the limited mobility of workers between occupations may have contributed to this outcome.

For Latin America, where there is just such a concentration of education among small groups, as well as education gaps, the connection between productivity and education is particularly relevant. Over the last three

<sup>6</sup> See Appendix 1.1.

**Figure 1.3 Productivity and School Attainment**



Note: Each dot represents a country. Latin American countries are shown in red. Source: Appendix Table 1.1 and Barro and Lee (2000).

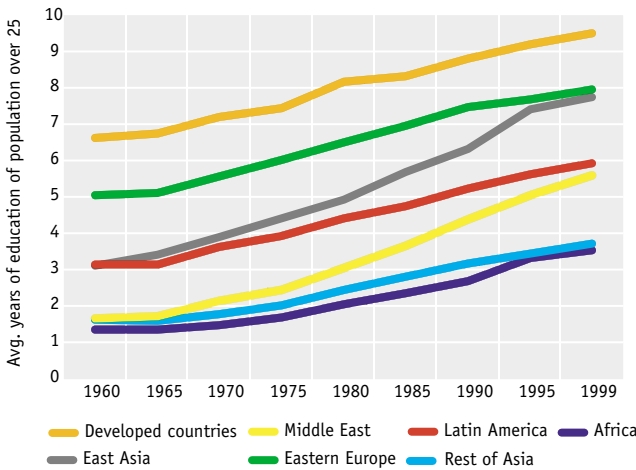
**Figure 1.5 Productivity and Institutional Quality**



Note: Each dot represents a country. Latin American countries are shown in red. Source: Appendix Table 1.1 and Kaufmann, Kraay and Zoido-Lobaton (1999a and b).

**Figure 1.4 Average Years of Education of the Labor Force**

(In percent)



Source: Barro and Lee (2000).

decades, East Asian countries have cut the education gaps of their labor force vis-à-vis the developed countries by at least one half. The countries of the Middle East have also made rapid gains since the 1960s, doubling the average number of years of schooling of their labor force. By contrast, Latin America has gone from an average of three years of education four decades ago to around five years today (Figure 1.4). What is worse is that the pace of increase has slowed as a result of the economic crises of the 1980s and 1990s. While initial access to education is high in Latin America, the completion rates for secondary schooling are very low, and as a

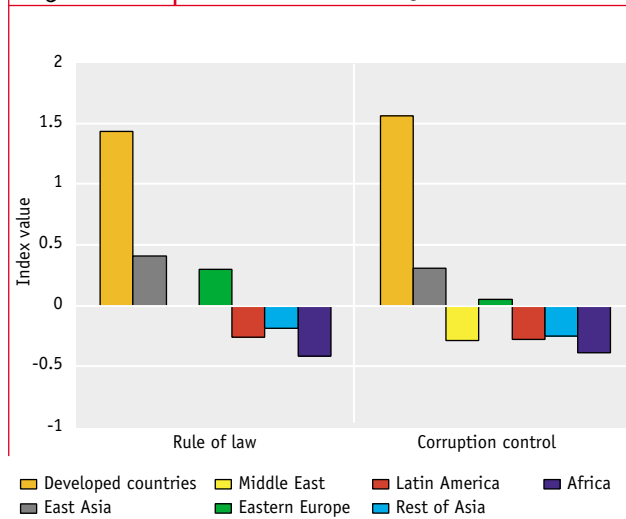
result, higher education is very concentrated in a small group of the population. This limits the ability of workforces to assimilate new technologies and ways of organizing production.<sup>7</sup>

Another hypothesis (which does not necessarily rule out the previous one) is that productivity increases were limited in the poorer countries because of the fragility of their public institutions. In the absence of a stable and respected system of laws, there may not have been sufficient incentives to assimilate new technologies that require long-term investments, whether in infrastructure or other areas. This may also have limited the capacity of the financial system to support the development of new investments. The ineffectiveness of government, or the presence of an environment that encourages corruption, may have discouraged foreign investment and technology transfer, and diverted productive resources toward rent-seeking activities. The absence of institutions for social protection and for the resolution of distribution conflicts may have hindered or prevented investment in highly productive activities because of the impossibility of compensating the losers.

Figure 1.5 and the econometric analysis in Appendix 1.1 provide support for this suggestion. During the 1990s, productivity rose substantially faster in countries

<sup>7</sup> For an analysis of trends in education and their distributional effects, see IDB (1998-99). Behrman, Duryea and Székely (1999) have analyzed the reasons for slow educational progress in Latin American countries.

Figure 1.6a Institutional Quality



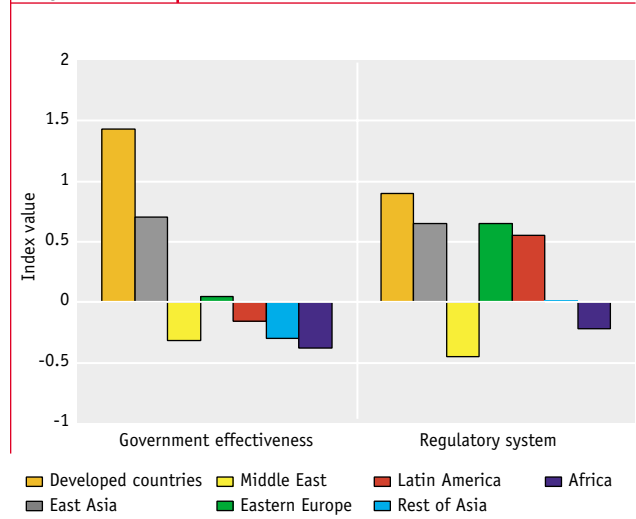
Source: Kaufmann, Kraay and Zoido-Lobaton (1999a).

with better institutions. The institutions indicator used here is the synthetic index developed by the World Bank, which uses information from a variety of sources, giving more weight to those of greater consistency.<sup>8</sup> The index examines four central aspects of the quality of government: the rule of law, the control of corruption, the effectiveness of public administration, and the quality of the regulatory framework. Latin America has serious deficiencies in the first two areas—that is, the degree of respect of citizens and the state for the institutions that govern relations between them. There are also striking deficiencies in the effectiveness of public administration. Most Latin American countries are below the world average in this area due to problems with delivering public services, the efficiency of the bureaucracy, the competence of government employees, political independence of the civil service, and credibility of government policy commitments. The most advanced aspect of institutions in Latin America is the regulatory framework, which covers the legal environment in which markets operate and the degree of government interference in economic decisions. In this regard, the region's indicators are well above the world average, although lower than the averages of the developed countries and East Asia (Figures 1.6a and b).

## Indices of Competitiveness

What factors explain a country's ability to efficiently produce goods and services at international standards

Figure 1.6b Institutional Quality (cont.)



Source: Kaufmann, Kraay and Zoido-Lobaton (1999a).

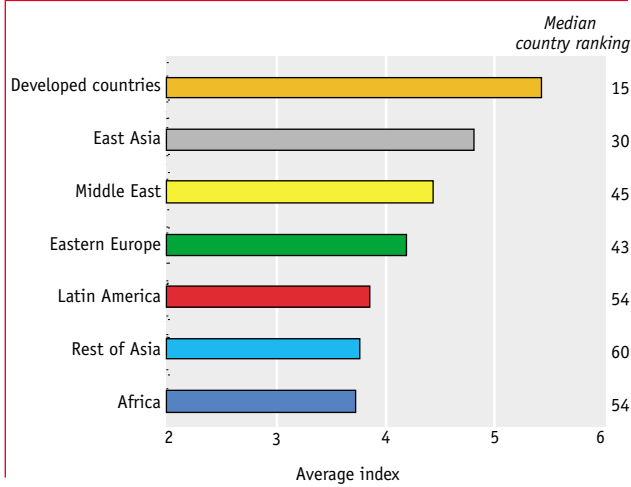
of technology and quality, and consequently raise productivity and incomes? The purpose of competitiveness indicators is to answer this question, and the best-known indicators are those produced by the World Economic Forum and published in *The Global Competitiveness Report*. The 2001 edition of the report states that the three most important factors for competitiveness are the quality of the macroeconomic environment, the quality of public institutions, and technological capacity. In each of these areas, *The Global Competitiveness Report* constructs indices based on a combination of objective information and indicators of the opinions of business leaders (based on surveys of approximately 100 managers per country).<sup>9</sup> The average of the three indices constitutes the competitiveness index, on the basis of which countries are ranked.<sup>10</sup> The rankings are not directly comparable with previous years because the 2001 edition includes new countries. In all, the edition encompasses 75 countries, among them 20 Latin American countries, nine of which did not appear in previous

<sup>8</sup> Kaufmann, Kraay and Zoido-Lobaton (1999a and b). For a description of the main results of these indices in terms of Latin America see IDB (2000, Chapter 1).

<sup>9</sup> Appendix 1.2 lists the variables and methods of construction of the indices and reports the main results for Latin American economies.

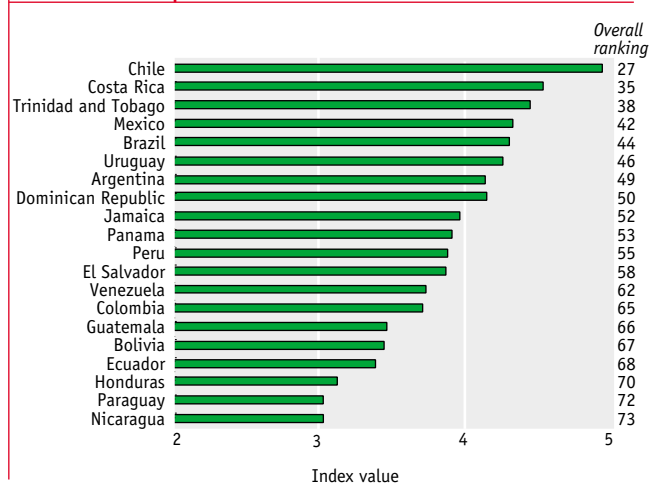
<sup>10</sup> Simple averages of the three indices are used for developing countries. For developed countries and other economies that are important technological innovators, the technology index receives a weighting of 50 percent and the other two indices 25 percent. For economies in technological transition (Hong Kong, Singapore and Ireland), the competitiveness index is an average of the two previous methods.

**Figure 1.7 Growth Competitiveness Index by Region**



Source: World Economic Forum (2001).

**Figure 1.8 Growth Competitiveness Index for Latin America**



Source: World Economic Forum (2001).

editions.<sup>11</sup> Nor are the indices strictly comparable for each country with respect to previous years because of changes in methodology, often substantial ones. For example, the principal areas of the competitiveness index in the 2000 edition were international openness, financing and innovation. Although these important changes reflect the lack of a consolidated methodology, they are in large part the result of the reorganization of a basic body of variables (especially between the areas of finance and the quality of the macroeconomic environment, on the one hand, and between innovation and technological capacity, on the other).

In addition to assembling the variables that enter into the index, *The Global Competitiveness Report* contains objective information and opinions on a wide range of issues related to both the macro environment and the microeconomic dimensions of competitiveness.

Based on the results of *The Global Competitiveness Report* for 2001, Latin America occupies fifth place among the seven major regions of the world in terms of competitiveness, only slightly ahead of the poor countries of Asia and the small group of African countries that are included (see Figure 1.7).<sup>12</sup> Given that the competitiveness index reflects the capacity to produce goods and services according to international standards of technology and quality, it is not surprising that the index tends to reflect countries' income levels.<sup>13</sup> Latin American countries are in intermediate or low positions, due in part to this association. Chile, Costa Rica and

Trinidad and Tobago—relatively high-income countries within the region—occupy the best positions: 27th, 35th and 38th, respectively. At the other extreme, seven of the 11 lowest positions worldwide are occupied by Latin American countries, some of which have very low income levels, such as Honduras and Nicaragua (see Figure 1.8).

In contrast to their extensive association with income levels, indices of competitiveness do not present a high correlation with economic growth.<sup>14</sup> This may seem surprising, given the objective of these indices. The explanation is that what is relevant for growth is the country's conditions of competitiveness *relative to its income level*. In effect, when these conditions are better than expected for an income level, the country in question tends to grow more rapidly, and vice-versa.<sup>15</sup> The countries with the greatest per capita growth dur-

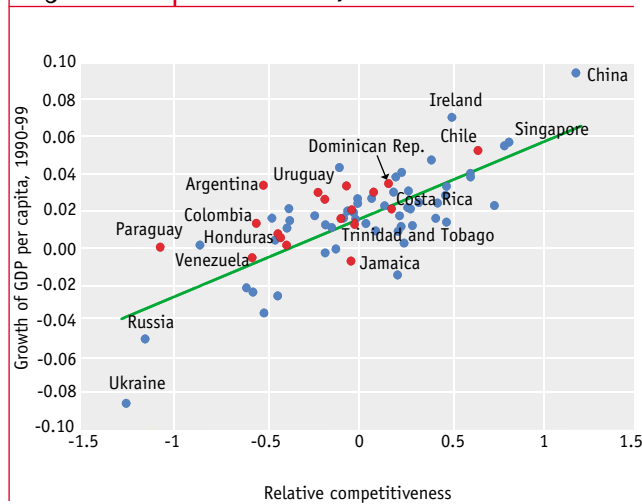
<sup>11</sup> The nine countries are Guatemala, Honduras, Jamaica, Nicaragua, Panama, Paraguay, the Dominican Republic, Trinidad and Tobago, and Uruguay. Their inclusion is the result of a joint effort of the Inter-American Development Bank and the World Economic Forum.

<sup>12</sup> The poor countries of Asia are Bangladesh, China, India, Sri Lanka and Vietnam. The African countries included in the index are Mauritius, Nigeria, South Africa and Zimbabwe.

<sup>13</sup> There is a correlation of 0.91 between the 2001 competitiveness index and per capita income in 1999 dollar parity.

<sup>14</sup> For example, the correlation between the 2001 competitiveness index and growth in per capita income of countries during the 1990s is only 0.28, and over 1997-99 it is 0.34.

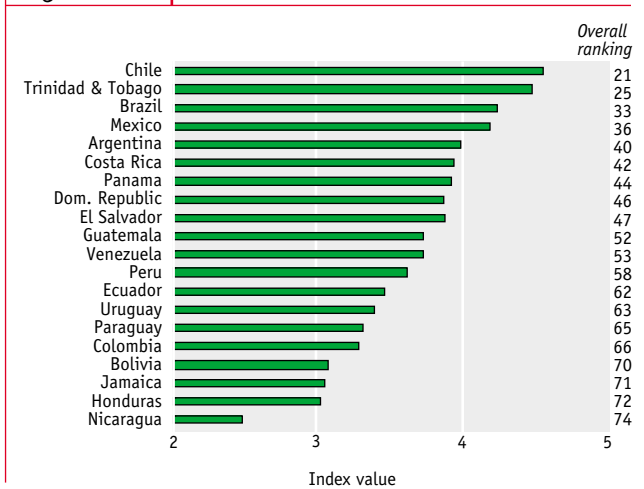
<sup>15</sup> This argument has also been developed by Porter (2000).

**Figure 1.9** Relative Competitiveness and Growth

Note: Each dot represents a country. Latin American countries are shown in red.  
Source: IDB calculations based on World Bank (1999) and World Economic Forum (2001). See Appendix Table 1.3.

ing the 1990s—China, Ireland, Singapore and Chile, whose income levels encompass an extremely wide range—display conditions of competitiveness substantially above what would correspond with their income levels (see Figure 1.9). At the other extreme are several countries of Eastern Europe that performed poorly over the past decade and have very low conditions of competitiveness for their per capita income levels. It is important to note that the relationship between growth and conditions of competitiveness relative to income level is econometrically solid and not due simply to endogeneity between the two variables.<sup>16</sup>

The modest economic growth of Latin American countries in recent years is in keeping with their conditions of competitiveness, which are generally lower than their income levels would suggest. Of the 20 countries included in *The Global Competitiveness Report* for 2001, only Chile presents conditions of competitiveness outstanding for its income level per capita. Nine other countries present conditions approximately equivalent to their income level, while the 10 remaining countries present unfavorable competitiveness conditions (see Table 1.3). The average growth rates of these three groups of countries in the 1990s were 5.3 percent, 1.8 percent and 1.2 percent, respectively, and over 1998-2000 their respective growth rates were 1.4 percent, 2.2 percent and -0.7 percent. Consequently, the patterns of growth among Latin American countries confirm the relevance of competitiveness conditions relative to income level.

**Figure 1.10** Macroeconomic Environment Index

Source: World Economic Forum (2001).

### Quality of the Macroeconomic Environment

The fragile competitive position of most Latin American countries is manifested in the three areas that make up the index of *The Global Competitiveness Report*. Consider the index of the quality of the macroeconomic environment, which summarizes objective indicators of price stability, cost of internal and external financing, tendencies in the real exchange rate, savings rates, and levels of public spending, along with opinions on prospects of recession and ease of access to credit (see the list of variables in Appendix 1.2). When the index was computed in early 2001, Chile and Trinidad and Tobago had the highest positions (21st and 25th), but 16 of 20 countries occupied positions below the world average (see Figure 1.10). If the association between the quality of the macroeconomic environment and income level is isolated, it is found that only Chile, Trinidad and Tobago and Brazil had a relatively favorable macro environment, while eight countries had macro environments that were very adverse to competitiveness. These results indicate that the understandable emphasis the

<sup>16</sup> The relation holds when totally exogenous instruments are used (such as origins of legal codes and geographic factors) in a regression of per capita income growth as a function of competitiveness conditions relative to income (these being, in turn, the residuals of a regression of the competitiveness index of *The Global Competitiveness Report* as a function of the per capita income level). See Appendix 1.3.

Table 1.3 Competitiveness Levels Relative to Income Levels

Country	Growth competitiveness index	Macroeconomic environment index	Public institutions index	Technology index
Chile	Outstanding	Outstanding	Outstanding	Normal
Bolivia	Normal	Deficient	Outstanding	Normal
Brazil	Normal	Outstanding	Deficient	Normal
Costa Rica	Normal	Normal	Normal	Outstanding
Dominican Republic	Normal	Normal	Normal	Outstanding
El Salvador	Normal	Normal	Normal	Normal
Jamaica	Normal	Deficient	Outstanding	Outstanding
Mexico	Normal	Normal	Deficient	Normal
Peru	Normal	Normal	Normal	Deficient
Trinidad and Tobago	Normal	Outstanding	Normal	Deficient
Argentina	Deficient	Deficient	Deficient	Deficient
Colombia	Deficient	Deficient	Deficient	Deficient
Ecuador	Deficient	Normal	Deficient	Deficient
Guatemala	Deficient	Normal	Deficient	Deficient
Honduras	Deficient	Deficient	Deficient	Normal
Nicaragua	Deficient	Deficient	Normal	Normal
Panama	Deficient	Normal	Deficient	Deficient
Paraguay	Deficient	Deficient	Deficient	Deficient
Uruguay	Deficient	Deficient	Normal	Deficient
Venezuela	Deficient	Normal	Deficient	Deficient

Note: In order to classify countries in each of the columns, a regression was made between the values of the corresponding index and the logarithm of the 1999 GDP per capita adjusted by purchasing power parity. Countries that had residuals between 0.5 and  $-0.5$  times the standard error of the regression were classified as average. Those with errors above 0.5 were considered outstanding, and those with errors below  $-0.5$  were classified as deficient.

Source: IDB calculations based on World Economic Forum (2001).

countries of the region have placed on improving their macroeconomic management is still incomplete. While high inflation and major fiscal deficits have been contained, the macroeconomic environment for competitiveness remains adverse. This is due in particular to the high cost of and unstable access to internal and external financing for the private sector, which will be explored in later chapters of this Report. Major swings in market perceptions would imply significant changes in the macroeconomic environment index of *The Global Competitiveness Report*, a point that is particularly relevant to countries such as Argentina and Brazil, where shifting market sentiments since mid-2001 are not fully captured in the index.

### Quality of the Institutional Environment

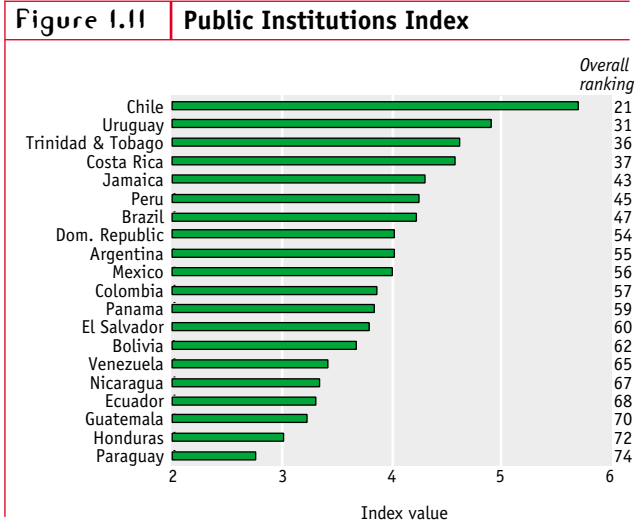
With regard to public institutions, *The Global Competitiveness Report* summarizes the opinions of business communities as to the rule of law and control of corruption. Although only seven questions are used to construct this index, their correlation with recognized indicators

such as those of Kaufmann, Kraay and Zoido-Lobaton (1999a and 1999b) is remarkably high.<sup>17</sup> The foremost positions in the quality of institutional environment in Latin America and the Caribbean are occupied by Chile (21st), Uruguay (31st), Trinidad and Tobago (36th) and Costa Rica (37th), as shown in Figure 1.11. The rest of the countries are in positions below the world average, many of them among the lowest in the world. Taking into account the differences in income levels, only three countries have better relative positions than what could be expected, while nine countries among the 20 Latin American countries present indicators that are highly deficient.

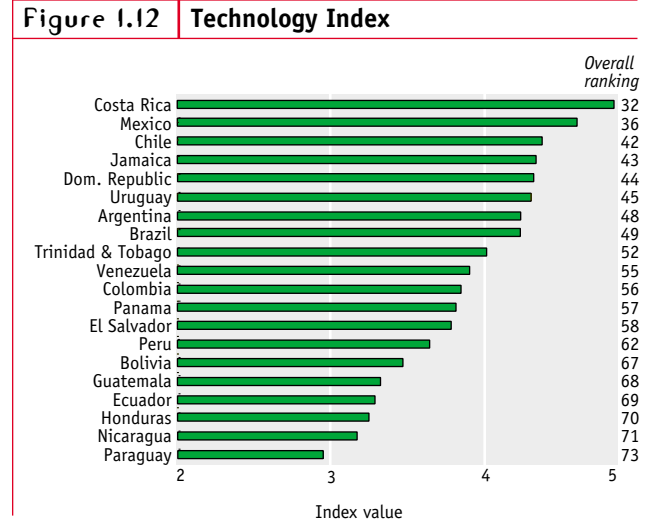
### Technological Capacity

The quality of the environment for technological progress and innovation occupies a prominent place among the

<sup>17</sup> The correlation is 0.92 between indicators of rule of law in both sources, and 0.97 between indicators of corruption.



Source: World Economic Forum (2001).



Source: World Economic Forum (2001).

studies and indicators of *The Global Competitiveness Report*. The technology index was introduced in the 2000 report, and it has been substantially modified in the 2001 edition. The new version combines three sub-indices that measure the quality of the environment for innovation, the capacity to receive international technology and export goods with technological content, and the degree of assimilation of new information and telecommunications technologies. The three sub-indices combine objective information and the opinions of business leaders.

In the technology index, the Latin American countries that occupy the highest positions are Costa Rica (32nd) and Mexico (36th). The rest of the countries are in below-average positions (see Figure 1.12). In isolating the relation between technological capacity and income level, only Costa Rica, the Dominican Republic and Jamaica have a more favorable environment for technological development than would be expected for their income level. On the other hand, 10 of the 20 Latin American countries are in a precarious position for technological development, given their income levels.

In sum, the indices of *The Global Competitiveness Report* confirm that Latin American countries have serious deficiencies in critical areas of competitiveness, such as the quality of the macroeconomic environment, the quality of public institutions, and the ability to assimilate and generate technological change. These deficiencies suggest that most countries of the region currently

are unable to substantially and sustainably raise their productivity and income levels.

It is necessary to caution that the competitiveness indices described here are not exempt from criticism.<sup>18</sup> It can be argued that the indices should be limited to sectors or activities that are directly subject to international competition in order to avoid their dispersion among areas that bear more of a relationship with productivity and growth in general. Without a doubt, that would be the consistent focus of a strict definition of the concept of competitiveness. Even so, the competitiveness of activities that face international competition depends not only on sectoral factors, but also on general factors of the environment that affect other businesses as well. Given the gravity of many of the problems of the macro and institutional environment of developing countries, it is quite possible that the ability to compete internationally depends more on general factors than those that are specific to particular sectors. The evidence we present in the following chapter indicates as well that the seriousness of the problems for business development differs much more among countries than among sectors or types of firms. Consequently, it would prove of little advantage to limit information (objective or subjective) to firms directly exposed to international competition.

<sup>18</sup> See, in particular, Lall (2001).

The index of *The Global Competitiveness Report* can also be criticized for not concentrating on studying the market failures that affect competitive capacity, particularly those factors that influence the creation of dynamic comparative advantages. The rationale for these criticisms is that any competitiveness strategy should ultimately lead to identifying the policies that governments should implement to resolve or take advantage of those failures. Presumably, those actions should be selective among sectors and different between some countries and others according to the characteristics of markets, the capacity of governments, and the social and institutional context. Competitiveness indices do not take these differences into account: they treat all countries in the same manner and maintain a basic focus on freedom of the market. This criticism was much more valid in previous versions of the competitiveness index, when international openness was included as one of the principal areas of competitiveness. In the current version, there is not in strict terms any variable that implies a bias for the freedom of the market, but it is certain that it does not measure the presence or efficacy of active policies that can contribute to taking advantage of externalities and creating comparative advantages.

In the selection and management of information, the competitiveness index can be criticized for the subjective character of a large portion of the information utilized, for the limited selection and the interpretation of various variables, and for the arbitrary weight assigned to the components of the index. Nonetheless, even a critic such as Lall (2001) has observed that “there is a useful role for competitiveness indices to benchmark national performance. Indices can help policy-makers to evaluate the shortcomings of their economies, in the same way that technical benchmarking helps enterprises to assess themselves against rivals and undertake appropriate strategies. Indices can also help investors to allocate resources between countries, researchers to analyze important issues in comparative terms, aid donors and international institutions to judge economic performance, and domestic industries to measure themselves against competitors. The justification for using benchmarks (rather than theoretical norms) is simple: many aspects of performance can only be assessed with reference to actual practice. Theoretical norms are often difficult to construct with the precision needed to allow evaluations in a complex and fast changing world” (pp. 6-7).

## Conclusions

Latin America and the Caribbean face serious problems of competitiveness. If one judges by the results of economic growth and productivity over the past decade, only Africa presents worse results. Rates of accumulation of physical and human capital in Latin America are low, sufficient only to sustain average growth on the order of 4 percent. In the 1990s, growth did not even reach that figure, as declines in productivity in the use of factors in most countries of the region subtracted 0.6 percent from that modest potential. As a consequence of poor productivity, the per capita income gap between Latin America and the developed countries is widening. Gaps in productivity between the rich and poor countries within the region are widening as well. Two factors that appear to be clearly associated with this phenomenon are the educational levels of the workforce and the quality of public institutions. The countries of Latin America present serious deficiencies on both fronts.

The competitive landscape is not much different when judged not by results but by the quality of the conditions that determine countries’ competitiveness. According to the indices of *The Global Competitiveness Report* for 2001, the countries that offer the best conditions are Chile, Costa Rica and Trinidad and Tobago. The remaining countries of the region are below the world average, many of them in the lowest positions among the 75 countries considered. This is not surprising, given the extensive association of these indices with countries’ income levels. The capacity for growth depends not so much on these absolute positions as on their level relative to countries’ incomes. The countries that tend to grow more rapidly are those that have better conditions of competitiveness than what would correspond to their income levels at a given time. Currently, only Chile presents such conditions, while 10 of the 20 countries in the region included in the index have conditions significantly worse than what would correspond to their income levels. The deficiencies originate in the three basic areas considered by the indices: the quality of the macroeconomic environment, the quality of public institutions, and technological capacity. Thus, the region faces a serious challenge in terms of competitiveness: most countries lack the foundation to substantially improve growth in productivity and incomes.

## Appendix I.1 Calculation of Productivity Growth

Data on annual growth of productivity were constructed following the traditional method of breaking down output into contributions of factors and productivity. Productivity was obtained residually starting from a standard production function, and utilizing data on product, labor force, education, and capital by country. The series of productivity and growth rates by decade were obtained through regressions of the annual observations of these variables against a lineal trend, so as to isolate the effects of the business cycle.

The sensitivity of the estimates to variations of the parameters was analyzed to assure that the conclusions on productivity trends were not the result of the assumptions used in the production function and in constructing the series (see Appendix Table 1.1).

### The Production Function

A Cobb-Douglas type production function was used:

$$Y = AK^\alpha (HL)^{1-\alpha}$$

where Y is the output, A is total factor productivity, L the labor force, H human capital and  $\alpha$  the technical coefficient. The calculations presented in the text were carried out assuming an  $\alpha$  of 1/3, the standard value found in the literature. The results also assume an  $\alpha$  of 2/3, a value more in accordance with the national accounts of developing countries.

### Series

Series were used for the 1970–99 period, expressed in 1985 purchasing power parity prices to facilitate comparisons between time periods and between countries. The series of output growth, labor force growth, and investment were drawn from the World Bank's World Development Indicators. The indicator of human capital was the average education of the population over 25, obtained from the Barro-Lee database. Following Hall and Jones (1999), years of education weighted by education returns according to level was used as an alternative index of human capital. The returns were those estimated by Psacharopoulos (1994): 13.4 percent for the first four years, 10.1 percent for the next four, and 8.3 percent from eight years onward. The perpetual inventories method was used for constructing the capital series, assuming a 6 percent depreciation rate. Calculations were also done with a rate of less than 4 percent. Initial capital was constructed by applying to the first year for which investment data are available an equation that relates the capital-output ratio to the per capita income level. This was estimated with cross-sectional data for 1988, the year for which capital data obtained from Hall and Jones (1999) are available.

Appendix I.1-Table I Productivity Growth Estimates in the 1990s

(In percent)

Region	d = 6%, $\alpha = 1/3$ , H = Years		d = 4%, $\alpha = 1/3$ , H = Years		d = 6%, $\alpha = 2/3$ , H = Years		d = 6%, $\alpha = 1/3$ , H = Return		d = 4%, $\alpha = 1/3$ , H = Return		d = 6%, $\alpha = 2/3$ , H = Return	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Developed countries	0.56	0.35	0.45	0.09	0.35	0.17	0.77	0.50	0.66	0.40	0.46	0.30
East Asia	-0.80	-0.53	-0.84	-0.60	-1.88	-2.36	-0.12	-0.37	-0.16	-0.44	-1.55	-2.15
Middle East	-2.00	-1.10	-2.12	-1.23	-0.95	-0.84	-0.86	0.02	-0.99	0.06	-0.38	-0.81
Eastern Europe	0.82	1.03	0.68	0.99	0.24	0.15	1.09	1.29	0.94	1.25	0.37	0.28
Latin America	-0.62	-0.61	-0.67	-0.71	-0.50	-0.27	-0.14	-0.09	-0.19	-0.16	-0.27	0.04
Rest of Asia	0.69	0.18	0.62	0.05	0.26	-0.09	1.38	1.01	1.31	0.93	0.61	0.45
Africa	-1.62	-1.33	-1.81	-1.61	-0.89	-0.62	-0.39	-0.09	-0.66	-0.56	-0.30	-0.16

Notes: d = Annual depreciation rate of fixed capital;  $\alpha$  = capital share in a Cobb-Douglas production function; H = Human capital (measured as either labor force average years of education [years] or average returns of labor force education [return]).

Source: IDB calculations.

Appendix 1.1-Table 2 Productivity, Education and Institutions: Cross-Section Regression Results

Independent variables	Dependent variable: Annual productivity growth			
	Reg. 1	Reg. 2	Reg. 3	Reg. 4
Per capita GDP (log), 1990	0.0145 (-4.42)***	0.0028 (1.79)**		-0.0158 (-3.77)***
<b>Education</b>				
Average years of education, 1990	0.0039 (3.15)***			0.0035 (2.38)***
Excess education given income level in 1990		0.0039 (3.15)***	0.0037 (2.95)***	
<b>Institutions</b>				
Institutional quality index	0.0172 (4.12)***			0.0202 (3.80)***
Excess institutional quality given income level in 1990		0.0172 (4.12)***	0.0190 (4.61)***	
<b>Other control variables</b>				
Exports over GDP, 1990				0.0031 (0.26)
Average inflation rate (1990-99)				0.0009 (0.92)
Investment rate (1990-98 average)				-0.0008 (-0.02)
Constant	0.0902 (4.12)***	-0.0310 (-2.33)***	-0.0075 (-4.17)***	0.1023 (3.00)***
<b>R<sup>2</sup></b>	0.39	0.39	0.37	0.48
<b>No. of observations</b>	85	85	85	64

Notes: t-statistics in parentheses.

\* Significant at the 10% level.

\*\* Significant at the 5% level.

\*\*\* Significant at the 1% level.

## Appendix 1.2. Growth Competitiveness Index<sup>1</sup>

For Technological Core Economies (most developed countries, plus Israel and Taiwan)

$$\begin{aligned} \text{Core GCI} = & 1/2 \text{ Technology Index} \\ & + 1/4 \text{ Public Institutions Index} \\ & + 1/4 \text{ Macroeconomic Environment Index} \end{aligned}$$

For Technological Non-Core Economies (most developing countries, plus Greece and Spain)

$$\begin{aligned} \text{Non-Core GCI} = & 1/3 \text{ Technology Index} \\ & + 1/3 \text{ Public Institutions Index} \\ & + 1/3 \text{ Macroeconomic Environment Index} \end{aligned}$$

For Technological Transition Economies (Hong Kong, Singapore, Ireland)

$$\begin{aligned} \text{Transition GCI} = & 1/2 \text{ Core GCI} + 1/2 \\ & \text{Non-Core GCI} \end{aligned}$$

### A. Macroeconomic Environment Index

$$\begin{aligned} \text{Macroeconomic Environment Index} = & \\ & 1/2 \text{ Macroeconomic Conditions Sub-Index} \\ & + 1/4 \text{ Country Credit Ranking Index} \\ & + 1/4 \text{ General Government Expenditure Index in 2000} \end{aligned}$$

$$\begin{aligned} \text{Macroeconomic Conditions Sub-Index} = & \\ & 3/4 \text{ Macroeconomic Hard Data} \\ & + 1/4 \text{ Macroeconomic Survey Data} \end{aligned}$$

#### Hard Data (all converted to 1 to 7 scale)

- Inflation in 2000
- Lending – borrowing interest rate spread in 2000
- Real exchange rate in 2000 (1990-1995 average = 100)
- General government surplus in 2000
- National savings rate in 2000

<sup>1</sup> Taken from World Economic Forum (2001).

**Country Credit Risk Rating (from Institutional Investor) in March 2001.**

**Survey Data (1 to 7 scale)**

- Is your economy likely to be in a recession next year?
- Has obtaining credit become easier or more difficult in the past year?

**B. Public Institutions Index**

$$\text{Public Institutions Index} = 1/2 \text{ Property and Law} + 1/2 \text{ Corruption}$$

**1. Property and Law Sub-index (1 to 7 scale)**

- Is your government neutral among bidders when deciding upon public contracts?
- Is the judiciary independent from the government and/or parties to dispute?
- Does organized crime impose costs on business?
- Are financial assets and wealth clearly delineated and well protected by law?

**2. Corruption Sub-index (1 to 7 scale)**

- How common are bribes associated with import and export permits?
- How common are bribes associated with connections to public utilities?
- How common are bribes associated with annual tax payments?

**C. Technology Index**

For Technological Core Economies

$$\text{Core Technology Index} = 1/2 \text{ Innovation Index} + 1/2 \text{ ICT Index}$$

For Technological Non-Core Economies

$$\text{Non-Core Technology Index} = 1/8 \text{ Innovation Index} + 3/8 \text{ Technology Transfer Index} + 1/2 \text{ ICT Index}$$

$$\text{1. Innovation Index} = 1/4 \text{ Survey Data} + 3/4 \text{ Hard Data}$$

**Innovation Survey Index (1 to 7 scale)**

- What is your country's position in technology relative to world leaders?
- Does continuous innovation play a major role in generating revenue for your business?
- Do companies in your country spend heavily on R&D relative to international peers?
- What is the intensity of business collaboration in R&D with local universities?

**Innovation Hard Data Index (1 to 7 scale)**

- Gross tertiary enrollment rate in 1997.
- United States utility patents granted per million population in 2000.

**2. Technology Transfer Index (1 to 7 scale)**

- Is foreign direct investment in your country an important source of new technology?
- Technology-in-trade residual in 1999<sup>2</sup>

**3. Information and Communication Technology Index**

$$\text{ICT Index} = 1/3 \text{ ICT Survey Sub-index} + 2/3 \text{ ICT Hard Data Sub-index}$$

**ICT Hard Data Sub-index (Hard data converted to 1 to 7 scale)**

- Number of telephone mainlines per capita
- Number of personal computers per capita
- Number of Internet service providers (ISP) per capita
- Number of Internet users per capita
- Number of mobile telephone users per capita

**ICT Survey Sub-index (1 to 7 scale)**

- Is ICT an overall priority for the government?
- Are government programs successful in promoting the use of ICT?
- Are laws relating to ICT (electronic commerce, digital signatures, consumer protection) well developed and enforced?
- Is competition among ISPs sufficient to ensure high quality, infrequent interruptions and low prices?
- How extensive is Internet access in schools?

<sup>2</sup> Or latest available year. Residual is from the regression of the log of non-primary product exports, as a percentage of GDP, with the logarithm of population as the explanatory variable.

Appendix 1.2- Table 1 Growth Competitiveness of 20 Latin American Countries

	Growth competitive-ness index		Macroeconomic environment index				Public institutions index				Technology index													
	Index	Ranking	Index	Ranking	Sub-Index	Ranking	Index	Ranking	Sub-Index	Ranking	Index	Ranking	Sub-Index	Ranking	Index	Ranking	Sub-Index	Ranking						
Argentina	4.11	49	3.99	40	3.88	51	4.01	55	3.75	50	4.28	55	4.33	48	3.61	6	3.88	34	4.84	39	5.31	38	3.92	47
Bolivia	3.42	67	3.08	70	2.84	73	3.67	62	3.08	62	4.26	56	3.52	67	2.50	30	3.86	35	3.52	65	3.87	64	2.80	74
Brazil	4.26	44	4.24	33	4.50	31	4.21	47	3.97	45	4.45	49	4.33	49	2.66	25	4.17	30	4.86	38	5.04	45	4.49	32
Chile	4.90	27	4.56	21	4.20	40	5.69	21	5.03	26	6.35	13	4.45	42	3.41	10	3.80	38	5.20	32	5.51	34	4.57	29
Colombia	3.68	65	3.29	66	2.94	70	3.85	57	2.96	67	4.73	40	3.92	56	2.39	33	3.78	39	4.40	51	4.62	53	3.95	44
Costa Rica	4.49	35	3.94	42	3.49	58	4.56	37	4.52	35	4.60	43	4.97	32	3.51	8	5.84	5	4.69	42	5.15	41	3.78	52
Dominican Republic	4.11	50	3.87	46	3.21	66	4.02	54	3.59	54	4.46	47	4.42	44	2.78	22	5.50	11	4.02	57	4.10	58	3.86	49
Ecuador	3.36	68	3.45	62	3.75	52	3.30	68	2.70	73	3.91	63	3.33	69	2.25	35	3.31	48	3.62	63	3.88	63	3.11	67
El Salvador	3.84	58	3.87	47	3.30	64	3.79	60	3.11	61	4.47	46	3.86	58	2.08	38	4.37	27	3.93	60	3.92	61	3.93	46
Guatemala	3.44	66	3.73	52	2.84	72	3.22	70	2.31	75	4.12	60	3.38	68	2.00	41	3.66	43	3.50	66	3.77	65	2.97	69
Honduras	3.11	70	3.02	72	3.22	65	3.01	72	2.37	74	3.64	67	3.29	70	1.96	42	3.84	37	3.22	70	3.36	69	2.92	72
Jamaica	3.93	52	3.05	71	3.20	67	4.30	43	3.89	47	4.70	41	4.43	43	2.29	34	4.96	19	4.57	47	4.81	50	4.11	40
Mexico	4.29	42	4.18	36	3.55	57	3.99	56	3.58	55	4.40	52	4.70	36	2.61	28	5.53	9	4.60	46	4.99	46	3.82	51
Nicaragua	3.01	73	2.48	74	2.72	74	3.33	67	2.91	68	3.76	65	3.21	71	1.83	44	3.69	41	3.21	71	3.29	70	3.05	68
Panama	3.88	53	3.92	44	3.95	49	3.83	59	3.41	57	4.26	57	3.89	57	3.24	13	3.32	47	4.48	49	4.79	51	3.86	48
Paraguay	3.01	72	3.31	65	3.18	68	2.75	74	2.72	72	2.77	73	2.98	73	1.74	48	2.62	51	3.56	64	3.90	62	2.89	73
Peru	3.85	55	3.62	58	3.37	62	4.24	45	3.16	60	5.31	30	3.71	62	2.62	27	3.67	42	4.01	58	4.23	55	3.57	59
Trinidad & Tobago	4.40	38	4.48	25	4.66	20	4.63	36	4.15	41	5.10	35	4.10	52	1.94	43	4.09	33	4.64	44	5.11	42	3.71	57
Uruguay	4.22	46	3.38	63	3.02	69	4.89	31	5.01	27	4.78	38	4.40	45	3.03	17	3.85	36	5.15	34	5.62	33	4.21	39
Venezuela	3.70	62	3.73	53	3.32	63	3.40	65	2.76	71	4.05	61	3.98	55	3.01	18	3.60	46	4.51	48	4.85	48	3.84	50

<sup>1</sup> These rankings include non-core and transition economies only.  
Source: World Economic Forum (2001).

## Appendix 1.3 Per Capita GDP Growth and Competitiveness: Cross-Section Regression Results

Independent variables	Dependent variable Annual per capita GDP growth in the 1990s		
	Reg 1	Reg 2	Reg 3
1990 per capita GDP (log)	-0.035 (-7.70)***		
<b>Competitiveness</b>			
Competitiveness index	0.043 (8.50)***		
Excess competitiveness given income level in 1990		0.043 (8.50)***	0.032 (2.60)***
<b>Constant</b>	0.141 (5.55)***	0.016 (7.38)***	0.016 (6.82)***
<b>R<sup>2</sup></b>	0.51	0.50	0.45
<b>No. of observations</b>	72	72	66
<b>Methodology</b>	OLS <sup>1</sup>	OLS	IV <sup>2</sup>

Notes: t-statistics in parentheses.

<sup>1</sup> OLS = Ordinary Least Squares.

<sup>2</sup> IV = Instrumental variables. The instrumental variables in this case are dummies of the legal code origin and percent of tropical area of the country.

\* Significant at the 10% level.

\*\* Significant at the 5% level.

\*\*\* Significant at the 1% level.

