The Macroeconomic Context

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Background paper examining the state of the Andean region for the Andean Competitiveness Project

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INTRODUCTION AND BACKGROUND

In this chapter we review the economic performance of the Andean Region. We adopt a long-term approach to better understand the fundamentals behind the particular behavior of these economies in the last 35 years. The first section describes the overall region's and each country's evolution in comparison to other regions of the world and in different points of time. Some key common factors affecting the Andean economies' development are qualitatively identified. In the second section, a quantitative analysis is presented. We adopt two approaches: sources of growth and growth accounting. The first aims at identifying and measuring the factors that explain the differences in growth rates between the region and other groups of countries. The second approach explores the role of the inputs and technological change in explaining the Andean Region's performance.

LONG-RUN MACROECONOMIC PERFORMANCE

Economic Growth 1965-1999

Figure 1 shows the real GDP per capita in international dollars for each of the Andean countries and for the region as a whole during the period 1965-1999[1]. In the aggregate (i.e. the entire region) some common time-patterns of growth can be identified. Between 1965 and the late 1970s the Andean region grew relatively rapidly, reaching a peak in its level of per capita GDP in 1979. Although Peru deviated from the pattern of rapid growth around 1975, by the beginning of the 1980s it had almost recovered its per capita GDP peak level. Sometime around 1979 the region entered a phase of deep decline in economic activity (until the mid 1980s) that turned into economic stagnation that lasted for about 10 years. This now is commonly referred to as the "lost-decade" for Latin America. The poor performance in these years can be traced back to the accumulation of unsustainable disequilibria in the late 1960s and 1970s. Especially in the last half of the 1970s, the Andean countries rapidly accumulated external debt almost doubling its levels to reach around 52% of GDP in 1980, more than 10 and 20 points higher than the rest of Latin America and Fast Growing Asia, respectively. In the first years of the 1980s terms of trade were badly hit -especially in Bolivia (13.8% in the 1980-1984 period) but also in Ecuador (3.8%) and Peru (3.4%)- and international interest rates jumped to historical records – with US real interest rates raising from an average of less than 1% in the last 5 years of the 1970s to 7.7% in 1981 and 8.3% in 1992-. As a result, budget deficits soared leading to very high rates of

[1] These series are based on the Penn-World Tables 5.6 (for the period 1965-1992) and updated with IMF data (1993-1999, 1999 estimated) from International Financial Statistics 1999 and World Economic Outlook 1999. The figures are expressed in 1985 international prices.

inflation, making obvious the need to correct the disequilibria and stabilize. Stabilization will prove hard to achieve and very expensive in terms of lost growth.

Two countries were able in some degree to escape temporarily from this situation: Colombia and Venezuela. Both very closed economies. Colombia also with a much lower dependence on primary products exports and Venezuela thanks to high oil prices. Although at much slower rates, Colombia was the only country able to maintain positive growth in the decade.

By 1990 the countries in the region had lost between 15% a 31% of their peak-level per capita GDP. Starting in 1990 the Andean region showed signs of recovery. Only Ecuador remained stagnant. However, the recovery proved brief. Following the Mexican and Asian crises, the second half of the 1990s brought with it a new disappointing period. This has been especially true for Ecuador and Venezuela. In fact, only Bolivia has been able to achieve a positive per capita growth in the 1995-1999 period.

It has been 20 years since the region first departed from its sustained growth path. Colombia is the only country that surpassed its late seventies' level of per capita product. No other economy has been able to achieve that. Currently, for the region as a whole, per capita GDP remains 12% lower than its peak in 1979.

Figure 1. Real Gross Domestic Product per Capita
(1985 International Prices)

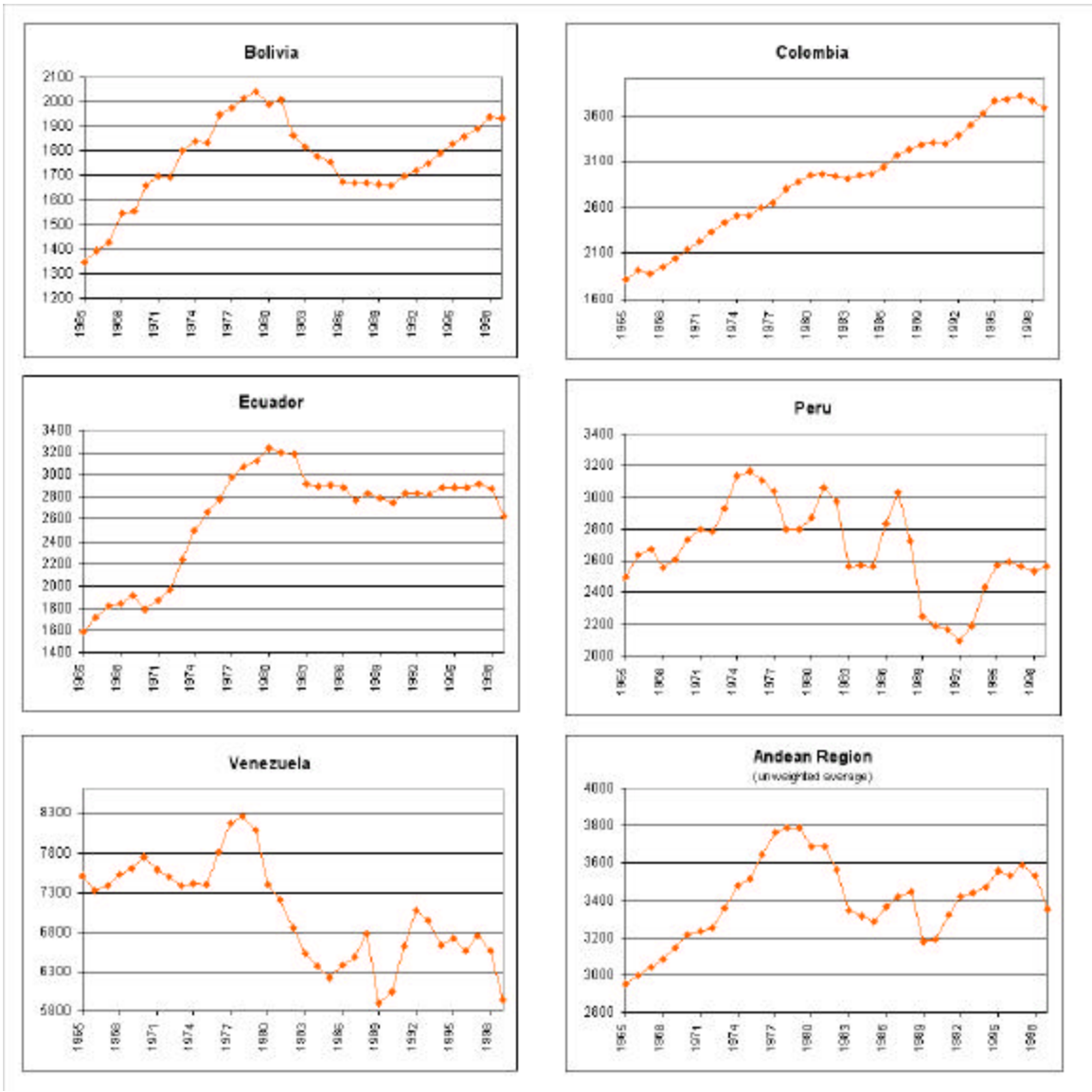
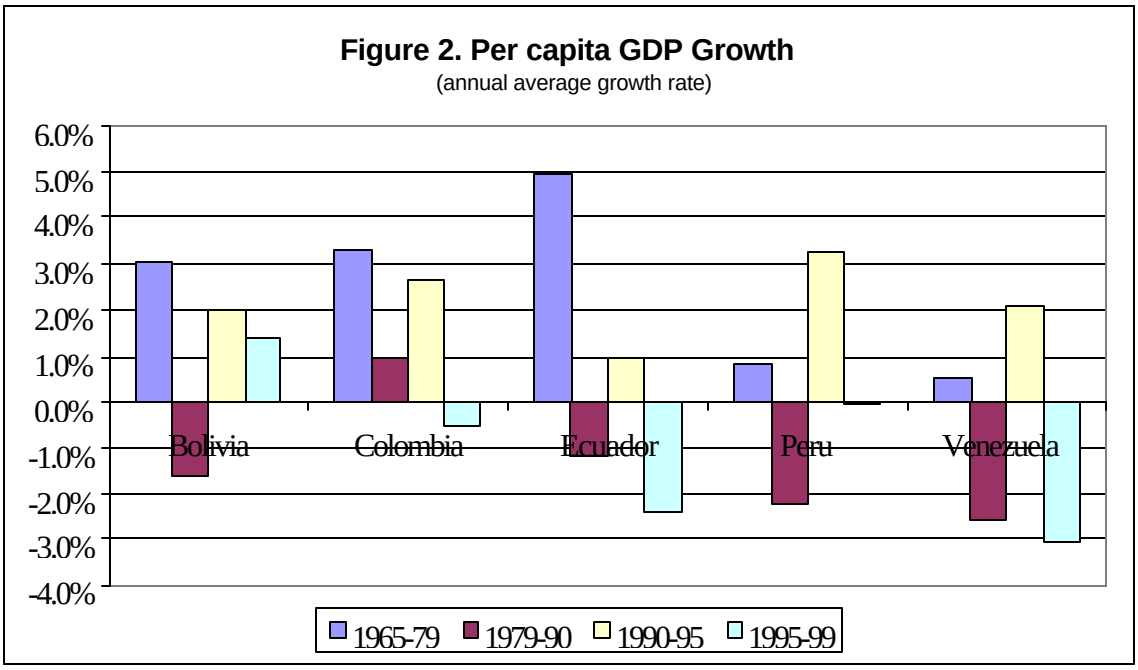


Figure 2 shows the growth rates for each country over four periods. Three things can be inferred from this chart. First, growth rates have not been stable but rather very volatile, especially in the last two decades. Second, there are certain common factors that help explain the macroeconomic performance of the Andean region's countries. In fact, the post-World-War II growth in international trade, the 1980s debt crisis, and the Mexican and Asian crises in the second half of the 90s affected each of the Andean economies. Third, the effects of these external

shocks were different for each country. For instance, while Ecuador suffered an average loss of annual per capita GDP growth of more than 6 percentage points in the 1980s, Colombia lost only around 2 points and kept a positive average rate.



Between 1965 and 1999 the Andean Region's per capita product grew at an average annual rate of 0.82%. Individual performances range between a maximum of 2.09% for Colombia and a minimum of –0.86% for Venezuela. Ecuador, Bolivia, and Peru recorded per capita growth rates of 1.51%, 0.98% and 0.37% per annum, respectively. These rates of growth have been highly disappointing when compared with other regions. Table 1 presents the comparative performance of the Andean region relative to four groups of countries: Rest of Latin America, All Developing Countries, Fast-Growing Asia (China, Hong-Kong, Indonesia, Japan, Korea, Malaysia, Singapore, and Thailand), and the group of Advanced Economies[2].

Over the period we are focusing on and the groups we have defined, there is one clear winner: the Fast-Growing Asian economies (with a per capita growth rate of 4.26% per annum) and one clear looser: the Andean Region (0.36%). The Andean countries' annual per capita growth rate was 2.2 percentage points below that of the Advanced economies, about one point lower than All Developing economies and 0.75 point lower than the rest of Latin America. As a result, its relative per capita output has diminished greatly when compared with any of these groups. In 1965 the region's average per capita GDP was only surpassed by that of the Advanced Countries and was 17% higher than in the rest of Latin America, 67% higher than that of the Asian group and almost twice as high as that of the average developing economy. However, by 1999 it only surpassed the one of the developing countries group and by a mere 35%. Although the Andean averages are highly influenced by Venezuela's high income at the beginning and its

[2] The definition of the developing and developed groups follows IMF's. The sample here comprises 100 countries. Otherwise stated, it varies only slightly in subsequent tables in response to data availability.

subsequently disastrous performance, a similar pattern arises when the comparison excludes this country. The rest of the Andean economies show a slight improvement over the rest of Latin America, and a slight decrease in their relative position with respect to the developing ones. However, the huge relative impoverishment with respect to the Advanced and Asian economies remains: from having almost the same per capita GDP of the Asian economies and around 30% of the one in the rich countries, the Andean region excluding Venezuela now does not reach even a 40% and 20% respectively of these groups' income.

Table 1. Output per Capita in the Andean Region Relative to other Regions

	1965	1980	1990	1995	1999e
A. Relative to Rest of LatinAmerica					
Bolivia	0.53	0.53	0.51	0.50	0.51
Colombia	0.72	0.78	1.02	1.07	1.00
Ecuador	0.63	0.86	0.85	0.83	0.72
Peru	0.99	0.76	0.67	0.76	0.77
Venezuela	2.97	1.96	1.87	1.79	1.52
Andean	1.17	0.98	0.98	0.99	0.90
Excl. Venezuela	0.72	0.73	0.76	0.79	0.75
B. Relative to Fast Growing Asia					
Bolivia	0.76	0.51	0.27	0.24	0.25
Colombia	1.03	0.75	0.54	0.51	0.49
Ecuador	0.90	0.83	0.45	0.39	0.35
Peru	1.41	0.74	0.36	0.36	0.38
Venezuela	4.25	1.89	0.99	0.85	0.74
Andean	1.67	0.94	0.52	0.47	0.44
Excl. Venezuela	1.03	0.71	0.41	0.37	0.37
C. Relative to All Developing Countries					
Bolivia	0.87	0.70	0.76	0.75	0.76
Colombia	1.18	1.03	1.51	1.58	1.50
Ecuador	1.03	1.14	1.26	1.23	1.08
Peru	1.62	1.01	1.00	1.12	1.15
Venezuela	4.86	2.59	2.77	2.66	2.27
Andean	1.91	1.29	1.46	1.47	1.35
Excl. Venezuela	1.17	0.97	1.13	1.17	1.12
D. Relative to Advanced Economies					
Bolivia	0.22	0.20	0.13	0.13	0.13
Colombia	0.29	0.30	0.26	0.28	0.25
Ecuador	0.26	0.33	0.22	0.22	0.18
Peru	0.40	0.29	0.17	0.20	0.19
Venezuela	1.21	0.75	0.48	0.47	0.38
Andean	0.48	0.37	0.25	0.26	0.22
Excl. Venezuela	0.29	0.28	0.20	0.21	0.19

During the 1960s and 1970s, when the Andean Region was performing relatively well in comparison to its historical record, the other regions performed even better. The region's relative position then fell. Despite of this, the Andean countries' average per capita GDP was essentially the same as the one in the Fast-Growing Asia group by 1980. During the 1980s the economies of the region kept the pace with Latin America and regained some terrain relative to the developing nations. However, these were not good news since the developing world was suffering a deep crisis (with an average per capita GDP growth of –2.7% per annum). The Andean countries' relative position again fell rapidly when compared with the other groups. In 1990, the region's per capita output had shrunken to represent around half of that of the Asian economies and one quarter of the advanced ones. The recovery process of the first half the 1990s allowed the region to keep its relative position with respect to all but the Fast-Growing Asia group of countries. However, during the last five years of the decade the loss of relative position continued.

The performance described above for the region as a whole is more or less mimicked by all the Andean Countries. The extreme case is Venezuela, which 1965 per capita GDP was even higher than the average in the Advanced Economies group and more than 4 times the one of both Fast-Growing Asian and All Developing countries. Around 1980, although it reached its highest per capita GDP and remained far wealthier than the Asian Group, its per capita output was then 25% lower than the one of the rich economies. By 1999, Venezuela had only a 38% of the Advanced Economies per capita GDP and was 26% poorer than the Fast-Growing Asian countries. It remains far richer than both the average developing and Latin American country, but the difference has shrunk hugely. In the past 35 years only Colombia has been able to outpace significantly—and therefore improve its relative position with respect to—the groups of developing and Latin American economies. However, when compared with the Asian and the advanced groups, its performance has also been disappointing. Somewhat paradoxically, this same relatively successful country in the last 35 years is the one with the poorer prospectus for future growth rate increase within the region (see growth decomposition section below).

Summarizing, the Andean region's macroeconomic performance can be described as tragic. In fact, in a period in which the average developing country saw its per capita output grow by around 60% and a group of successful Asian economies quadrupled it, the Andean countries on average managed to increase it by only 13% (52% excluding Venezuela). Identifying and understanding the deep roots of this highly disappointing performance is a key element in proposing sound measures to promote sustained future development. For the moment, in the next sections we advance some of the issues that cannot be absent in this discussion.

Natural resources dependence

An important puzzle arising from cross-section economic data is the tendency of resource-poor economies to grow faster than economies with substantial natural resources. The issue has been a recurring theme in the economic history literature for a long time. From the study of the causes of early industrialization in the XIX century to the performance of The Netherlands after natural gas discovery, and certainly also in the context of slow growth rates in Latin America since the Great Depression, the natural resources curse has been extensively argued. It is indeed

a theoretical puzzle for one would expect higher wealth and purchasing power over imports to promote investment and raise growth rates.

Recently Sachs and Warner (1997) have provided evidence on the negative effects of natural resource abundance on growth on a basis of a world wide comparative study. They find a significant negative relation between resources abundance and subsequent economic growth using various measures of the dependent variable and even after controlling for different subsets of initial output, openness, capital accumulation, quality of institutions, global commodities prices shocks, and other classic explanatory variables. Although the estimated coefficient of resources abundance on growth varies with different specifications, the negative effect appears to be robust, both when we consider the growth of the whole economy or the non-resources sector. Moreover, the economic magnitude of the effect is large, implying -for instance- that one standard increase from the mean share of natural resources exports of GDP (16 percentage points from 16%) reduces the annual per capita growth rate by roughly between 0.5 and 1.5 percentage points a year.

These results are consistent with many theories that have been advanced to try to explain this puzzle. In particular it seems highly supportive of Dutch disease models. The explanation in these models focuses on the higher demand –and therefore production and allocation of resources- on the non-tradable goods induced by a greater natural resources endowment. If the forward and backward linkages in the typically tradable manufacturing sector constitute positive externalities in production or learning-by doing processes, a lower allocation of resources to this sector can lead to socially inefficient lower rates of growth.

Table 2. Natural Resources Abundance

(Primary Exports Share, 1970)

	% of GDP	% of Exports
Bolivia	18.5%	96.9%
Colombia	9.4%	93.1%
Ecuador	10.6%	98.3%
Peru	15.3%	99.9%
Venezuela	23.7%	98.4%
Andean Region	15%	97%
Rest of Latin America	12%	81%
Fast-Growing Asia	9%	52%
All Developing Countries	18%	86%
Advanced Economies	6%	32%

Source: Authors calculations based on Sachs and Warner (1997) data.

Table 2 presents the comparative natural resources abundance for the Andean Region's countries and the control groups previously defined. The data are taken from Sachs and Warner (1997), and the figures correspond to the share of natural resources exports (fuel and non-fuel primary products) on Gross Domestic Product and total Exports in 1970.

The first column makes evident the important endowment of natural resources of the developing countries in contrast with the case of the rich economies. Latin America, and specifically the Andean Region, shares with the developing world this high abundance of natural

resources. In particular notice the difference with respect to the successful Asian economies that were poorer in terms of average per capita income than the Andean nations in those days. However, the picture for the individual countries differs significantly. While Venezuela and Bolivia are highly endowed, Colombia and Ecuador were much more alike the Asian and Advanced groups. In terms of Sachs and Warner (1997)'s estimates, only Venezuela would have suffered an important fall in its annual per capita growth rate (of about 0.25 to 0.75 percentage points) due to this abundance.

Nevertheless, when we focus on the share that the exports of primary products represented on total exports (second column), it is evident that the Andean Region has been much more dependent on these natural resources than any other group and than what seems at first sight. In fact, almost all of each country's exports consisted on natural resources. In other words, by 1970 the basic constraint –at least on the medium-term- that these countries faced on the size of the exports sector was their endowment of natural resources. Given that these exports are basically comprised of commodities, these countries growth prospectus were intimately linked to external factors such as the performance of the advanced economies and the world prices for these goods. This is consistent with the cycles the Andean region has experienced throughout the last 30 years. Indeed, the region's highest growth rates (in the 1970s) were experienced precisely in a context of rapid growth in the advanced economies and high commodities prices (specially oil). While the most disappointing periods (the 1980s and the last half of the 1990s) have been the accompanied by relatively low international prices.

Moreover, Andean exports are not only very intensive in natural resources, but also heavily concentrated in a few of those products. The most dramatic case is that of Venezuela whose oil sales represented more than 90% of total exports until the mid-1980s. However, export diversification is also very low for the other Andean countries with the top four groups of products[3] representing 82.5%, 62.5%, 54.4%, and 46.6% of total exports in Ecuador, Peru, Colombia and Bolivia, respectively. The deep dependence of the Andean Region to natural resources is, therefore, a key factor to understand both its cyclic and growth performance since 1965.

Fortunately, although the share of primary in total exports in the Andean Region has remained very high, it has declined to 83% by the mid 1990s. Moreover, there has been a dramatic increase in export diversification in each of the Andean countries, especially since the mid 1980s. (For a detailed exposition on these matters, please refer to the Trade and Exports chapter).

Financial Development

Until recently, the relationship between financial development and economic growth had been greatly understated by the development literature. Moreover there has been lack of agreement among economists both on weather the relation is important and on causality[4]. The role of financial systems in economic growth can be better understood by the ties between

[3] At a 2-digit SITC level.

[4] For an extensive discussion on both the theoretical and empirical links between financial development and growth, please refer to Levine (1996).

growth and the quality of the functions provided by the financial system. Among these functions we can identify the management of the risks in the economy, the allocation of resources, the monitoring of managers and corporate control, and the exchange services. The efficiency with which financial systems accomplish these tasks can have important effects on growth rates.

During the last five years a new wave of literature has tried to understand both the determinants of financial development and its effects on growth. Following the seminal work by Goldsmith (1969), Levine et. al. (1999) address both issues within the context of cross-section country regressions. Their findings strongly support the hypothesis that financial development exerts a statistically significant and economically large impact on economic growth. Furthermore, the analysis appears robust both to different measures of the dependent variable and conditioning sets. Regarding the causes of financial development, they report a positive effect of legal rights of creditors, the efficiency of contracts enforcement and the existence of good accounting systems standards.

From the microeconomic stand-point, Rajan and Zingales (1998) report that industrial sectors that are relatively more in need of external finance develop disproportionately faster in countries with more developed financial markets. Similarly, Wurgler (2000) shows that countries with large financial markets increase investment more in their growing industries, and decrease more in their declining industries, than those with small financial markets. These studies then suggest two ways in which financial underdevelopment can have a negative effect on growth: the relative stagnation of finance intensive sectors and the failure to allocate resources efficiently.

New results, therefore, increasingly point out the importance of the development of financial markets for growth. And not just for growth, but also in the way countries are differently affected by external crisis [5].

Table 3. Financial Development 1960-1995

(Credit to Private Sector as % of GDP)

	1960-65	1965-70	1970-75	1975-80	1980-85	1985-90	1990-95
Bolivia	3.7%	7.0%	8.7%	13.9%	9.8%	14.5%	36.6%
Colombia	19.8%	17.7%	15.0%	24.9%	27.6%	12.7%	30.0%
Ecuador	18.4%	17.1%	15.8%	17.6%	20.8%	17.3%	18.8%
Peru	16.2%	16.5%	18.2%	12.6%	13.5%	7.4%	8.5%
Venezuela	17.8%	24.7%	30.4%	48.3%	55.8%	39.4%	18.5%
Andean Region	15.2%	16.6%	17.6%	23.4%	25.5%	18.3%	22.5%
Rest of Latin America	13.1%	15.1%	20.9%	24.6%	28.8%	24.9%	27.4%
Fast-Growing Asia	29.3%	27.8%	43.5%	48.9%	55.2%	71.6%	94.2%
All Developing Countries	13.3%	15.6%	18.4%	22.4%	25.5%	24.2%	26.8%
Advanced Economies	45.5%	52.2%	59.3%	65.7%	72.7%	82.8%	95.2%

Source: Beck, Demirguc-Kunt and Levine (1999).

[5] In the theoretical side see, for instance, Caballero and Krishnamurthy (2000). In the empirical side, see Johnson et al. (1999).

Table 3 presents the degree of financial development in the Andean countries and the control groups for the 1960-1995 period. The private credit to GDP index aims at establishing the intensity with which the formal financial system intermediates the resources of the economy. Despite of being a noisy measure for various reasons, we choose it because it is readily available for most countries since 1960 and has proven to be highly significant in explaining growth differences across countries.

As can be seen, the degree of development of the financial sector in the Andean Region of the 1960s was very similar to that of the rest of Latin America and All Developing Countries. Despite being somewhat lower than in the Asian economies, the difference was small when compared with what would become later. During the next fife-teen years, the financial system developed rapidly in Asia and the developed world, a phenomenon that - although at a much lower pace- would be shared with Latin America and the developing countries. However, the index for the Andean Region as a whole remained stagnant. The first wave of liberalizing reforms during the second half of the 1970s coupled with the massive capital inflows of the late 1970s allowed the region to catch up with the rest of the developing countries. The debt crisis stopped the process of financial development all over Latin America and –to a lesser degree- in the other developing countries. The Andean countries were specially affected. While the other poor economies managed to recover their pre-crisis levels of financial development by the end of the 1980s, the average Andean economy had not done it even by the first half of the 1990s. A second round of reforms -basically in the last five years- has achieved important results, however the region as a whole still has not been able to catch-up with the rest of the poor countries, while the difference with respect to the fast growing Asian and Developed economies has grown hugely. Once again the Andean Region appears as the worst performing group among those studied.

Although in general terms all Andean countries fit the description above for the region as a whole, there is some variation of performance across them. Bolivia, which begun with an almost inexistent financial market, has been able to surpass the other economies of the region thanks to its successful performance -shared with Colombia- during the 1990s. However, both economies still fit easily into the poorly developed financial system category. The experiences of Peru and Venezuela have been especially dramatic. Peru has seen its index falling to half the value it had during the 1960s and 1970s, while Venezuela, after achieving a degree of financial development similar to that of the Asian economies between 1975 and 1985, has seen falling its index continuously with no evident signs of recovery.

The poor results in terms of financial development spread across the entire financial industry. The region's stock markets are not only very small –on average, market capitalization represents 14.2% of GDP, well below the figure of 122% for the US and also much lower than in the leading markets in Latin America-, but also highly illiquid –with turn-over ratios that range between 0.4% and 31.5%-. Both the insurance industry and the market for private bonds are, for all practical matters, inexistent. And the banking system is highly concentrated and very costly –with overhead costs twice those in the US and an average net interest margin of 7.4%-. The bank industry has also proven to be very unstable playing a key role on explaining and magnifying the effects of external as well as internal crisis. In fact, every Andean country has seen at least one (and usually more) systemic banking crisis in the last 15 years, while especially for Ecuador and Venezuela this is still pretty much an ongoing process.

The important financial backwardness of the region can be traced back to the pervasive legal environment in which the capital markets function in these countries. The creditor rights index computed by Levine et. al. (1999) -which is supposed to capture the ability of financial intermediaries to persuade firms to pay their loans- takes an average value of –1 in the Andean zone, in a scale between 1 (best) and –2 (worst). This figure is similar to that in the rest of Latin America but much lower than in the average developing country (-0.3). The efficiency in enforcing contracts and the quality of accounting standards are also much lower than the average in the developing world and than in any other group. The high and variable inflation rates, the important participation of the public sector in the region's local capital markets, and poor regulation have certainly all contributed to explain this situation. It can be easily argued that most of these factors affect growth not only through a less developed financial system, but also in a direct way.

CROSS-COUNTRY EVIDENCE ON THE DETERMINANTS OF ECONOMIC GROWTH AND THE ANDEAN REGION GROWTH PERFORMANCE

In this section we conduct an exercise with the goal of identifying some of the key factors that help explain the relatively poor macroeconomic performance of the Andean countries since 1965. We adopted a long-term growth perspective in order to focus on those elements that can be thought to be of structural nature. The analysis is based on the growth regressions framework. In the first stage a long-term growth model is matched with cross-country data for the period 1965-1990 in order to identify and estimate the importance of the different growth determinants. Having accepted that the model fits the data relatively well -specially for the Andean region-, the second stage decomposes these countries' predicted growth on its determinants. This allows us to answer the question: which factors actually explain the relatively low rate of growth of each Andean country and the region as a whole?

Cross-country Economic Growth: Empirical Evidence

The framework that we use is similar to the one popularized by Barro and Sala-i-Martin (1995) and is based on the following expression:

$$Dy = f(y_{-1}, \mathbf{x})$$

where Dy is the growth rate of income per capita in a given period, y_{-1} is the income per capita in the initial year, and $\mathbf{x}$ is a vector of determinants of the steady state income level. The vector $\mathbf{x}$ may include a series of economic, politic, climate, geographic, and/or institutional variables, which are expected to affect the relative position of an economy's steady state. These variables enter usually in two different formats, either as beginning-of-period variables or as period averages. These variables are supposed to affect the position of the steady state level of an economy's income per capita. However, the underlying neoclassical economic-growth model pertains to output per worker. Given that output per capita is a preferable measure of welfare we keep it as the variable to be explained, but we account for this discrepancy adding to the explanatory variables the growth rate of both workers and total population, and taking y_{-1} to be the initial level of per worker GDP.

Table 4 shows the results of the growth equation estimation in its logarithmic form for a sample of 84 countries for the 1965-1995 period. Each of the coefficients appears with the expected sign and is significant at a 5% level[6]. The model explains almost three quarters of the growth rate differential across countries.

Although the coefficients of population and labor force growth are not of equal magnitude but opposite sign as implied by the correction mentioned above, the difference between them is not statically significant. The coefficient of the log of initial level of per worker GDP once again confirms the conditional convergence hypothesis around a value of approximately 1.5% per year. The importance of health, and more generally, human capital factors is stressed by the negative coefficient associated to the log of initial life expectancy at birth. In fact, 10 more years of life expectancy at the beginning of the period imply on average that the annual growth rate will be around 0.5 points higher, *ceteris paribus.* More striking, having an open instead of a closed economy is associated with between 1.5 and 2 points higher growth rate. Also, climate factors are important determinants of long-term growth. For instance, the difficulties that bring the tropical climate on average diminish the growth rate by almost 1 percentage point a year. The degree of Natural Resources Intensity is also a key factor in explaining long-term growth rate differentials. Finally, the quality of the country's institutions affects hugely economic performance.

Table 4. Cross-Country Growth Regression

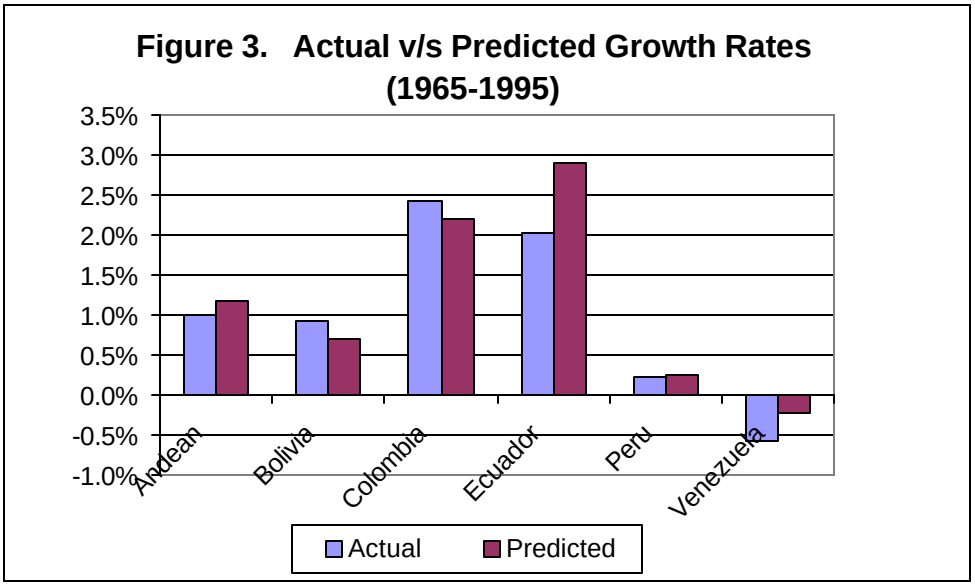
Independent Variables	**Coeficient**	**Std. Dev.**
Log GDP per worker on 1965	-0.0146	0.0026
Log Life Expectancy at Birth on 1965	0.0278	0.0131
Working-age Population growth rate 1965-1995	2.7892	0.4659
Total Population growth rate 1965-1995	-2.5268	0.5523
Trade Openness	0.0166	0.0041
Climate	0.0100	0.0047
Natural Resources Intensity	-0.0313	0.0143
Quality of Institutions Index	0.0019	0.0009
Constant	-0.1059	0.0513
R2	0.734	
Adj R2	0.705	
# of Observations	84	

The dependent variable corresponds to the average annual per capita growth rates computed using the Penn World Tables 5.6 (PWT) for the 1965-1992 period and data from World Development Indicators 1999 (WDI) afterwards. The same sources are used to compute the population growth rates. The initial level of per worker GDP comes from PWT and is measured in PPP terms. The trade openness variable corresponds to Sachs and Warner (1995)'s dummy. Natural Resources Intensity corresponds to primary products exports over GDP and comes from Sachs and Warner (1997). The Quality of Institutions Index is computed as the simple average of five sub indexes developed by Political Risk Services: rule of law, bureaucratic quality, corruption in government, risk of expropriation, and government repudiation of contracts. The climate variable comes from Gallup, Sachs and Mellinger (1999).

Figure 3 presents a comparison between the actual growth rate of the Andean region and each particular country, and the rate predicted by the estimated equation in the period 1965-1995.

[6] The description of each variable and the sources of the data are described at the bottom of Table 5.

The estimated model explains quite well the effective pattern of growth for the region as a whole. It also provides a relatively good description of individual countries' performance. Overall, the results do not suggest that the Andean countries grew significantly faster or slower than we would have expected. In that sense, we can think that there is no common factor affecting these economies' growth that is being left aside. Taking into consideration these results we proceed with the growth decomposition exercise.



Growth Decomposition: An Exercise

So far we have identified some of the factors that have influenced economic growth rates in a wide sample of countries and accepted that they provide a relatively good description in particular for the Andean region's growth experience. However, we want to assess the relative importance of each factor for the countries under study. With that purpose in mind, we conduct a sources-of-growth decomposition analysis.

The approach that we use is as follows. First, we define a number of regions that will serve as reference points. Second, we compute the contribution of each independent variable in explaining the difference in growth rates between two given regions by using the following expression:

$$\Delta y_{i,j} = \beta_i (x_{i,j} - x_{i,AR})$$

where $\Delta y_{i,j}$ is the contribution of factor i to explaining the difference in growth rates between region j and the Andean Region *(AR)*, β_i is the estimated coefficient associated to variable i, and $x_{i,j}$ ($x_{i,CA}$) is the average value of variable i in region j (Andean Region).

We use the same control groups defined in the previous section: Rest of Latin America, All Developing Countries, Fast-Growing Asia, and Developed Economies[7]. Table 5 compares the

[7] Within the groups defined, only the countries actually included in the regression are considered.

average values of the dependent and explanatory variables for the Andean region and each of the control groups.

Table 5. Average Values of Explanatory and Dependent Variables

	Andean Countries	Rest of Latin America	Fast-Growing Asia	All Developing Countries	Advanced Economies
Log GDP per worker on 1965	1.5173	1.4332	0.9095	0.8694	2.2017
Log Life Expectancy at Birth on 1965	4.0080	4.0739	4.0145	3.9136	4.2551
Working-age Population growth rate 1965-1995	0.0296	0.0250	0.0231	0.0278	0.0110
Total Population growth rate 1965-1995	0.0251	0.0212	0.0177	0.0253	0.0082
Trade Openness	0.3692	0.1051	0.7115	0.1558	0.9308
Climate	0.0000	0.1513	0.2813	0.1180	0.8480
Natural Resources Intensity	0.1548	0.1194	0.0916	0.1418	0.0610
Quality of Institutions Index	4.3557	4.4710	6.4592	4.5933	8.8036
# of Observations	**5**	**15**	**8**	**59**	**25**

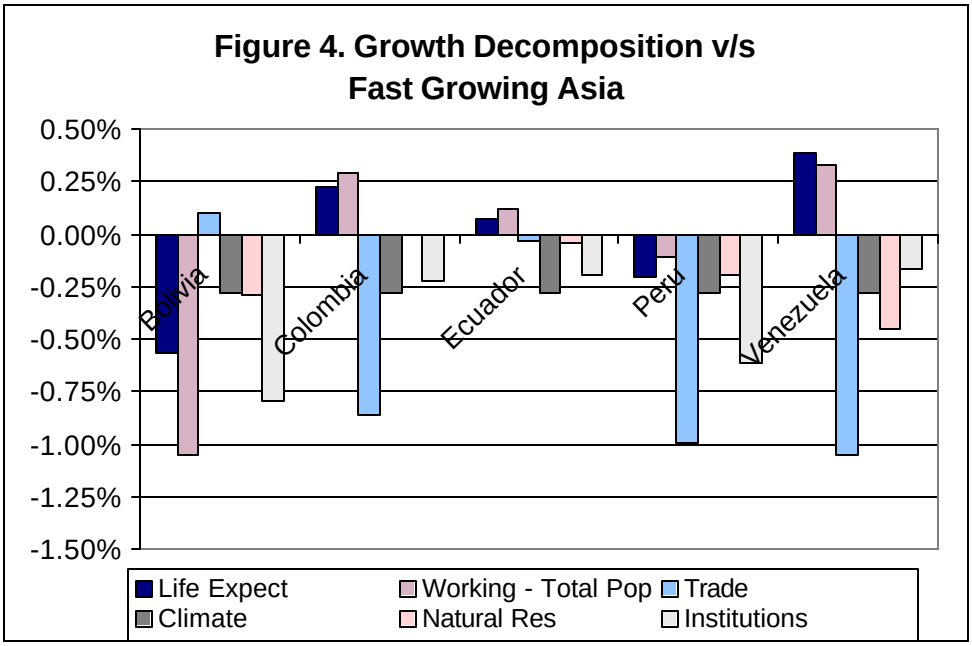
The initial level of the region's GDP per worker appears to be higher than the other groups, except for the developed economies. This fact implies a lower growth rate because of the conditional convergence effect. However, given the nature of this particular variable it will not be considered in the analysis that follows and, therefore, the growth decomposition analysis will control for the differences on the initial positions. The life expectancy at birth figure of 55 years in 1965 was in line with the rest of the developing world but around 15 years lower than in the rich countries. On average the region has been much more open than the rest of Latin America and the Developing countries, although the differences between the Andean countries were huge (with Bolivia and Ecuador having been almost all the time opened to international trade and Colombia, Peru and Venezuela pretty closed). In any event, the openness index contrasts with those high values of Fast-Growing Asia and the advanced economies. The Andean region's tropical climate condition is shared to a lesser extent with the Rest of Latin America and the Developing Countries. The quality of the Andean countries' institutions was not particularly different than those of Latin America and the Developing Countries but much lower than those of Asia and the rich nations. The dependence on primary exports appears much stronger in the Andean Region that in the rest of Latin America, the Fast-Growing Asian economies and, especially the advanced nations. Finally, there are no big differences in terms of total and workers' population growth among the poor countries.

Table 6 presents the results of the growth-decomposition analysis that we have been describing. We decompose the difference between the Region's and the control groups' predicted growth rates onto the factors explaining them, controlling for the different initial per capita incomes.

Table 6. Growth Decomposition for the Andean Region

	Rest of Latin America	Fast-Growing Asia	All Developing Countries	Advanced Economies
Log Life Expectancy at Birth on 1965	-0.18%	-0.02%	0.26%	-0.69%
Working-age Population growth rate 1965-1995	1.27%	1.79%	0.49%	5.19%
Total Population growth rate 1965-1995	-1.00%	-1.88%	0.04%	-4.29%
Trade Openness	0.44%	-0.57%	0.36%	-0.93%
Climate	-0.15%	-0.28%	-0.12%	-0.85%
Natural Resources Intensity	-0.11%	-0.20%	-0.04%	-0.29%
Quality of Institutions Index	-0.02%	-0.40%	-0.05%	-0.85%
Gap Explained	**0.24%**	**-1.55%**	**0.95%**	**-2.71%**

The analysis shows that when compared to the rest of Latin America and all the developing countries, the Andean economies' poor performance was mainly driven by their higher initial level of per capita GDP. However, the adverse climatic conditions and -to a lesser extent- the greater natural resources intensity and lower quality of its institutions, are responsible for the lower rates of growth exhibited, when controlling by initial income. The degree of openness to international trade actually helped these economies when compared to the much-closed Latin American and developing groups. But the effect is greatly reduced when we take into account the fact that almost exclusively primary products comprised the exports of the Andean countries.



When we compare with the Fast-Growing (see Figure 4) and Advanced Economies, the reasons for the Andean performance make themselves evident. The relative closeness to trade is the single more important factor in explaining the differences of growth rates. In fact, it accounts for almost one full percentage point of lower annual growth rate when compared with the rich

nations. The high natural resources intensity, the tropical condition and the poor quality of the Andean Region's institutions appear also as key negative factors. Although these negative factors are present in all the Andean countries, their relative importance varies greatly. The relative closeness was much more important in Colombia, Peru and Venezuela. The poor quality of institutions was more pervasive in Peru and Bolivia. Finally, while the primary products dependence had little effect in Colombia, it was very strong in Venezuela.

The Future

The growth decomposition analysis can also share some light on the effects of recent policy changes on the medium-term prospectus of these economies. In comparison to the 1965-1995 period, the Andean countries are now far more open to international trade. In fact, currently all of the region's countries can be classified as having open economies, in contrast with the 1965-1990 period in which, on average, the region kept open less than 40% of the time. This factor alone could increase the average per capita GDP growth by as much as 1% a year if the tendency to liberalize trade is not reversed in the years to come. In addition, the important investment done in human capital (proxy here by the changes in life expectancy) could represent another 0.6 points of higher growth. In contrast with these important achievements, the Andean economies have demonstrated a persistent inability in addressing the natural resources intensity issue and improving the quality of their institutions. In fact, the quality of institution index has even deteriorated with respect to that of the 1980s, especially in the case of Colombia, Ecuador and Venezuela. If these problems are not tackled soon, it could mean a future with half of a percentage point loss of yearly growth with respect to the past 30 years. However, the advances made on liberalizing international trade and increasing human capital formation should be more than enough to offset the failures in the other areas, so that the prospectus of economic performance are greatly increased anyway.

It has to be pointed out, however, that the predicted improvement distributes unevenly among the Andean Countries. It does not reach Colombia and is very small for Ecuador. This is basically due to the worsening of their institutions, and the even greater dependence to natural resources in the case of Ecuador, that have offset the gains from liberalizing trade. Among the rest of the economies, Peru appears with the biggest improvement thanks primarily to having been able to abandon its inward-looking policies and to achieve a dramatic increase in life expectancy.

For the Andean region as a whole, the predicted annual per capita growth rate of 2.3% for the next 30 years doubles the performance since 1965. The bold improvement in the prospectus for the region cannot lead us to conformity for two reasons. First, the predicted rate of growth is still low implying, for instance, that it will take more than one generation (approximately 30 years) for the average economy in the region to double its current per capita GDP. Second, there still remain many challenges (such us the consolidation of the liberalizing reforms made in the past and addressing the forgotten issues) and new ones have been added lately (such as how to compete in an increasingly globalized world economy or to take advantage of the technological revolution).

GROWTH ACCOUNTING

In this section we report some results on growth accounting exercises for the Andean Region. This analysis complements the growth decomposition exercise in that links the factors affecting growth to the availability and accumulation of the different inputs and the efficiency with which they are used. This method, pioneered by Solow (1957), aims to break down the growth rate of aggregate output into contributions of inputs and the advancement of technology[8]. In its simplest form, the analysis starts from a standard neoclassical function assuming output-augmenting technology (Hicks neutral):

$$Y(t) = A(t) \cdot F\left[K(t), L(t)\right],$$

where *A(t)* is an index of the level of technology -usually called Total Factor Productivity (TFP)- and where *K(t)* and *L(t)* are the capital and the labor input, respectively. Assuming competitive factor markets and constant returns to scale, we can write the growth rate of output as:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \alpha(t) \cdot \frac{\dot{K}}{K} + \left[1 - \alpha(t)\right] \cdot \frac{\dot{L}}{L}.$$

That is, the growth rate of aggregate output is a weighted average of the growth rates of the two inputs, where the weights are the corresponding inputs shares in total income. In applied work, it is usual to further assume that the aggregate production function can be described by a Cobb-Douglass technology, so that these shares are constant over time, and to use some estimate for the contribution of capital (usually between 0.4 and 0.45). Although the inputs in the production function should be interpreted as physical quantities effectively used on production, data availability usually only allows the estimation of the aggregate stock of each factor. Physical capital is normally computed based on investment using the perpetual-inventory method, while labor is assumed to be the labor force. The method is sometimes extended to allow for changes in the quality of the inputs.

Total factor productivity is computed as the residual between real output growth and the contribution of inputs growth. Therefore, it should be used carefully to make inferences because, in general, it will include all measurement errors. In terms of its interpretation, it should not be taken narrowly to account only for technical progress. In a broader sense, it accounts for everything that affects output and is not directly related to physical capital or labor. In particular, the changes in TFP include natural resources discoveries, innovation in the technological processes and, most importantly, economic policy shifts.

De Gregorio and Lee (1999) conducted a growth accounting exercise for Latin American countries for the period 1960-1990. They used a physical capital share of 0.4. Physical capital stock was computed by the perpetual-inventory method and the labor input corresponds to the total labor force. Table 7 summarizes the results and provides a comparison with estimates for the Rest of Latin America, the Advanced Economies and the Fast-Growing Asian Countries[9].

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[8] For a description of the growth accounting method, please refer to Barro and Sala-I-Martin (1995), Chapter 10.

[9] The figures for the Advanced Economies (Canada, France, Germany, Italy, Japan, U.K. and U.S.) and Fast-Growing Asian Countries (Hong Kong, Singapore, Korea and Taiwan) are simple averages taken from the compilation made by Barro and Sala-I-Martin (1995), Table 10.8. The study for the Asian economies covers only

Table 7: Growth Accounting 1960-1990

	Annual GDP Growth	Contribution from Capital	Contribution from Labor	TFP Growth Rate
Bolivia	3.9%	1.4%	1.3%	1.2%
Colombia	4.7%	1.8%	1.6%	1.3%
Ecuador	5.2%	2.1%	1.6%	1.6%
Peru	2.9%	1.6%	1.6%	-0.2%
Venezuela	3.2%	1.5%	2.2%	-0.5%
Andean Region	4.0%	1.7%	1.7%	0.7%
Rest of Latin America	3.3%	2.0%	1.4%	-0.1%
Fast-Growing Asia	8.8%	4.4%	3.2%	1.2%
Advanced Economies	3.9%	2.1%	0.5%	1.3%

Source: Authors' calculations based on De Gregorio and Lee (1999) and Barro and Sala-I-Martin (1995).

Physical capital accumulation has been the driving force behind GDP growth in the period. Only in the Andean Region the contribution of labor has been similarly important. The Andean group of economies was pretty much left aside the shift to higher capital-intensive production processes most of the world was embarked in. In fact, while the advanced nations and the Fast-Growing Asian economies almost tripled and more than quadrupled (respectively) their capital intensity, the Andean Region managed only to expand it by slightly more than 50%, much slower than in the rest of Latin America[10]. The picture is similar for every country in the region. The extreme case is Venezuela in which capital intensity remained constant in the 30-year period.

In fact, the relative scarcity of physical with respect to human capital is a salient feature shared by many developing countries today (most of Latin America and Eastern Europe) and some developed countries in the past (for instance, post-world war western Europe, Japan in the 1950s and the fast growing Asian economies since the 1970s). In the case of the developing countries, one can think that poor economic policies are at the center of the problem. There are, at least, three reasons that support that. First, physical capital is typically less durable and much more mobile than human capital, allowing it to escape more easily to poor economic policies. Second, the distortions caused by these policies affect both the return and the opportunity cost of the investment on human capital. And third, education tends to be highly subsided by the state and this subsidy is usually stable even when economic performance is relatively poor. Then, it is by no means a chance that following decades of poor economic policies the economies will end up with a low ratio of physical to human capital. Once the policies are corrected, large capital inflows to these economies are then an equilibrium phenomenon that responds to higher returns to physical capital relative to the rest of the world and especially to the industrial countries. This represents good news but also calls for some warnings. As Braun and Braun (1999) show, a growth model built around these ideas predicts much higher convergence rates than the neoclassical model does, and a rapidly raising price for human capital (or wages). However, it also predicts large current account deficits. The role of local capital markets in these conditions

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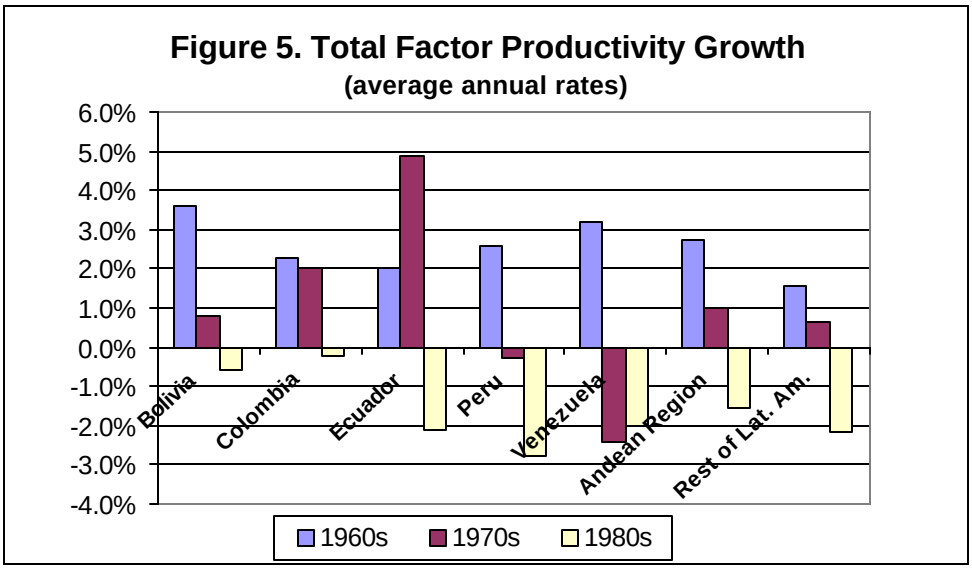
the period 1966-1990. The inputs shares vary by country. For Rest of Latin America (which includes 17 countries), we take the simple average of the figures reported by De Gregorio and Lee (1999).

[10] We point out that these figures overstate the change in capital intensity in terms of effective labor or human capital because increases in labor quality have not been considered.

is, then, of great importance for they assign those capital flows across sectors and individuals in the economy. The mixture of fragile financial institutions and international financial integration has indeed proven to be sometimes disastrous. This calls for urgency in the strengthening of currently poorly developed financial systems in the Andean Region to take advantage of the rapid growth opportunity.

Total factor productivity has also contributed a lot in the Advanced Economies and added more than one percentage point of annual growth in the Asian countries. In contrast with the rest of Latin American countries, the Andean ones managed to increase their TFP, although at a smaller pace than the successful Asian and the rich nations. However, individual behavior varies significantly. Ecuador, Colombia and Bolivia recorded the highest productivity increases in the sub-continent in contrast with Venezuela whose total factor productivity in 1990 was 14% lower than in 1960. Figure 5 shows that TFP growth has also varied greatly over time.



The Andean economies behaved similarly during the 1960s, experiencing all of them high TFP growth rates. During the 1970s, however, their performance diverges significantly. While productivity in Ecuador increased even more rapidly, in Peru it stagnated and in Venezuela dropped by more than 2% a year. During the 1980s, every Andean nation saw their TFP decline sharply. This is consistent with the Latin American experience. In fact, during that decade, all but two countries in our Latin American sample decreased their productivity. One central factor behind this decline is the high unemployment and low capacity utilization that afflicted the sub-continent during the debt crisis. It is important to notice that, again, Colombia shows higher stability than any other country in the Andean zone.

Overall, we can conclude that much of the unsatisfactory economic performance of the Andean countries since the 1960s can be explained by low rates of capital accumulation and poor productivity growth. The incapacity of most of these economies to consistently utilize their

resources and keep up with world shifts in production techniques is a key factor behind their low per capita growth rates.

SUMMARY AND CONCLUSIONS

Between 1965 and 1999 the Andean Region's per capita product grew at an average annual rate of 0.82%. Individual performances range between a maximum of 2.09% for Colombia and a minimum of –0.86% for Venezuela. Ecuador, Bolivia, and Peru recorded per capita growth rates of 1.51%, 0.98% and 0.37% per annum, respectively. These rates of growth have been highly disappointing when compared with other regions. In fact, in a period in which the average developing country saw its per capita output grow by around 60% and a group of successful Asian economies quadrupled it, the Andean countries on average managed to increase it by only 13% (52% excluding Venezuela). Identifying and understanding the deep roots of this highly disappointing performance is a key element in proposing sound measures to promote sustained future development. Among these, the high dependence on a few natural resources and the poor development of the financial system cannot be absent.

When we use a growth decomposition analysis and compare with the Fast-Growing and Advanced Economies, the reasons for the Andean performance make themselves evident. The relative closeness to trade is the single more important factor in explaining the differences of growth rates. In fact, it accounts for almost one full percentage point of lower annual growth rate when compared with the rich nations. The high dependence on natural resources, the tropical condition and the poor quality of the Andean Region's institutions appear also as key negative factors. Although these negative factors are present in all the Andean countries, their relative importance varies greatly. The relative closeness was much more important in Colombia, Peru and Venezuela. The poor quality of institutions was more pervasive in Peru and Bolivia. Finally, while the primary products dependence had little effect in Colombia, it was very strong in Venezuela.

Using the growth accounting methodology we conclude that much of the unsatisfactory economic performance of the Andean countries since the 1960s can be explained by low rates of capital accumulation and poor productivity growth. The incapacity of most of these economies to consistently utilize their resources and keep up with world shifts in production techniques is a key factor behind their low per capita growth rates.

Important changes in economic policy in the past few years, however, have led to improved prospectus for growth in the medium-term for the Andean Region. The advances made on liberalizing international trade and increasing human capital formation should be more than enough to offset the failures in the other areas –notably the deterioration in the quality of institutions- in most of the countries. However, important challenges remain. In particular, the consolidation of past reforms, tackling the natural resources dependency, strengthening local capital markets and improving the quality of institutions. Economic policies do make the

difference between poverty and development. As many countries have demonstrated –some of them close neighbors-, sound policies can indeed be put to work effectively.

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