

Latin America in the XXth Century: Stagnation, then Collapse.*

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Abstract

Most Latin American countries experienced their last peak in output per capita relative to the United States' between 1971 and 1982. Prior to this peak per capita output was rapidly catching up to the developed world. Twenty years after the peak the average country's relative per capita output was 68% of its peak level. A growth accounting exercise shows that between 1960 and 1985 the contribution of physical capital to growth, at 74%, was more than twice the world's average. There is an investment/productivity puzzle since capital accumulation was among the highest in the world and productivity growth one of the lowest. Import Substitution Industrialization and targeted investment subsidies may be the key to understanding Latin America's lack of development.

The theory of economic growth predicts that poor countries should grow faster than richer ones so that their living standards converge. In the last half of the twentieth century, many market economies in different regions of the world (such as Western and Southern Europe and East Asia) have indeed enjoyed remarkable growth experiences significantly reducing their development gap. Latin American countries on the other hand have stagnated relative to the productive frontier represented by the US until the 1970's. Thereafter, their economies collapsed. This paper is about Latin America's growth performance in the last fifty years. Its goal is modest as it only seeks to describe Latin America's development patterns in this period. Explaining the facts described here is a challenge faced by Latin American social scientists.

This study of Latin America's development experience is based on a comparative analysis of relative per capita income across the world over the period following 1950 and a subsequent growth accounting exercise that relates the evolution of relative per capita income to that of the accumulation of human and physical capital, as well as to the rate of growth of total factor productivity. The last sections of the paper contain some conjectures about a plausible theory to explain the facts.

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The main conclusion that emerges from our analysis is that Latin American countries' output per capita relative to US values stagnated until the 1970's and collapsed thereafter. Latin America's relative per capita output was about one fourth between 1950 and 1980 and collapsed to one fifth of the US in the 1990s. In contrast, during the last 50 years Europe's relative income increased by fifty percent and East Asia's multiplied by a factor of three.

In order to further understand the dismal development performance of Latin America, we examine more closely the sources of economic growth. Throughout the last half of the century, the US economy represented the productive frontier, with levels of productivity higher than those of any other region. The productivity gap between the US and most countries in the world steadily narrowed in the period 1960-85. This was not the case for Latin American economies, that did not accomplish any catchup in productivity. In spite of this productivity gap, investment was in line with other countries. As a consequence, the contribution of capital accumulation to total growth in Latin American countries is more than twice the world's average. We find that LA is also special because, only in this region, countries that accumulated more capital are those in which total factor productivity increased the least. These facts are puzzling, given that standard growth theory would predict lower capital accumulation in countries with lower productivity.

Though the purpose of this paper is primarily descriptive, we provide some tentative ideas that may help understand these facts about LA's development. Our main conjecture is that the misallocation of capital is a key factor in the analysis. A set of development policies adopted by many Latin American countries, known as Import Substitution Industrialization, that progressively closed these economies to foreign trade and provided generous targeted investment subsidies may be the key to understanding this misallocation.

1 Latin American Development: an Overview

We start with an overview of Latin American development in the twentieth century by looking at the evolution of income per capita in the region and comparing it to that of other parts of the world.

Our analysis is based on the analysis of data on the per capita income of different countries and regions relative to the United States. More precisely, we study the behavior of y_{it} over time and across countries, where y_{it} is defined as

$$y_{it} = \frac{\text{Income per Capita of Country } i \text{ in year } t}{\text{US Income per Capita in year } t}.$$

The United States was the industrial leader since the end of World War I and it is a natural candidate to represent the potential income per capita that different countries could achieve. All the data used in this section is from Maddison (2003) .

The main conclusions that emerge from the data are the following:

1. There is a substantial gap between the income per capita of Latin American countries and that of the United States.
2. There was no significant sustained economic growth in Latin America.
 - (a) Between 1950 and 1980 relative income in Latin American countries exhibited very mild growth.
 - (b) Relative income in Latin America fell in the 1980s and 1990s.
 - (c) Other regions of the world experienced sustained growth.
3. Most Latin American countries reached their last peak in relative income per capita in the 70s.

The most striking fact about Latin America's development is that in addition to the lack of convergence almost all the Latin American economies collapsed after the 1970s.

[Insert Figure 1]

Figure 1 plots the evolution of relative per capita income for all Latin American countries except for Puerto Rico and Venezuela¹. On the horizontal axis, year 0 in the figure corresponds to the last peak in relative per capita income before the late 1990s. The figure shows the evolution of this variable for the years preceding and following the peak. On the vertical axis, relative per capita income for each country is normalized to one at its level in the peak year. The bottom box indicates the peak year for each country.

Several striking facts emerge from the figure. All the countries in the sample experienced the last peak in their relative per capita income in over twenty years between 1971 and 1982. This period is referred to as the 70s in the paper. Twenty years before the "crisis" year, in almost all the countries in the sample relative income was either catching up to or keeping up with the United States, and only five countries had a relative per capita income that exceeded that of the crisis year². Most remarkably, even twenty to thirty years after the peak, no country in the sample regained the relative income position it had in the 70s except for Chile and the Dominican Republic (which required twenty six and eighteen years, respectively, to regain their pre-crisis relative position.) The average country's relative per capita income was 75% of its peak level ten years after its crisis and 68% after twenty years. Table I reports some of the data underlying figure 1.

¹ As it is shown in figure 2 Venezuela is a very special case as it shows a steady decline in relative per capita income since 1960. Puerto Rico, on the other hand, is special because its relative income is converging.

² Bolivia, Chile, Haiti, Honduras, and Uruguay.

Table I. Relative per Capita Income in Latin America

	Peak Year	Peak Year + l Years				
		$l = -20$	$l = -10$	$l = 0$	$l = 10$	$l = 20$
Argentina	1974	48%	46%	51%	37%	35%
Bolivia	1976	16%	13%	16%	10%	10%
Brazil	1980	21%	20%	28%	21%	20%
Chile	1971	38%	39%	37%	32%	30%
Colombia	1982	22%	21%	23%	21%	18%*
Costa Rica	1977	22%	23%	27%	21%	21%
Dominican Rep.	1982	12%	12%	13%	11%	13%**
Ecuador	1982	20%	19%	22%	17%	14%**
El Salvador	1975	15%	16%	15%	10%	10%
Guatemala	1977	20%	18%	20%	14%	13%
Haiti	1980	9%	6%	7%	4%	3%
Honduras	1978	13%	11%	11%	8%	8%
Mexico	1981	28%	29%	35%	27%	25%
Nicaragua	1974	19%	20%	20%	10%	5%
Panama	1982	23%	26%	29%	22%	20%
Paraguay	1981	14%	12%	19%	14%	11%
Peru	1974	25%	26%	26%	18%	14%
Uruguay	1980	44%	34%	35%	28%	28%
Average		23%	22%	24%	18%	17%

Source: Maddison (2001). * 18 years after peak. ** 19 years after peak.

Summary statistics for the distribution of relative per capita income in Latin American countries are presented in table II. The table also presents some data on Asian and European countries for comparison purposes.³

³ Latin America: Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay, Venezuela, Bolivia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay

Europe: Austria, Belgium, Denmark, Finland, France Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

East Asia: Indonesia, Japan Philippines, South Korea, Thailand, Taiwan, Hong Kong, Malaysia, Singapore.

South Asia: India, Bangladesh, Burma, Nepal, Pakista, Sri Lanka

Table II. Summary Statistics for Relative Income per Capita

	1950	1960	1970	1980	1990	2000
Latin America						
Average	24%	25%	26%	27%	21%	20%
Median	20%	20%	21%	23%	18%	14%
Std. Deviation	0.15	0.16	0.16	0.15	0.12	0.14
Mean 5 Poorest	12%	11%	11%	11%	8%	7%
Mean 5 Richest	49%	50%	51%	50%	37%	41%
Ratio 5 Richest/5 Poorest	4.0	4.4	4.8	4.5	4.7	5.9
Europe 15	49%	57%	70%	74%	74%	73%
East Asia	14%	16%	24%	33%	42%	48%
South Asia	7%	6%	6%	6%	6%	7%

Source: Maddison (2003). Figures are arithmetic averages of countries in each group.

On average the relative income of Latin American countries has been one fourth of the US one between 1950 and 1980 and about one fifth in 1990 and 2000. These numbers also illustrate the lack of sustained growth in Latin America. In order to put the Latin American experience in perspective, we show data for Asia and Europe. In East Asia and Europe we observe convergence towards the per capita income of the United States. In South Asia this is not the case, but we do not observe the poor performance of Latin America in the 1980s and 1990s.

The slowdown in economic growth in Latin America following the 70s was not a worldwide phenomenon. Latin American countries grew at a slower pace than the United States, but also lagged behind other developed and developing countries. Most countries in East Asia were catching up with the United States during this period. In Europe average relative income was stable, but the poorest European countries were gaining relative positions. In South Asia average relative income was constant, but the largest country, India, experienced a 38% gain in its relative per capita income between 1980 and 2000.

Latin America's weak growth prior to the 70s combined with the post 70s decline resulted in a dismal long run performance. Table III shows each country's relative income in the year 2000 as a share of its income in 1950. Table IV replicates Table III for a selected number of countries comparing income in 2000 with income in 1900.

Table III. Relative Income in 2000 as a % of 1950 level

Haiti	29%	El Salvador	69%
Nicaragua	36%	Paraguay	72%
Venezuela	42%	Colombia	89%
Bolivia	50%	Chile	97%
Honduras	56%	Panama	114%
Guatemala	61%	Mexico	115%
Peru	61%	Costa Rica	118%
Ecuador	63%	Brazil	125%
Uruguay	63%	Dominican Rep.	134%
Argentina	64%	Puerto Rico	248%

The table shows that only six out of twenty countries had a relative per capita income in 2000 that was higher than in 1950. Of these, only two of them are not small Caribbean countries. Looking at a smaller set of countries since 1900 a similar pattern emerges. Only Venezuela and Brazil had an income per capita that was higher in 2000 than in 1900.

Table IV. Relative Income in 2000 as a % of 1900 level

Venezuela	145%
Brazil	116%
Mexico	75%
Colombia	74%
Chile	71%
Peru	64%
Uruguay	50%
Argentina	44%

[Insert Figure 2: Evolution of relative per capita income for LAC 8]
 [Insert Figure 3: Evolution of relative per capita income for other LAC]

Figures 2 and 3 plot the behavior over time of the relative per capita income of Latin American countries and confirm the findings illustrated in tables I-IV. Figure 2 contains data for the 1900-2000 period for the LAC8 countries and Figure 3 shows the evolution of relative per capita income since 1950 for a subset of the other Latin American countries. Figure 2 confirms the absence of sustained economic growth for the LAC8 since 1900. The LAC8 countries are not converging towards the per capita income of the United States. Moreover

after the 70's all countries were falling back. A similar performance is found for the other Latin American countries shown in Figure 3.

2 An Anatomy of Latin American Development: 1960-1985.

In the previous section it was established that there is a development gap between Latin America and the United States and that for most countries in Latin America relative per capita income was roughly constant or displayed modest growth in the 1950s and 1960s and it collapsed at some point in the 1970s.

In this section we ask if there was something special about Latin American development before the crisis that might explain why Latin American economies performed so poorly in the last two decades. We analyze the sources of growth in Latin America between 1960 and 1985 and the factors that explain Latin America's development gap in 1985. Throughout, we compare Latin America with other regions of the world.

The departure point are the growth and development accounting exercises performed by Klenow and Rodriguez-Clare (1997), which will be referred to as KR. We use KR's data and production function to compare Latin America and the rest of the world. As a robustness check, we later compare the results with those that emerge using the dataset and production function employed by Hall and Jones (1998), HJ in the remainder of the paper.

Consider the aggregate production function used by KR,

$$Y = K^\alpha H^\beta (AL)^{1-\alpha-\beta},$$

where Y represents output, K and H the stocks of physical and human capital, A is a productivity index, and L is the number of workers in the economy. The total stock of human capital is the product of the average level of human capital, h , and the number of workers so that $H = hL$. This production function can be rearranged as

$$\frac{Y}{L} = A \left(\frac{K}{Y}\right)^{\frac{\alpha}{1-\alpha-\beta}} \left(\frac{H}{Y}\right)^{\frac{\beta}{1-\alpha-\beta}} \quad (1)$$

which is a more useful expression for our purposes (see KR and HJ). Equation (1) expresses output per worker as a function of the productivity index, A , the capital intensity, K/Y , and the human capital intensity, H/Y .

Using this production function we can decompose the growth rate of output per worker into the contribution of productivity, physical capital and human capital according to

$$g\left(\frac{Y}{L}\right) = g(A) + \frac{\alpha}{1-\alpha-\beta} g\left(\frac{K}{Y}\right) + \frac{\beta}{1-\alpha-\beta} g\left(\frac{H}{Y}\right), \quad (2)$$

where $g(z)$ is the growth rate of z .

All the data is from the data appendix in KR. Income, capital and employment data are based on the World Penn Tables 5.6 and H is based on Bils and Klenow (1996). KR report the growth rates of Y/L , K/Y , H/Y , and A over the 1960-1985 period. We group the countries in the KR data set into four groups: Latin America, East Asia, Developed Countries and the rest of the world⁴. The following table reports the growth rates of per capita income, factor intensities and productivity, for these country groups.

Table V. Average Annual Growth Rates: 1960-1985

Region	Y/L	K/Y	H/Y	A
LA	1.33%	1.39%	0.54%	-0.02%
East Asia	4.74%	1.63%	0.98%	2.92%
Developed	2.40%	0.61%	0.92%	1.35%
Rest	2.14%	1.05%	0.54%	1.03%
World	2.24%	1.08%	0.66%	1.04%
USA	1.30%	0.56%	1.27%	0.04%

Data from KR. Arithmetic averages of countries in each region.

The table confirms that during the 1960-1985 period Latin America’s income per capita was growing at roughly the same rate as the United States, 1.3% per year, and lagged behind East Asia, Europe and the rest of the world. Latin America is the only region that is not catching up with the United States.

The sources of growth in Latin America differ from the rest of the world: LA has one of the highest accumulation rates of physical capital intensity, and one of the lowest ones in human capital. The productivity index in LA also differs from its behavior elsewhere. In the rest of the world aggregate productivity indices were approaching the “world technical frontier” represented by the United States. The low growth rate of productivity in the United States is the due to the well known productivity slowdown of the 1970s.

⁴Latin America: Venezuela, Mexico, Argentina, Guyana, Brazil, Uruguay, Panama, Chile, Ecuador, Costa Rica, Colombia, Peru, Guatemala, Dominican Rep, Paraguay, Bolivia, Nicaragua, El Salvador, Honduras, and Haiti.

Developed Countries: U.S.A., Canada, Switzerland, Australia, Norway, Netherlands, Germany, West Belgium, France, Italy, Sweden, New Zealand, Denmark, Austria, Finland, Iceland, U.K., Israel, Spain, Ireland,

East Asia: Japan, Singapore, Hong Kong, Taiwan, South Korea, Malaysia, Thailand, and Indonesia.

Rest: Jamaica, Syria, Greece, Iraq, Malta, Jordan, Cyprus, Iran, Algeria, Barbados, Yugoslavia, Portugal, Fiji, South Africa, Tunisia, Mauritius, Turkey, Botswana, Congo, Sri Lanka, Swaziland, Philippines, Pakistan, Bangladesh, Cameroon, Papua N Guinea, Zimbabwe, India, Senegal, Zambia, Liberia, Ghana, Benin, Nepal, Kenya, Lesotho, Mali, Gambia, Rwanda, Guinea-Bissau, Central Afr R., Togo, Myanmar, Uganda, Mozambique, Tanzania, Malawi, Niger, and Zaire.

Using the growth accounting equation (2) we can use the numbers in the previous table to calculate which fraction of growth can be accounted for by each factor of production in each region. Following *KR* we set $\alpha = 0.3$ and $\beta = 0.28$ and then we divide each term in the right hand side of (2) by $g\left(\frac{Y}{L}\right)$. The outcome of this exercise is reported in the next table, which gives the percentage of the growth in income per worker accounted for by each factor.

Table VI. Growth Accounting

	Contribution of z to growth of Y/L		
	K/Y	H/Y	A
LA	74%	27%	-2%
East Asia	25%	14%	62%
Developed	18%	26%	56%
Rest	35%	17%	48%
World	34%	20%	46%
USA	31%	65%	3%

Source: *KR* (97)

The differences between Latin America and the rest of the world shown in this table are striking. The contribution of capital intensity to growth in Latin America, at 74%, is more than twice the world's average, and more than three times higher than in the fastest growing economies. This is explained by the puzzling combination of one of the highest rates of capital accumulation (almost 30% above the world average) and the lowest growth rate of total factor productivity. While the growth of the productivity index in Latin America was nil, in the rest of the world it accounted for at least 50% of per capita income growth.

KR also do an exercise of developing accounting asking what are the factors that explain differences in relative income per capita across the world. They conclude that about 60% of the variance in the world's relative per capita income is due to variations in productivity levels across countries.

In this paper we will perform a levels accounting exercise normalizing the levels of Y/L , K/Y , and H/Y in the United States to be one and asking what are the factors that account for the development gap between each country and the United States. The next table decomposes the development gap (relative to the US) into the three factors in equation (1) for the year 1985. The numbers in the table were calculated applying (1) to each individual country and then taking the geometric mean across the countries in each of the regions.

Table VII. Development Accounting (KR)

	Y/L	$(K/Y)^{\frac{\alpha}{1-\alpha-\beta}}$	$(H/Y)^{\frac{\beta}{1-\alpha-\beta}}$	A
LA	23%	72%	62%	51%
East Asia	31%	76%	70%	60%
Developed	77%	124%	73%	84%
Rest	12%	65%	57%	32%
World	22%	77%	62%	45%

Source: KR (97)

The results in this table are consistent with the growth accounting exercise performed above. The table shows that Latin America's development gap is mainly due to low levels of the productivity index and of human capital, and that Latin America's physical capital intensity is relatively high. This is not surprising since Latin America was accumulating a relatively large amount of capital in the 1960-1985 period and the growth of human capital intensity and of productivity were below those of the other regions.

If we compare Latin America and East Asia we observe that the physical capital to income ratio in the latter is only 5% higher than in the former while income per worker is 35% higher in East Asia.

Hall and Jones (1998) compute a decomposition of income levels across countries that is similar to that of Klenow and Rodriguez Clare (1997). HJ use a slightly different production function that yields the decomposition

$$\frac{Y}{L} = A \left(\frac{K}{Y} \right)^{\frac{\alpha}{1-\alpha}} h \quad (3)$$

and similar data sources to KR's. HJ incorporate a correction for natural resources by subtracting value added in the mining industry from GDP so that the productivity index is not driven by an unaccounted endowment of natural resources. The stock of K and h are estimated with similar methods to KR and HJ set $\alpha = 1/3$, which is also similar to KR. The results from de HJ decomposition are very similar to that of KR and they are shown in the next table.

Table VIII. Development Accounting (HJ)

	Y/L	$(K/Y)^{\frac{\alpha}{1-\alpha}}$	h	A
LA	21%	86%	55%	45%
East Asia	34%	89%	64%	59%
Developed	74%	106%	79%	88%
Rest	10%	74%	47%	30%
World	18%	82%	54%	41%

The HJ dataset also indicates that low levels of productivity and human capital are driving the low per capita income of Latin America. After correcting for natural resources, the similarities between the capital intensities of Latin America, East Asia and the Developed countries is even more striking. The physical capital intensity in the developed group is only 23% higher than in Latin America and income per worker is almost 3.5 times the Latin American one.

To conclude this section we investigate if there is a statistical association between the high levels of capital accumulation achieved by Latin American countries and the low levels of productivity growth and of income per capita growth.

Figure 4 plots the growth rate of A in the vertical axis against the growth rate of K/Y in the horizontal one. Each dot corresponds to the average growth rate of a country between 1960 and 1985. Latin American countries are marked by boxes and the rest of the world by circles. The smaller circles correspond to outliers⁵. If we consider the whole world without the outliers there is no association between $g(A)$ and $g(K/Y)$. In the Latin American countries, in contrast, these two variables are negatively correlated. Countries that accumulate more capital (relative to their income) have slower productivity growth. The simple correlations of $g(K/Y)$ with $g(Y/L)$ and $g(A)$ are reported below. The group of Latin American countries is the only one in the world where the correlation of $g(K/Y)$ with $g(Y/L)$ is negative. The correlation of $g(K/Y)$ with $g(A)$ is negative and much stronger than in the rest of the world⁶.

⁵The outliers are Lesotho, Iran, Irak, Gambia, Zaire, Mozambique, Congo, and Mali

⁶Including outliers the correlation of $g(K/Y)$ with $g(Y/L)$ is 0.04 in the rest of the world and in the whole world. The correlation of $g(K/Y)$ with $g(A)$ becomes -0.49 in the rest of the world and -0.42 in the whole world.

Table IX. Capital Intensity and Productivity Growth (1960-1985)

	Correlation of $g(K/Y)$ with	
	$g(Y/L)$	$g(A)$
Latin America	-0.36	-0.61
East Asia	0.29	-0.28
Developed	0.33	0.00
Rest	0.22	-0.19
World	0.17	-0.21

Source: KR.

We also estimated the cross country regression

$$g(A)_i = \beta_0 + \beta_1 g(K/Y)_i + \beta_2 g(K/Y)_i d(LA)_i + \varepsilon_i, \quad (4)$$

where $d(LA)_i$ is a dummy variable that takes the value of 1 for Latin American countries and 0 otherwise. The regression expresses the growth rate of productivity as a function of the growth rate of K/Y and allows for a different slope in the subset of Latin American countries. When we estimate the regression for the whole world (without outliers) the estimate of the coefficient β_1 is negative and significant at the 5% level. After we include the Latin American dummy, the estimate of β_1 is close to zero and it becomes statistically insignificant. The estimate of β_2 , on the other hand is significant at the 1% level and it is negative. Table X.

Capital Intensity and Productivity Growth (1960-1985)

	Estimates of (4)	
	β_1	β_2
1.	-0.30 (-1.97)*	
2.	-0.02 (-0.14)	-1.11 (-5.10)**
2'	-0.44 (-3.87)**	-0.81 (-3.51)**

t-statistics between brackets.

2' includes outliers

* indicates significant at 5% and ** significance at 1%

We concluded the previous section asking why growth in Latin America was so slow up to the 1980s and why relative per capita income in the region plummeted in the last 20 years. This section adds three more questions. First, why did Latin America accumulate so much capital? Second, why do the Latin American countries that accumulate more capital have slower productivity growth? Finally, a third question raised by the data is what is the connection –if any– between the over-accumulation of capital in 1960-1985 and the growth crisis of the 1980s.

3 The investment/productivity puzzle

In this section we try to address some of the questions above. The main puzzle is to reconcile high investment rates with low total factor productivity. Standard investment theory predicts a positive association between investment and the returns to capital. Increases in TFP lead to a higher marginal product of capital and thus higher capital/output ratios. There are two possible directions towards solving the puzzle.

The first explanation is measurement error in the investment series. An overstatement of the measured increase in the capital stock would immediately lead to an understatement of total factor productivity growth. While this may seem an appealing story, it raises the question of why this bias would arise particularly in Latin American countries.

The second explanation is that distortions in the decisions to accumulate capital can simultaneously explain high investment and low productivity. It is useful in this regard to distinguish public from private investment. The former does not necessarily equate marginal returns to capital accumulation to the cost of capital. The extent of this deviation and the relative importance of public vs. private investment are key elements that need to be quantified. At the extreme, this type of inefficiency was probably a key factor in explaining the poor performance of former centrally planned economies in Eastern Europe.

Other government policies that distort private marginal costs and/or benefits of investment can have similar effects. Policies that distort relative prices either in the output or input markets may artificially raise the private return to capital and lead to overaccumulation in favored sectors. Good examples of these policies are protectionism and subsidies to inputs provided by the public sector. Policies that directly distort the cost of capital, such as subsidized credit and tax advantages can have similar effects.

Many of the policies mentioned above are characteristic of import substitution industrialization strategies adopted by most Latin American countries. The following section discusses these policies and some of their effects.

4 Import Substitution Industrialization and Latin American Development

Import Substitution Industrialization (ISI) is a development strategy based on the idea that the key to development is to stimulate the growth of domestic industries by substituting domestically produced goods for goods that were previously imported. Along the road to development countries progressively produce a larger fraction of the goods that are imported from industrialized countries in the early stages of development. Countries grow by successively closing market after market to foreign exporters to develop a local industry.

Hirschman (1968), a strong supporter of ISI, describes ISI as a process by tightly separated stages. “It starts predominantly with the manufacture of finished consumer goods that were previously imported and then moves on [...] to the “higher stages” of manufacture, that is, to intermediate goods and machinery, through backward linkage effects. [...] Thus, “industrialization through import substitution becomes a highly sequential, or tightly staged, affair”.

The following paragraphs, quoted from Cardoso and Helwege (1992), describe how ISI was implemented in Latin America.

In practice, ISI differed from protectionism in industrialized countries. Whereas protectionism in developed countries has typically been aimed at helping specific industries, ISI was adopted as an economy-wide strategy. Moreover, the goal of ISI was to establish new industries, not simply to protect existing firms. Governments were expected to play an active role in the economy, with benefits extending beyond the small number of workers already employed in industry.

The main tools used to implement an ISI strategy were import licensing, tariffs, overvalued exchange rates, and direct government investment in key industries. Import licensing enabled the government to control the composition of imports in order to promote specific activities. Essential goods—mainly food, capital goods, and intermediate inputs—were given preference, while imports of final goods consumer goods were discouraged with administrative red tape. Essential goods entered under lower tariffs and at preferential exchange rates. Multiple exchange rate systems served as an important mechanism for subsidizing favored goods.

Governments themselves constructed plants in heavy industry—steel, cement, utilities and airplanes—where the amount of start-up capital involved was thought to discourage private investment. New plants in automobiles, pharmaceuticals, and grain processing were set up as joint ventures with foreign firms. ...

Latin American governments also stimulated industry through low interest rates and easy access to credit under soft monetary regimes. Publicly owned enterprises subsidized intermediate goods like electricity and steel by running in the red. Price ceilings on

wage goods, especially food, helped to keep down labor costs for urban employers.

An implication of ISI is that as countries grow the share of exports and imports in their economy's becomes smaller. As ISI progresses output in each industry that closes to foreign competition grows until it is able to supply domestic demand and then flattens out. Continued growth through exports is unlikely since the country is specializing in goods for which it does not have a comparative advantage.

[Insert Figure 5-6]

A rough test of this hypothesis could be performed by comparing the openness of economies of Latin America with economies in other regions. Figure 5 is a scatter plot showing the average openness (exports+imports/GDP) in the vertical axis and the share of the world population of each country in the horizontal axis (in logs.)⁷ Each observation represents the average over the 1950-1970 period for a particular country. Latin American countries are represented by squares and the rest of the countries by circles. A regression line giving the overall relationship between openness and population is also provided. Most Latin American countries lie below this regression line indicating that they are less open than the rest of the world.

How did the degree of openness change over the period analyzed? To answer this question we estimate the following regression for each year in the 1960-1990 period.

$$\log(\text{openness}_i) = \beta_0 + \beta_1 \log(\text{population}_i) + \beta_2 d(LA) + \varepsilon_i, \quad (5)$$

where $\text{openness} = (\text{exports} + \text{imports}) / \text{GDP}$, population_i is the population in country i divided by the world population and $d(LA)$ is a dummy variable that takes the value of 1 for Latin American countries and 0 otherwise, and ε_{it} is a random shock satisfying the usual assumptions.

The coefficient β_2 can be used to measure how closed the Latin American Economies are with respect to the rest of the world. Consider the following measure of Latin America's openness gap,

$$\text{LA gap} = \frac{\text{openness in LA} - \text{openness in the world}}{\text{openness in the world}} = \exp \beta_2 - 1.$$

Figure 6 shows the evolution of Latin America's openness gap between 1960 and 1990. The graph shows that between 1960 and 1980. Latin America's openness gap grew from 25% of the average openness in the world (controlled by size) in 1960 to 45% in 1981. ISI policies were very successful in terms of closing the economies of Latin America to foreign trade.

⁷ The logic underlying this regression is that small countries trade more. We expect cities, like Hong Kong, to trade more than small countries, like Belgium, which in turn trade more than large countries like the United States. The United States is a large open economy with a small share of $X + M$ in GDP . It was suggested by Cole, Ohanian and Riascos (2003).

Import Substitution Industrialization and Growth

Can ISI policies account for the growth anomalies stated in the beginning of this section?

Mundell's (1957) classic paper on the capital that "jumps" the tariff is a natural starting point to evaluate the long run effects of import substitution policies on growth. Consider a small open economy in a world with no distortions within the country and no impediments to international trade. There are two goods produced with constant returns to scale, there is incomplete specialization and one of the two goods is capital intensive. Assume that factor endowments are such that the small open economy imports the capital intensive good. Mundell asks what would be the effect in such a world if the small country imposes a tariff on the capital intensive good. For simplicity consider the imposition of a prohibitive tariff.

The tariff raises the domestic relative price of the capital intensive good and stimulates a movement of resources towards the production of this good, creating an excess supply of labor and an excess demand for capital, which raises the return to capital and lowers real wages. This is the Stolper-Samuelson effect. If there is free capital mobility (and no labor mobility), the increase in the return to capital stimulates capital inflows from the rest of the world towards the country that imposed the tariff. The capital inflows expand the domestic production possibilities up to the point where the return to capital is back to its international level. At this point, by the logic of the factor price equalization theorem domestic relative prices are equal to international prices and, even without the tariff, there will be no international trade.

In the new equilibrium the GDP of the country that imposed the tariff is higher and the increase in output equals the interest payments on the new imported capital. There is no change in the country's consumption possibilities or in national income.⁸ A growth accounting analysis comparing the final equilibrium with the initial one would show some of the characteristics of the Latin American development patterns described above. We would observe a one time increase in GDP per capita, growth rates of relative per capita output will be high after the imposition of the tariff and then they will go back to zero. All the increase in relative per capita output would be due to the contribution of physical capital and there would be no productivity growth. Observe that in this world, after the change in the capital stock has taken place, a trade liberalization has no effect whatsoever.⁹

⁸If there is no international capital mobility the imposition of the tariff will have the same effect on the variables analyzed in this paper. The higher return to capital stimulates domestic savings and the capital stock grows until the same equilibrium as in the case with international capital mobility is reached from the point of view of production. The difference between the two cases is that with no international factor movements consumption along the path to the new steady state will be lower, but it would be higher in steady state since no interest payments would go to the foreign owners of capital.

⁹Mundell analyzes the case in which initially there is incomplete specialization. If we assume, instead, that initially the country is completely specialized in the production of the labor intensive good the analysis will be very similar if the tariff is high enough.

Mundell's analysis is a nice benchmark, which is useful to explain the high contribution of physical capital to growth in relative per capita output in Latin America and the temporary nature of ISI lead growth.¹⁰ However, it does not account for the negative relation between growth in productivity and growth in K/Y , for Latin America's lack of "catch up" in productivity, or for the growth collapse following the 70s.

There are several differences between the experience of Latin America's ISI policies and Mundell's experiment that can help explain the facts. In the first place, the model assumes that the underlying technologies are the same in all countries and that all comparative advantage originates in different capital/labor endowments. Recent papers (Eaton and Kortum (2002), Lucas (2003)) are challenging this view, suggesting that product specific efficiency differentials across firms/countries can play a key role in explaining observed patterns of trade. According to this view, production should be located at the point where plants are most efficient. Deviations from this principle lead to productivity losses. Edwards (1998) finds that closed economies have lower growth rate of productivity growth. This suggests that by closing their economies Latin American countries were unable to exploit comparative advantages and became more inefficient.

Secondly, ISI policies created distortions that go well beyond the trade distortions considered by Mundell. Tariffs were not uniformly imposed on all goods. As Cardoso et. al. describe in the quote above, tariffs were typically higher for consumer goods than for industrial raw materials and capital goods. Moreover, ISI proceeded in stages as Hirschman (1968) described. In the late stages of import substitution the inefficient production and protection in industries that produce goods that are inputs in other industries render the latter more inefficient, calling for more protection. What would be the effect of the accumulation of layer after layer of distortions in a model with a richer production structure? Would it be possible for the tariff dispersion and the sequential nature of ISI to account for the collapse of Latin America's economies in the 70s in such a model?

ISI policies also provided direct subsidies to capital formation through subsidized loans and direct investment by the public sector. These policies create inefficiencies because marginal rates of return to capital are no longer equal

¹⁰ If domestic capital is subject to a tax (or to risk of expropriation) so that the return to capital located in the domestic economy is higher than the international one. The factor price equalization theorem implies that if initially there is free trade in goods factor returns will be the same across countries. The capital inflows induced by the imposition of the tariff are smaller than in the previous case because the returns to domestic and foreign capital in the final equilibrium will differ on account of the capital income tax. This implies that the domestic relative price of the capital intensive good will be higher than the international price and that final GDP will be lower. In the absence of the tariff, at the production point with the new factor endowments the country would still import the capital intensive good. A significant difference would be that GDP measured at international prices will be lower than GDP measured at domestic prices, so the productivity index will fall if output is measured at international prices. This implies that countries with productivity will be higher in the countries that accumulate more capital, contrary to the evidence.

across sectors and because they stimulate an overaccumulation of capital (domestic distortions that are not present in Mundell's analysis). Moreover, this missallocated capital is financed by taxing the private sector creating additional distortions. Bulmer-Thomas (1994) reports the following figures on state owned enterprises in Latin America that indicate the quantitative importance of these subsidies.

Table XI. Current and Investment Expenditures by State-Owned Enterprises as % of GDP

	1970-73	1974-78	1978-81
Argentina	12.5	17.0	19.5
Brazil	10.4	18.6	25.6
Chile	21.8	31.3	26.1
Colombia	6.4	6.0	8.4
Mexico	11.9	16.4	20.7
Peru	10.1	24.3	32.1
Venezuela	19.3	21.1	28.2

Source: Bulmer-Thomas (1994)

He also reports that the (weighted) average for the Latin American share of state-owned enterprises in gross domestic investment at the end of the 70s was 29%, compared to 4% in the United States, 11% in Japan, and 17% in the United Kingdom. These figures suggest that the subsidies to physical capital accumulation in the last stages of ISI may have been such a large burden on the rest of the economy that they resulted in the massive fiscal deficits of the 1980s.

It is interesting to observe that the first country to abandon ISI for an outward oriented development strategy was Chile. In the last twenty five years Chile opened its economy and adopted a series of market oriented reforms. Coincidentally, Chile is also the only country in Latin America that experienced sustained economic growth in the last twenty years and it is also the only one that regained its pre-crisis level of relative per capita income.

5 Conclusions

In this paper we studied the development performance of Latin America over the last fifty years. We found that there was no sustained economic growth in the region and almost all Latin American countries experienced the last peak in their per capita income relative to the United States between 1971 and 1982. Thereafter the economies of Latin America collapsed: for the average country in Latin America, relative per capita income twenty years after its peak was 30% lower. The collapse of Latin American economies occurred while the rest of the world was growing and catching up to the United States. We also found that the economic performance of Latin America differed from the rest of the world in that in Latin America growth was driven by the accumulation of physical

capital and productivity growth was nil. The contribution of physical capital to economic growth in Latin America was twice the world's average.

In the last part of the paper we described the development strategy adopted by many Latin American countries in the 1950 and 1960s known as Import Substitution Industrialization. These policies closed the economy to the imports of foreign goods and subsidized the accumulation of capital in some sectors to stimulate the development of local industries. These policies could account for the overaccumulation of capital and low productivity of Latin American countries prior to their collapse. The collapse of Latin America's economies in the 1980s and the difficulty in implementing market oriented economic reforms in the 1990s could also be the consequence of the economic structure created by the ISI policies. As the process of import substitution came to an end in the 1970s government subsidies to capital increased and so did the demand for social expenditure while the growth of tax revenues slowed down. The fiscal difficulties of the 1980s that resulted in the debt crisis and in inflation could be traced to the ISI that preceded them. The difficulties in implementing market oriented reforms in Latin America could also be the legacy of the ISI that created powerful vested interests in an economic structure that needs protectionism and government subsidies. A deeper study of the long run consequences of ISI is an important open question left for future research.

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6 Appendix

Growth Accounting in Latin America: 1960-1985

	Growth Rate of				Contribution to growth of		
	Y/L	K/Y	H/Y	A	K/Y	H/Y	A
ECUADOR	3.07%	0.78%	1.12%	1.77%	18%	24%	58%
PANAMA	3.00%	1.45%	0.62%	1.55%	35%	14%	52%
BRAZIL	2.73%	0.32%	0.36%	2.26%	8%	9%	83%
MEXICO	2.33%	1.27%	0.70%	0.95%	39%	20%	41%
PARAGUAY	2.23%	2.10%	0.09%	0.67%	67%	3%	30%
DOMINICAN R	2.16%	2.33%	0.33%	0.28%	77%	10%	13%
BOLIVIA	2.11%	0.57%	0.48%	1.38%	19%	15%	65%
COLOMBIA	2.10%	0.33%	0.84%	1.31%	11%	27%	62%
HONDURAS	1.41%	0.21%	0.93%	0.64%	11%	44%	45%
GUATEMALA	1.32%	1.24%	0.47%	0.12%	67%	24%	9%
COSTA RICA	1.17%	1.68%	0.50%	-0.36%	103%	28%	-31%
ARGENTINA	1.11%	1.38%	0.57%	-0.25%	89%	34%	-23%
PERU	1.02%	1.45%	1.05%	-0.72%	102%	69%	-71%
HAITI	0.96%	2.23%	-0.07%	-0.58%	166%	-5%	-60%
EL SALVADOR	0.95%	1.94%	0.53%	-0.79%	146%	37%	-83%
NICARAGUA	0.56%	2.35%	0.28%	-1.31%	300%	33%	-234%
CHILE	0.44%	0.73%	0.52%	-0.43%	119%	79%	-98%
URUGUAY	0.17%	1.34%	0.87%	-1.36%	563%	341%	-800%
VENEZUELA	-0.43%	2.46%	0.82%	-2.74%	-409%	-127%	637%
GUYANA	-1.80%	1.58%	-0.18%	-2.82%	-63%	7%	157%
Average Country	1.33%	1.39%	0.54%	-0.02%	74%	27%	-2%

Figure 1. Latin America: Stagnation, then Collapse

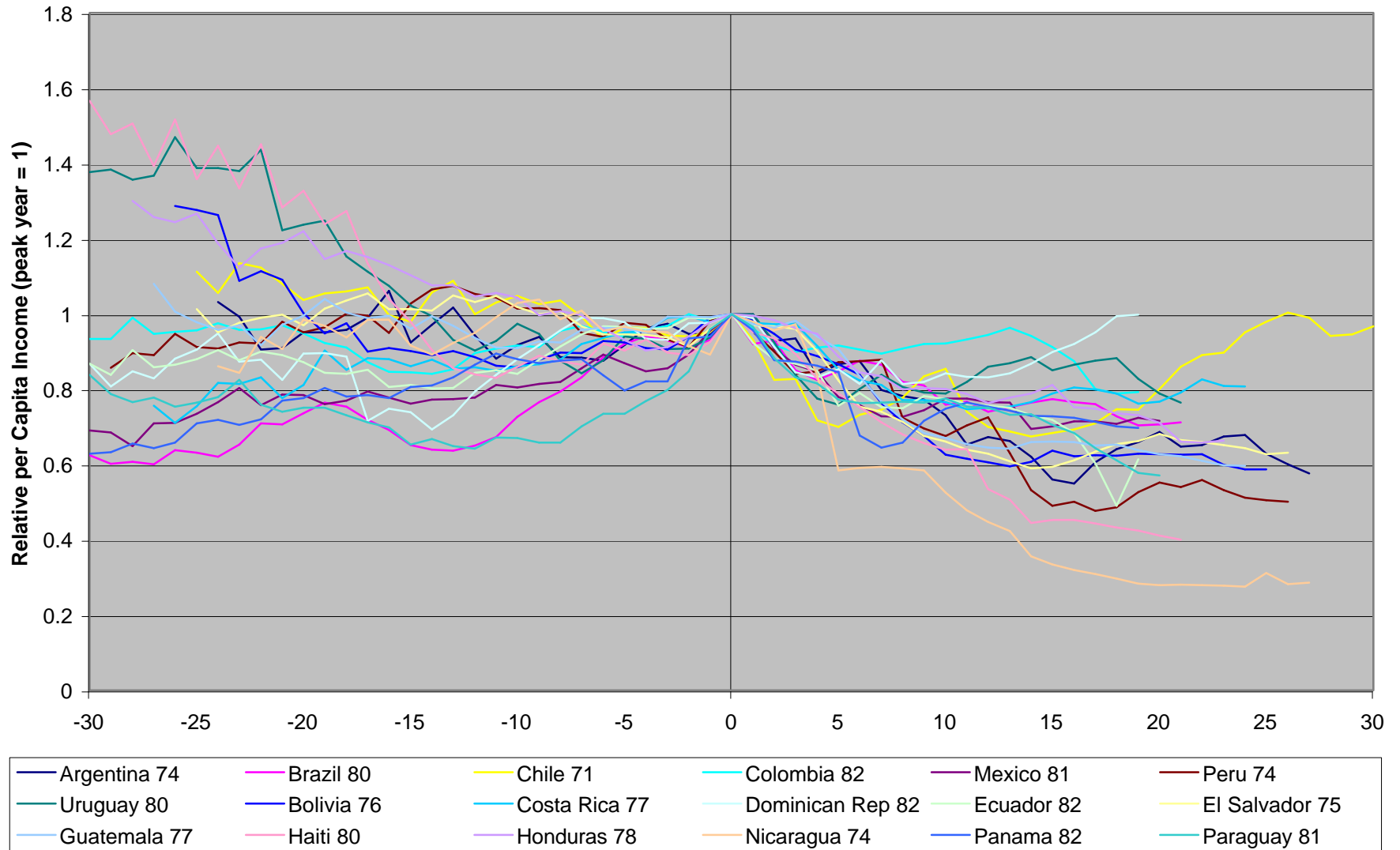


Figure 2: Latin America's per capita GDP

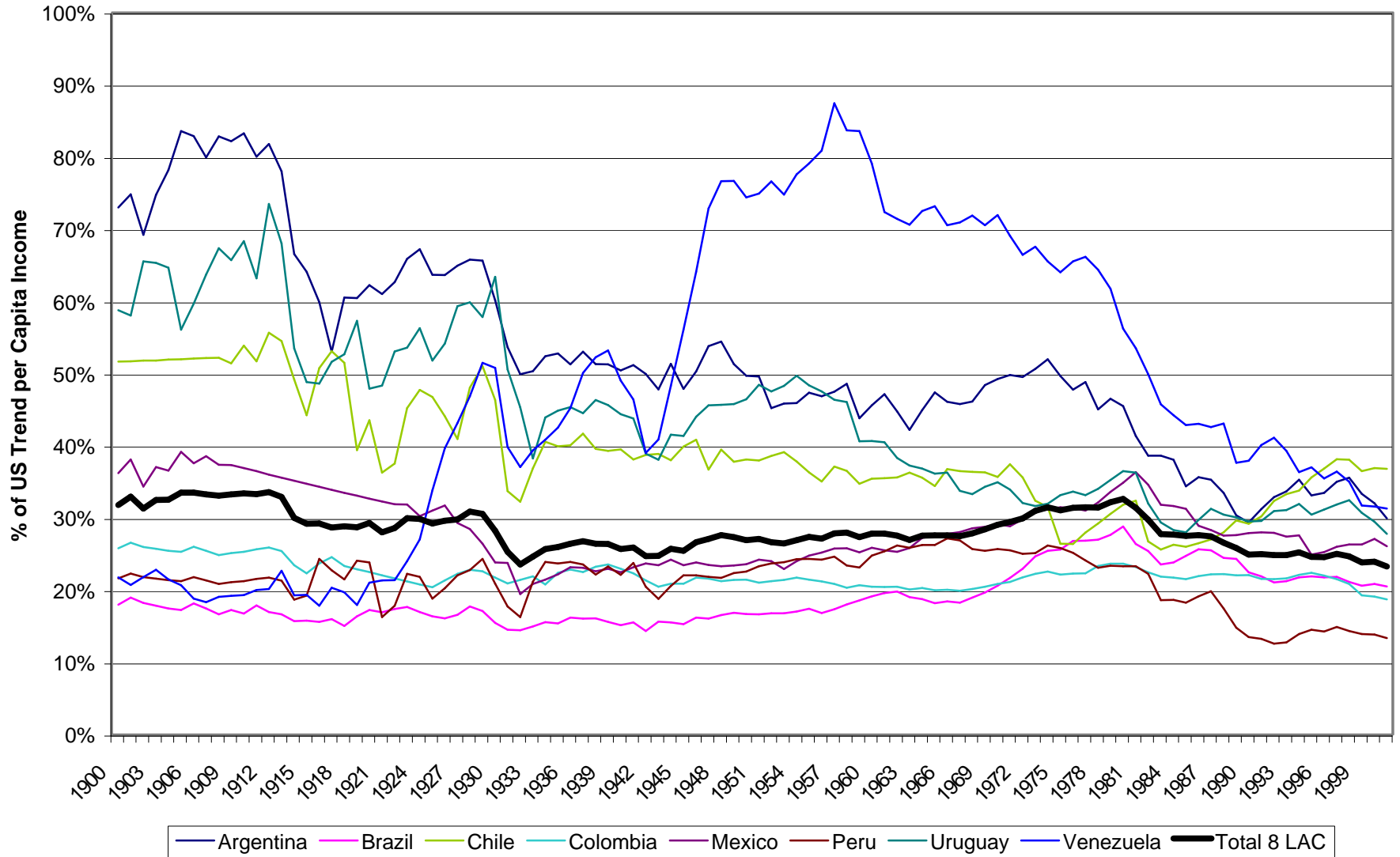
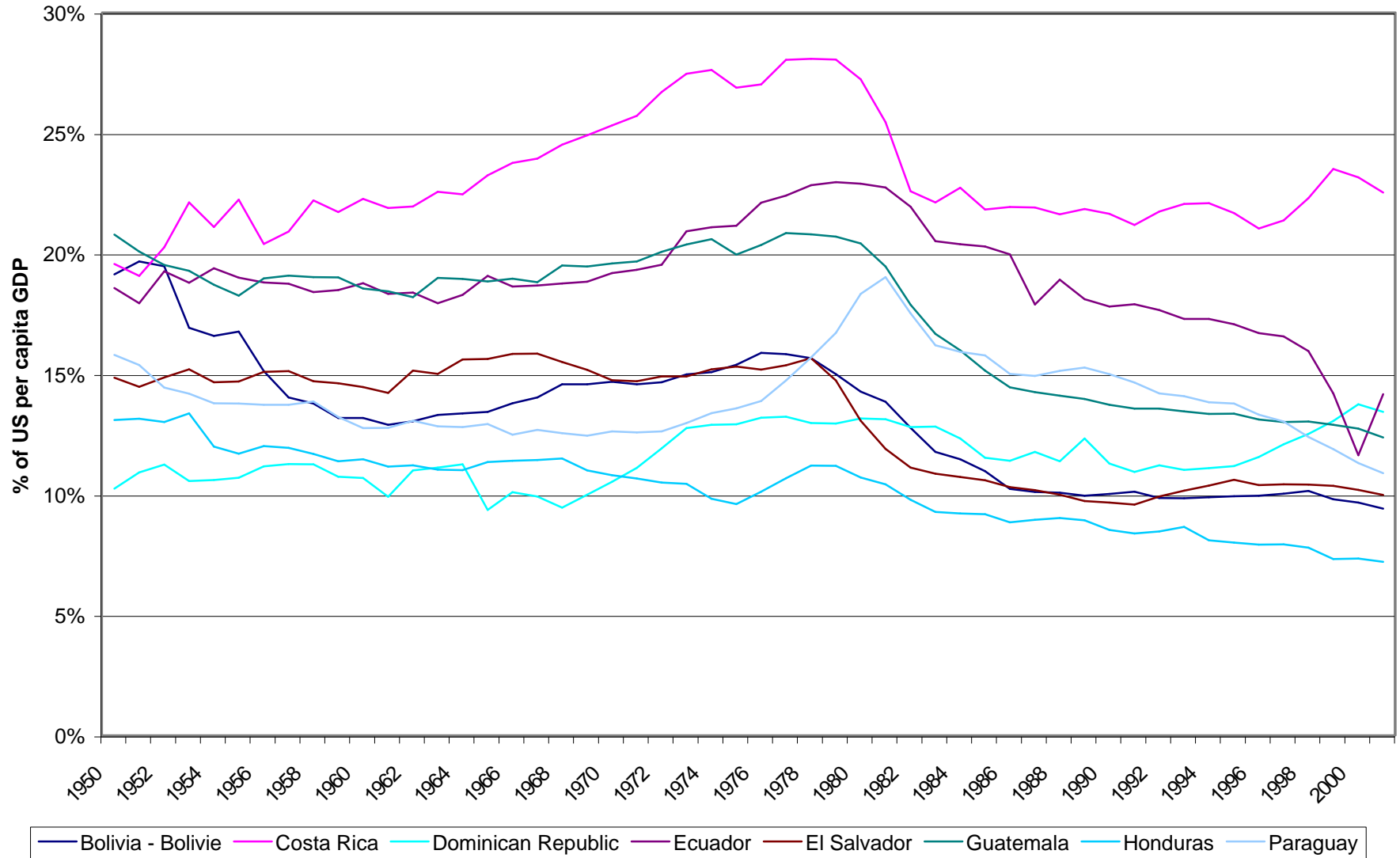


Figure 3: Per Capita GDP for other LAC



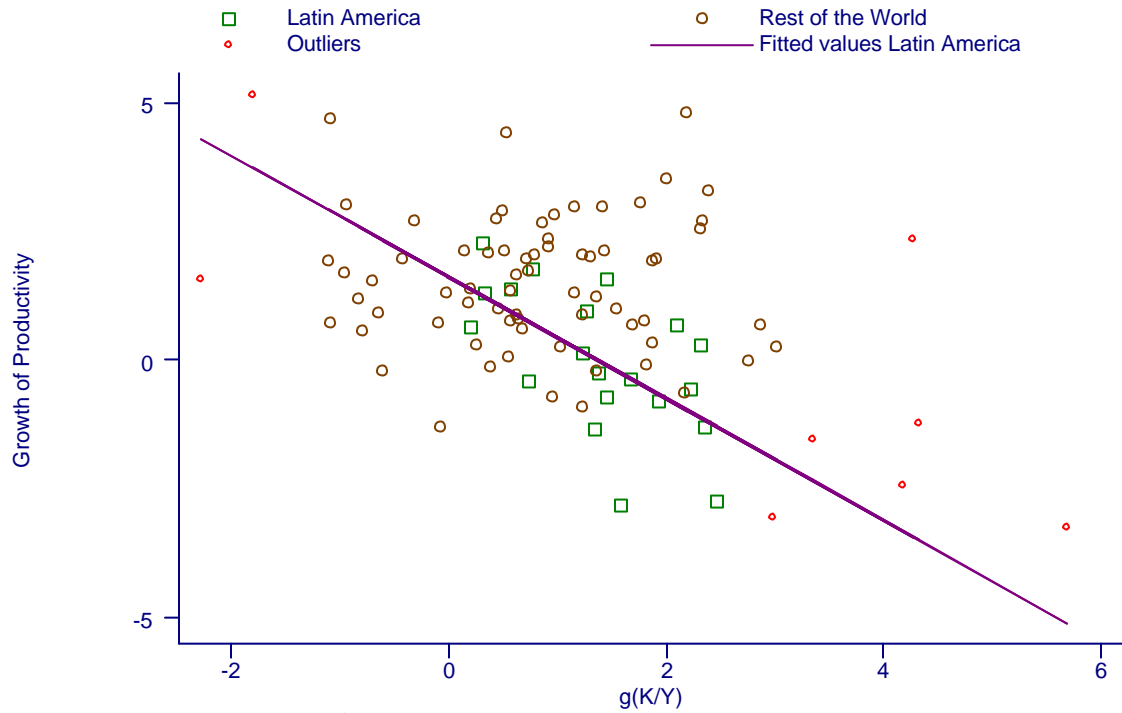


Figure 4: Growth of Productivity and Capital intensity

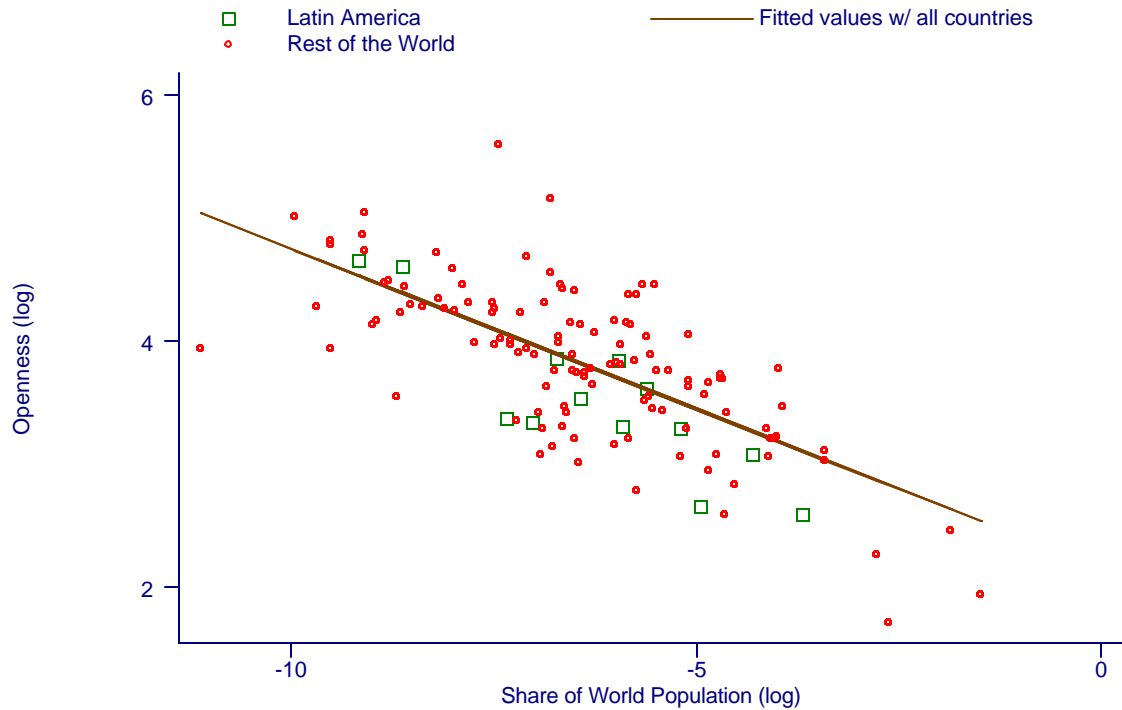


Figure 5: Openness and Population: 1950-1970

Figure 6. Openness in Latin America

