CONVERGENCE, CATCH UP, AND THE FUTURE

OF LATIN AMERICA

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1. Introduction

Simón Bolívar, the great liberator of South America who dreamed of a united continent, once bemoaned that attempts to unite South America were as futile as plowing the sea. Two centuries later in August 2000, twelve South American presidents met in Brasilia, Brazil to discuss regional issues of political and economic integration. Led by the regional heavyweight of Brazil--which accounts for the bulk of the region's landmass, economic output, and population--the summit is but a further sign of a recent trend towards regional integration. Just a few years ago, and in an effort to curtail invasions of soldiers or products, rail-gauges between Brazil and Argentina were non-compatible. Today, an ambitious project of continental communication networks, riverways, highways, and ports is underway to link the Atlantic with the Pacific.[1] And while the regional ANDEAN and MERCOSUR trading blocs have been beset by crises and challenges, the real gains in trade and political integration would have been unimaginable just a few years ago. In addition to the 2,000 summit, the South American presidents met together with all the leaders of the European Union countries in 1999, with the goal of establishing a trading block between the two continents. Current proposals for a hemispheric free trade area, the FTAA (Free Trade Area of the Americas), and even the free circulation of labor are no longer simple pipe-dreams. South America is each year looking more like an economic and political unit.

Competition from other trade blocs such as NAFTA and the EU, efforts in a regional defense of democratic processes, and trade liberalization under GATT and the WTO are potential

contributors to the regional integration process. In this paper, we examine an additional variable as a potential factor, economic convergence.

The effect of economic integration and trade liberalization on per capita or per worker income convergence has been examined repeatedly. The question typically asked is; does economic liberalization lead to convergence? Studies have examined convergence in single countries such as the United States (Sukkoo 1998) and Colombia (Cardenas and Ponton 1995), and in regions such as NAFTA, European Union, or Asia (Barro and Sala-i-Martin 1991; Dan 1993; Felipe 1999). Pan (1999), Sachs and Warner (1995), and Slaughter (1997) examine the effect of trade openness on convergence of per capita income with the two former studies affirming a positive relationship and the latter questioning the relationship. These and many other important studies focus on convergence as the outcome or dependent variable and integration and the subsequent flows of trade, technology, or capital as the causal variables.

We are also interested in the empirical question of whether or not the per capita incomes in certain groups of countries are tending to converge. Our concern is not, however, with whether economic variables induce convergence. Rather, our starting point is the simple observation that regional integration and trading blocs are the result of political processes. An examination of EU expansion, the creation of NAFTA, or the emergence of MERCOSUR reveals that future convergence is not merely a goal of economic integration, but that prior convergence is a crucial component of the political process leading to integration. In the European area, there has been political resistance to accepting new members whose economies are seen as underdeveloped with low wages that may lead to a wave of immigrants. In 1974, the EEC Commission issued a formal opinion that Greece was not economically prepared for membership.[2] And today, the EU is careful to court new members that are demonstrating

economic success (the Czech Republic has a much better chance of being accepted than does Romania). Ross Perot's "giant sucking sound" nearly undermined NAFTA, and the limited nature of the agreement owes much to the economic disparities between Mexico and its two northern neighbors.[3] And in Argentina, there was not only little interest but outright disdain for regional economic integration when their per-capita GDP was triple that of its neighbors (Brazil, Bolivia, Chile, and Paraguay).[4] Argentina wanted nothing to do with the region, preferring to act as a stranded European country. MERCOSUR occurred only after a period of catch-up by the neighbors, particularly Brazil. It is a stylized fact that economic convergence contributes to regional integration and economic divergence hinders integration.

The biggest prize of economic integration in the hemisphere remains the Free Trade Area of the Americas (FTAA), scheduled to begin in 2005. The FTAA was announced with much fanfare by the Clinton Administration and embraced by Latin American leaders. While the commitment remains strong in Latin America, the U.S. commitment has grown cold, if not frigid. While domestic political issues such as the Congress's unwillingness to grant President Clinton Fast-Track Authority for trade, it must be accepted that politically powerful sectors such as labor and agriculture as well as nationalists such as Pat Buchanan view poor low-wage countries such as Haiti and Honduras as economically incompatible as free-trade partners. Again, there is a strong relationship between convergence and integration.

With this relationship in mind, we ask the following specific questions about convergence in the region.

(1) Have incomes tended to converge within the Western Hemisphere, and within sub-regions of the hemisphere in the post-WWII era?

(2) Have the incomes of Latin American countries tended to catch up with that of the United States?

(3) What annual growth rates of per capital income will the countries in the region have to achieve if they want to have the same per capita income as the US within a given number of years?

(4) If future growth rates mirror those in the past half-century and if current population projections are accurate, what will the region's economic and population disparities look like in the year 2020?

The answers to these questions will provide the foundation for a discussion of the relative pace of integration in the hemisphere and the region. In addition, it will permit predictions about the prospects for regional and sub-regional integration in the future.

The sample of cases considered includes Costa Rica, the Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Puerto Rico, and Trinidad and Tobago for the subset of Central America and the Caribbean; and Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela for South America. The period of study is 1950-1992. Data on output and the share of investment in output are from the Penn World Tables, downloaded from the web site at the University of Pennsylvania. Human capital is from the STARS database at the World Bank. Population data are from the ECLAC (Economic Commission for Latin America and the Caribbean) database. The rest of the paper is structured as follows. In Section 2 we test the hypothesis of absolute convergence in the region, using the notions of sigma and beta convergence. In Section 3, we discuss the notion of catch-up. In section 4 we perform a simple textbook exercise and estimate the number of years it will take the Latin American countries to

catch up with the US in terms of per-capita income. In Section 5, we try to explain growth in

Latin America through its main determinants. In section 6 we discuss the relationship between

convergence and integration.

1.1 Latin America as a Region

The proposition that there is a link between the rate of growth in a country and in

neighboring countries is long and rich. In the classical period of economic thought, the

relationship was frequently thought to be negative and parasitic; with countries growing at the

expense of their neighbors. Technological progress and gains in trade brought a reversal in

thought and the dominant view that growth is contagious for both closed and open economies,

with convergence stronger in open economies (see Elmslie and Criss 1999; Robson 1998, chs.

2,3, and 12).[5]

Constituting a big neighborhood, Latin America as a region and as sub-regions should

experience economic convergence according to the neoclassical model (Robson 1998, 238). The

region also exhibits certain broad commonalties in regards to its economic, social, political, and

cultural history. Recent works by economists such as Bulmer-Thomas (1994), Edwards (1995),

and Thorp (1998) examine the history of economic policies in Latin America and describe the

broad regional shifts in economic policies. With few exceptions, such as Castro's Cuba, Latin

American countries have generally followed roughly similar economic prescriptions, albeit with

a few countries slightly ahead of or behind the regional pack. In the latter half of the 19th

Century, liberalism, free trade, and commodity exports were widely accepted as the path to

development. During World War 1, with a paucity of manufactured goods to import, countries

of the region began to focus on domestic industrialization. The influence of Raul Prebisch and

the Economic Commission for Latin America and the Caribbean enhanced the inward economic orientation, and led to a prolonged period of import-substitution-industrialization. ISI ran out of steam in the 1970s, and the debt crisis of the 1980s led to neo-liberal policies of small-government, privatization, non-traditional exports, and trade liberalization.

Political scientists have also highlighted the broad similarities in Latin America. Susan Eckstein notes that despite the heterogeneity and diversity in the region, "Latin America's broader repertoire is rooted in its distinctive political history" (1989, 10-11).[6] The commonalties in the region has led many to exploit Latin America as a "…fertile laboratory for studying comparative economic, social, and political change" (Wiarda and Kline 1996, 533). Finally, observers of East Asian economic growth have employed Weberian notions of culture to account for economic performance. And De Long (1986) finds a significant relationship between religion and growth. Latin America shares a common dominant religion and recent survey research has identified a common political culture in the region (Inglehart and Carballo, 1997).

Latin America represents the region of the developing world that is most similar in cultural, economic, and political terms. There is significant evidence that the region's economic fortunes are tied together. All of the countries of Latin America suffered economic contraction during the "lost decade" of the 1980s and the 1992 Mexican Peso crisis triggered recessions from the Rio Grande to Patagonia. Recent studies on the correlates of economic growth show that even when controlling for up to 59 independent variables, the Latin America dummy variable is highly significant; suggesting that there is something about "Latin America" that is not captured by economic models of growth (Barro 1991; Sala-i-Martin 1997).

Given these broad similarities, one may conjecture that the region exhibits economic convergence. The convergence hypothesis posits that backwardness carries the potential for rapid productivity advances. Solow's neoclassical model (1956) predicts that, given universally available technology and an inverse relationship between income per head and the productivity of capital, per capita income across countries should converge. In addition, countries with large numbers of redundant workers in agriculture have an opportunity for rapid productivity growth by re-allocating labor (Abramovitz 1986). Honduras should growth faster than Costa Rica and Brazil faster than Argentina. Productivity and economic output per worker should converge in the region.

2. Convergence or Divergence in the Western Hemisphere?

The literature recognizes two distinct concepts of convergence (see Barro and Sala-i-Martin 1992). The first, referred to as sigma convergence, refers to a reduction in the cross-sectional variance of income per capita (or per worker) among a group of countries. Sigma convergence occurs when the dispersion of GDP per capita (worker) declines over time. Beta convergence, measures the extent to which poorer countries grow faster than richer countries. Beta convergence refers to the predicted inverse relationship between the initial level of income and the subsequent growth rate. Sigma convergence is determined visually by plots while Beta convergence is determined by regressions.[7]

Figures 1 and 2 plot the evolution of sigma convergence for both income per capita and income per worker for different samples of cases in the hemisphere--all of Latin America and the Caribbean (All LA), all of Latin America and the Caribbean plus the US (All + US), Central America and the Caribbean plus Mexico (CA + Car), and all of Continental South America (South Am.).[8] The graphs suggest that (a) incomes in the hemisphere are becoming more rather

than less dispersed in the hemisphere as a whole and in Central America and the Caribbean, while (b) in South America the long term trend is stable while there has been a considerable

Figure 1: Income per capita: sigma convergence

Figure 2: Income per worker: sigma convergence
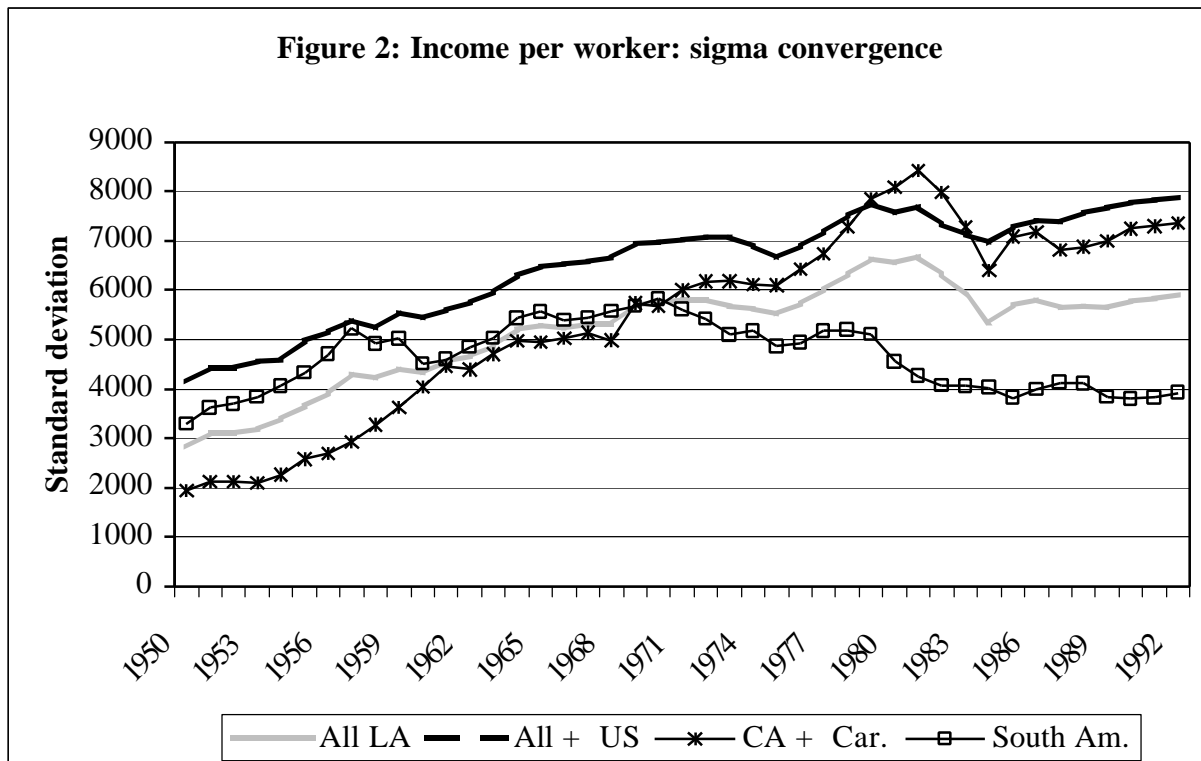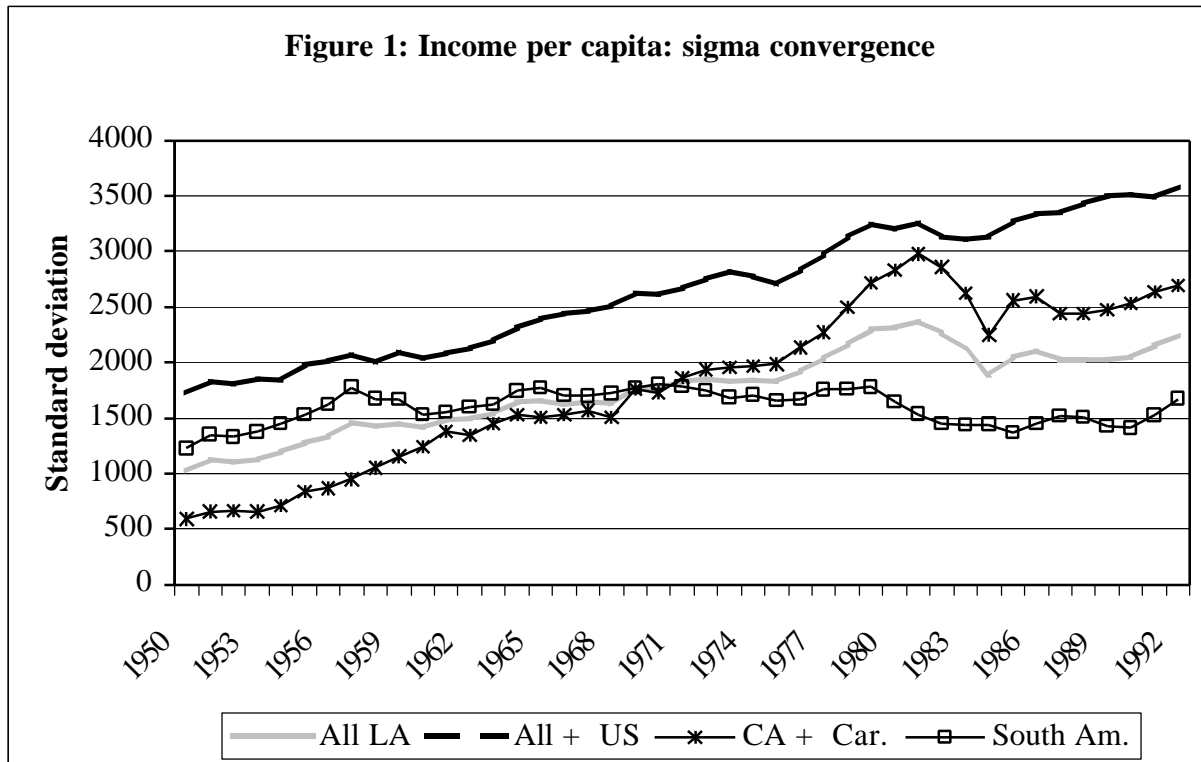
process of convergence (particularly per worker) in the 1970-1992 period. The figures also illustrate the impact of the financial crisis of the 1980s (the so-called lost decade) on convergence with a sharp decrease in dispersion 1981-1985, which was particularly strong in Central America and the Caribbean. There are pronounced and important differences between the convergence trends in Central America and South America. In 1950, CA+Car had the lowest levels of dispersion in the hemisphere while the dispersion in South America was much higher. These positions crossed around 1970 and by 1992 the dispersion was much more pronounced in CA+Car than in South America.

These trends are only partially supported by the measurement of Beta-convergence, reflecting the tendency of countries with relatively low initial levels of output per capita to grow relatively faster. The test for β-convergence consists of a regression of the growth rate of output per capita (or per worker), denoted $\Delta\ln\left(\dfrac{Y}{L}\right)_i$, for the periods 1950-55, 1955-60, 1960-65, 1965-70, 1970-75, 1975-80, 1980-85, and 1985-92 on the level of per capita (per worker) at the beginning of each sub-period (i.e., 1950, 1955, etc.), denoted $\ln\left(\dfrac{Y}{L}\right)_i^0$. The hypothesis of convergence would be empirically supported if the parameter of the initial income variable (β) turns out to be negative, indicating that countries with a lower initial level grew faster than countries with higher levels. On the other hand, a positive sign indicates that initially richer countries grew faster, a finding that would be contrary to the convergence thesis.

TABLE 1. ABSOLUTE CONVERGENCE REGRESSION, $\Delta \ln\left(\dfrac{Y}{L}\right)_i = \alpha + \beta \ln\left(\dfrac{Y}{L}\right)_i^0$

CENTRAL AMERICA & CAR. (CA + CAR)(96 observations)			
PER CAPITA		PER WORKER	
β	R^2	β	R^2
0.00066	0.00021	-0.005	0.015
(0.14)		(-1.21)	
SOUTH AMERICA (96 observations)			
PER CAPITA		PER WORKER	
β	R^2	β	R^2
-0.1012	0.044	-0.017	0.069
(-2.09)		(-2.64)	
CENTRAL AND SOUTH AMERICA (ALL LA) (192 observations)			
PER CAPITA		PER WORKER	
β	R^2	β	R^2
-0.0056	0.012	-0.010	0.038
(-1.52)		(-2.74)	
CENTRAL AM., SOUTH AMERICA, AND U.S.A. (ALL+US) (200 observations)			
PER CAPITA		PER WORKER	
-0.0038	0.007	-0.008	0.032
(-1.22)		(-2.59)	

Periods: 1950-55, 1955-60, 1960-65, 1965-70, 1970-75, 1975-80, 1980-85, 1985-92
Central America and Car.: Costa Rica; Dom. Republic; El Salvador; Guatemala; Haiti; Honduras; Jamaica; Mexico; Nicaragua; Panama; Puerto Rico; Trinidad & Tobago.
South America: Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Guyana; Paraguay; Peru; Suriname; Uruguay; Venezuela.

The results are shown in Table 1. For Central America and the Caribbean, the parameters

for both per-capita and per-worker Beta-convergence are insignificant and close to zero,

indicating that the hypothesis of a lack of convergence (β =0) is not rejected. While there is no

beta-convergence in Central America, Beta-convergence has occurred in South America. The

parameters are negative (indicating beta-convergence) and significant for both income per capita

and per worker. In South America, there is a inverse relationship between level of income and

subsequent growth--poor countries grow faster than rich countries.

Figures 3 and 4 show the scatter plots of the growth rates of per-capita (per-worker)

income on the initial levels for the broad sample of Central and South American countries, and

the U.S. Both graphs show the slight negative relationship between both variables obtained in the regressions.

[FIGURES 3, 4 ABOUT HERE]

The difference between Sigma and Beta convergence is highlighted by comparing the ALL LA and ALL + US results from Figures 2 with the results in Table 1. Figure 2 demonstrates sigma divergence for these two samples while at the same time Table 1 confirms beta convergence of per worker income for Latin America as a whole both with and without the United States. How is this possible? This difference highlights one of the secrets of convergence; poor countries can grow faster than wealthier countries even while the dispersion of income continues to widen. Let us take for example the cases of the Dominican Republic and Chile

Table 2: Beta and Sigma conversion in two cases

Country	1950 PCGDP (1985 US$)	1950-1992 Growth Rate	1992 PCGDP (1985 US$)
Dom. Republic	949	2.28%	2,250
Chile	2,431	1.18%	4,890

In this example, the Dominican Republic is poorer than Chile in the initial period (1950). As predicted by Beta convergence, the initially poorer country had a faster growth rate than did initially wealthier country over the 1950-1992 period. Indeed, in this case the growth rate was roughly twice as high in the Dominican Republic than in Chile. In spite of this Beta convergence, however, there was an increase in the dispersion of income from a standard deviation of $741 in 1950 to $1320 in 1992. Faster economic growth in poor countries (Beta convergence) does not necessarily result in a reduced dispersion of income (Sigma convergence), particularly when the initial dispersion is pronounced.

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These results indicate that the poor countries of Latin America have had faster growth rates of per worker income than have the richer countries in the 1950-1992 period. Nevertheless, the dispersion of income per worker and per capita has continued to widen in the overall sample. In Central America, there has been a sharp increase in income dispersion and no Beta convergence--the poor countries in this region at the beginning of the period have not registered higher growth rates than the richer countries. Central America is diverging considerably as a region. At the same time, South America exhibits Beta convergence in both per worker and per capita income, and Sigma convergence since 1970. South America is converging.

3. Catching up: Meaning and Implications

The so-called "catch-up hypothesis" is best articulated by Abramovitz (1986), who argued that technological leaders gain limited productivity gains when they replace old technology; while at the same time, technologically-backward countries can experience large productivity increases using the leaders' discarded technology. The neoclassical models posit that countries with low capital-labor ratios should catch up to the level of the developed countries because: (1) higher interest rates should induce higher domestic savings; (2) higher rates should attract foreign investment; and (3) the marginal productivity of a unit of invested capital is higher. Technology spillover from the advanced to the backward countries--mainly via international trade and foreign investment--is the principal mechanism behind the catch-up process. According to Abramovitz, "…the larger the technological and, therefore, the productivity gap between leader and follower, the stronger the follower's potential for growth in productivity; and, other things being equal, the faster one expects the follower's growth rate to be. Followers tend to catch up faster if they are initially more backwards" (386-387).

Gerschenkron (1962) also discusses the potential advantages of "economic backwardness" in the industrialization process. Gerschenkron used case studies to demonstrate how government economic policies could produce rapid industrialization in backwards countries. Evidence shows that the catch-up process operated in the post-World War II period, and that it permitted Europe and Japan to catch up to the US level (Baumol 1986). The problem is with the idea of an automatic catch-up due to technology spillovers. In practice this seems unlikely as the assimilation of technology is not an automatic process, but rather dependent on a complex set of variables (Hobday 1995; Freeman and Soete 1997)

In the Western Hemisphere, the US is the technological leader and the potential source of considerable technological spillover. The notion of catch up refers to a reduction in the gap between leader and followers. In this section, we ask whether there is empirical evidence of catch-up between the Latin American countries and the US. To this purpose we use Verspagen's (1991) catch-up equation. This is a relationship between the initial gap between the leader and the country in question, and the speed with which the gap is closed. We test this idea using a linear and a non-linear relationship. In the first case,

$$\Delta(\text{GAP}) = \alpha + \beta\,\text{GAP}_0 + \gamma\,\text{HUCAP}_0 \tag{1}$$

where GAP denotes the gap between the U.S. and the country. GAP is calculated as

$\text{GAP} = 1 - \dfrac{Y_i}{Y_{US}}$, where Y_i is the income of the country, and Y_{US} is US income. Defined this way,

$0 \le \text{GAP} \le 1$. GAP_0 measures the gap at the beginning of the period, while $\Delta(\text{GAP})$ is the growth of the gap. Note that a positive $\Delta(\text{GAP})$ indicates that the country is getting poorer with respect to the U.S. The regression controls for the level of human capital at the beginning of the period (HUCAP_0), which represents the intrinsic learning capability. The latter is measured as total

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number of years of schooling of the working population. Defined this way, catch up implies

negative signs on both regressors. Estimation results are shown in Table 3.

TABLE 3. LINEAR CATCH UP REGRESSIONS, $\Delta(GAP) = \alpha + \beta\, GAP_0 + \gamma\, HUCAP_0$

CENTRAL AMERICA							
PER CAPITA (39 observations)				PER WORKER (39 observations)			
α	β	δ	R^2	α	β	δ	R^2
-0.30	0.36	0.0003	0.15	-0.34	0.45	-0.002	0.18
(-1.52)	(1.75)	(0.045)		(-2.04)	(2.16)	(-0.29)	
SOUTH AMERICA							
PER CAPITA (50 observations)				PER WORKER (50 observations)			
α	β	δ	R^2	α	β	δ	R^2
-0.23	0.27	0.007	0.08	-0.14	0.21	0.002	0.03
(-1.08)	(1.25)	(0.44)		(-0.47)	(0.65)	(0.08)	
CENTRAL AMERICA AND SOUTH AMERICA (89 observations)							
PER CAPITA				PER WORKER			
-0.19	0.23	0.002	0.076	-0.12	0.20	-0.003	0.03
(-1.05)	(1.24)	(0.25)		(-0.45)	(0.69)	(-0.21)	

White heteroscedastic-consistent standard errors; Periods: 1960-65; 1965-70; 1970-75; 1975-80; 1980-85.
Central America and Car.: Costa Rica; El Salvador; Guatemala; Haiti; Honduras; Jamaica; Mexico; Panama.
South America: Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Paraguay; Peru; Uruguay; Venezuela.

The results clearly indicate that in none of the cases considered has there been an overall

phenomenon of catch up (of course it could have happened in some individual cases). The

interesting point is that in all cases the point estimate is positive, and in some cases even

significant. Furthermore, the human capital variable is insignificant.

The non-linear relationship is as follows:

$$\Delta(GAP) = \alpha + \beta\, GAP_0 \times e^{\delta[GAP_0/HUCAP_0]} + \gamma\, HUCAP_0 \qquad (2)$$

where "e" is the exponential number. This relationship indicates that the more backward a

country is, the more difficult it is to benefit from the various knowledge spillovers that are

supposed to be instrumental in catching up. This effect is lessened by HUCAP which, again,

represents the intrinsic learning capability. The larger the latter the smaller the technological

distance effect. Equation (2) indicates that, for a given intrinsic leaning capability, there is a

threshold value of the technology gap above which catch-up is not possible. Evidence of catch up would be if $\hat{\beta} < 0, \hat{\delta} < 0, \hat{\gamma} < 0$ indicating that the countries with the larger initial gap with the U.S. are the ones closing it faster.

Estimation results are shown in Table 4. These results corroborate what we found with the linear regression, namely, that there has been no catch up.

TABLE 4. NON-LINEAR CATCH UP REGRESSIONS

$$\Delta(\text{GAP}) = \alpha + \beta\,\text{GAP}_0 \times e^{\delta[\text{GAP}_0/\text{HUCAP}_0]} + \gamma\,\text{HUCAP}_0$$

CENTRAL AMERICA (39 observations)									
PER CAPITA					PER WORKER				
α	β	δ	γ	R^2	α	β	δ	γ	R^2
-0.21	0.17	0.86	0.008	0.21	-0.18	0.13	1.41	0.008	0.23
(-0.98)	(0.72)	(0.69)	(0.94)		(-1.13)	(0.61)	(0.62)	(0.81)	
SOUTH AMERICA (50 observations)									
PER CAPITA					PER WORKER (*)				
α	β	δ	γ	R^2	α	β	δ	γ	R^2
-0.28	0.07	4.34	0.03	0.11					
(-1.25)	(0.67)	(1.27)	(1.24)						
CENTRAL AND SOUTH AMERICA (89 observations)									
PER CAPITA					PER WORKER				
α	β	δ	γ	R^2	α	β	δ	γ	R^2
-0.21	0.16	0.98	0.012	0.09	-0.16	0.11	1.80	0.012	0.05
(-1.12)	(0.91)	(1.01)	(0.95)		(-0.62)	(0.44)	(0.65)	(0.63)	

Equation estimated using non-linear least squares. * indicates that the algorithm did not convergence; White heteroscedastic-consistent standard errors. Periods: 1960-65; 1965-70; 1970-75; 1975-80; 1980-85.
Central America and Car.: Costa Rica; El Salvador; Guatemala; Haiti; Honduras; Jamaica; Mexico; Panama.
South America: Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Paraguay; Peru; Uruguay; Venezuela.

Figures 5 and 6 show the scatter plot of the growth rate of the gap with the U.S. in per-capita and per-worker terms on the initial gap. Clearly, there is no negative relationship.

4. Does Growth Matter? The Tyranny of the Numbers

In light of the results above it is interesting to ask the following: how long will it take the Latin American countries to catch up to the US level (in per capita income in PPP terms)? Or its isomorphic question, what is the annual growth rate that the Latin American countries have to achieve if they want to catch up with the US in per capita income and is this growth rate feasible? Some countries in the region, such as Chile and Mexico, have indicated that they have goals of becoming an industrialized nation; Mexico is now a member of the OECD and Chile markets itself as the Latin tiger. The framework to answer these questions is given by the following relationship:

$$Y_{US}^0 \, e^{r_{US} \, t} = Y_i^0 \, e^{r_i \, t} \tag{3}$$

where Y_{US}^0 is the initial income of the U.S., Y_i^0 is the initial income of the Latin American country in question (both known), r_{US} and r_i are the annual growth rates of the US and the Latin American country, respectively, and "t" denotes time. The starting point is 1992, the latest available year in the Penn World Table Mark 5.6, and it is assumed that per-capita income in the US will grow at an annual rate of 1.75% (i.e., r_{US}=1.75%). The results are presented in Tables 5-6 (time to catch up) and Tables 7-8 (required growth rate to catch up in a given year). The first two tables are constructed by solving equation (3) for "t"; while the other two tables are constructed by solving equation (3) for r_i. We stress that these are not a forecast of the countries' growth rates. Rather, they show how fast the countries would *need to grow* to achieve the target and do not have any policy implications in themselves. The data does, however, provide information that can be used to judge the validity of certain policies and targets. It must also be remembered that, given the length of the periods considered, per capita incomes are not strictly comparable due to structural changes in the economy (e.g. we do not know the basket of goods and services

that will be available in the year 2100; just think about the difference between the available

goods of 1900 and today)

TABLE 5. REQUIRED ANNUAL GROWTH RATE (%) TO CATCH UP WITH THE U.S. IN PER CAPITA TERMS IN A GIVEN YEAR*

	2005	2025	2050	2075	2100	2200
C. RICA	14.17	6.64	4.53	3.70	3.25	2.53
D. REPUB.	14.72	8.04	5.33	4.25	3.67	2.75
E. SALVAD.	19.12	8.59	5.64	4.47	3.84	2.84
GUATEM.	17.73	8.05	5.33	4.25	3.67	2.75
HAITI	25.58	11.14	7.09	5.48	4.62	3.24
HONDURAS	21.45	9.51	6.17	4.84	4.12	2.98
JAMAICA	16.91	7.72	5.15	4.12	3.58	2.70
MEXICO	9.86	4.94	3.57	3.02	2.73	2.26
NICARAGUA	22.09	9.76	6.31	4.94	4.20	3.02
PANAMA	14.70	6.85	4.65	3.78	3.31	2.56
P. RICO	6.97	3.81	2.92	2.57	2.38	2.08
TR. & TOB.	7.50	4.01	3.04	2.65	2.44	2.11
ARGENTINA	12.02	5.80	4.05	3.36	2.99	2.39
BOLIVIA	19.78	8.85	5.79	4.57	3.92	2.88
BRAZIL	13.53	6.39	4.39	3.59	3.17	2.49
CHILE	11.75	5.69	3.99	3.32	2.95	2.38
COLOMBIA	14.59	6.81	4.33	3.76	3.30	2.55
ECUADOR	15.96	7.35	4.93	3.98	3.46	2.64
GUYANA	23.37	10.27	6.60	5.14	4.35	3.10
PARAGUAY	17.97	8.14	5.39	4.29	3.70	2.76
PERU	18.28	8.26	5.46	4.34	3.74	2.78
SURINAM	17.07	7.78	5.18	4.15	3.59	2.71
URUGUAY	11.30	5.51	3.89	3.25	2.90	2.35
VENEZUELA	8.90	4.57	3.35	2.87	2.61	2.20

* Assumption: U.S. annual growth rate= 1.75%. The starting year is 1992.

**TABLE 6. REQUIRED ANNUAL GROWTH RATE (%) TO CATCH UP WITH THE
U.S. IN PER WORKER TERMS IN A GIVEN YEAR***

	2005	2025	2050	2075	2100	2200
C. RICA	11.50	5.59	3.94	3.28	2.92	2.36
D. REPUB.	14.44	6.75	4.59	3.74	3.28	2.54
E. SALVD.	16.30	7.48	5.01	4.03	3.50	2.66
GUATEM.	14.11	6.61	4.52	3.68	3.24	2.52
HAITI	24.59	10.75	6.87	5.33	4.50	3.18
HONDURAS	17.72	8.04	5.33	4.25	3.67	2.75
JAMAICA	16.84	7.69	5.13	4.11	3.57	2.69
MEXICO	7.70	4.09	3.08	2.68	2.47	2.12
NICARAGUA	18.69	8.42	5.55	4.40	3.79	2.81
PANAMA	13.36	6.32	4.35	3.57	3.15	2.48
P. RICO	4.04	2.66	2.27	2.11	2.03	1.89
TR. & TOB.	6.43	3.59	2.80	2.48	2.31	2.04
ARGENTINA	8.98	4.60	3.37	2.88	2.62	2.20
BOLIVIA	16.68	7.63	5.10	4.09	3.55	2.68
BRAZIL	10.89	5.35	3.80	3.18	2.85	2.32
CHILE	10.43	5.17	3.70	3.11	2.80	2.29
COLOMBIA	11.74	5.69	3.99	3.32	2.95	2.37
ECUADOR	12.56	6.01	4.17	3.44	3.05	2.43
GUYANA	21.10	9.37	6.09	4.78	4.08	2.96
PARAGUAY	15.27	7.08	4.78	3.87	3.38	2.59
PERU	14.59	6.81	4.63	3.76	3.30	2.55
SURINAM	14.15	6.64	4.53	3.69	3.24	2.53
URUGUAY	10.69	5.27	3.75	3.15	2.83	2.31
VENEZUELA	7.51	4.02	3.04	2.65	2.44	2.11

* Assumption: U.S. annual growth rate= 1.75%. The starting year is 1992.

TABLE 7. YEAR CATCH UP WITH THE U.S. IN PER CAPITA TERMS OCCURS IF THE COUNTRY REGISTERS A GIVEN ANNUAL GROWTH RATE (%)

	2	3	4	5	6	7
C. RICA	2638	2121	2064	2042	2030	2023
D. REPUB.	2823	2158	2084	2056	2041	2032
E. SALVD.	2895	2173	2092	2061	2045	2035
GUATEM.	2823	2158	2084	2056	2041	2032
HAITI	3231	2240	2130	2087	2065	2051
HONDURAS	3017	2197	2106	2071	2052	2041
JAMAICA	2780	2150	2080	2053	2038	2030
MEXICO	2414	2070	2039	2024	2017	2012
NICARAGUA	3050	2204	2110	2073	2054	2042
PANAMA	2665	2127	2067	2044	2032	2024
P. RICO	2264	2046	2022	2013	2008	2005
TR. & TOB.	2291	2052	2025	2015	2010	2006
ARGENTINA	2526	2099	2051	2033	2023	2017
BOLIVIA	2930	2180	2096	2064	2047	2037
BRAZIL	2604	2114	2060	2039	2028	2021
CHILE	2512	2096	2050	2032	2023	2017
COLOMBIA	2660	2126	2066	2043	2031	2024
ECUADOR	2731	2140	2074	2049	2035	2027
GUYANA	3116	2217	2117	2078	2058	2046
PARAGUAY	2816	2161	2086	2057	2042	2032
PERU	2852	2164	2088	2058	2043	2033
SURINAM	2788	2151	2080	2053	2039	2030
URUGUAY	2489	2091	2047	2030	2021	2016
VENEZUELA	2364	2066	2033	2021	2014	2010

* Assumption: U.S. annual growth rate= 1.75%. The starting year is 1992.

TABLE 8: YEAR CATCH UP WITH THE U.S. IN PER WORKER TERMS OCCURS IF THE COUNTRY REGISTERS A GIVEN ANNUAL GROWTH RATE (%)

	2	3	4	5	6	7
C. RICA	2499	2093	2048	2031	2022	2016
D. REPUB.	2652	2124	2065	2043	2031	2023
E. SALVD.	2748	2143	2076	2050	2036	2028
GUATEM.	2634	2120	2063	2041	2030	2023
HAITI	3180	2230	2124	2083	2062	2049
HONDURAS	2823	2158	2084	2056	2041	2032
JAMAICA	2776	2149	2079	2052	2038	2029
MEXICO	2301	2054	2026	2016	2010	2007
NICARAGUA	2873	2168	2090	2060	2044	2034
PANAMA	2596	2113	2059	2038	2028	2021
P. RICO	2112	2016	2005	2001	1999	1998
TR. & TOB.	2235	2041	2019	2011	2006	2004
ARGENTINA	2368	2067	2034	2021	2014	2010
BOLIVIA	2768	2147	2078	2052	2038	2029
BRAZIL	2468	2087	2045	2029	2020	2015
CHILE	2443	2082	2042	2027	2019	2013
COLOMBIA	2512	2096	2050	2032	2023	2017
ECUADOR	2554	2104	2054	2035	2025	2019
GUYANA	2998	2193	2104	2069	2051	2040
PARAGUAY	2695	2133	2070	2046	2033	2025
PERU	2660	2126	2066	2043	2031	2024
SURINAM	2637	2121	2064	2042	2030	2023
URUGUAY	2457	2085	2044	2028	2019	2014
VENEZUELA	2291	2052	2025	2015	2010	2006

* Assumption: U.S. annual growth rate= 1.75%. The starting year is 1992.

The numbers in these tables reveal that outside of the special territory of Puerto Rico, prospects are particularly gloomy that any of these cases will catch-up with the United States in the foreseeable future. We should emphasize that these scenarios are based on per capita growth, and not total economic growth. If a country has 2% population growth, then they would need an impressive economic growth rate of 5% merely to achieve 3% per capita growth. We will return to the question of population growth below. What may we hope for in growth rates in the region in the future? Perhaps the best prediction of the future is performance in the past. Tables 9 and 10 present the performance of the economies in the region in both per-capita and per-worker

terms for 1950-92 and by decades. Certainly we should be very cautious about overly optimistic

growth forecasts. Take, for example, a country like Nicaragua which, for the four decades

considered, achieved annual growth rates in both per-capita and per-workers terms well below

1%. The best Nicaragua did was to achieve rates of around 4%, but only for one decade, 1960-

1970. We feel skeptical about the possibility that Nicaragua will achieve an average annual

growth rate of 4% during the next 100 years (this is the required growth rate to catch up with the

U.S. around the year 2100. See tables 6-8).

TABLE 9. PER CAPITA INCOME ANNUAL GROWTH RATE (%). CENTRAL AMERICA, SOUTH AMERICA, AND U.S.A.

	1950-1992	1950-1960	1960-1970	1970-1980	1980-19921
C. RICA	2.02	3.64	3.32	2.80	0.42
D. REPUB.	2.28	2.11	1.96	3.37	-0.23
E. SALVD.	1.01	1.79	2.80	2.13	-0.0005
GUATEM.	1.16	1.02	1.86	2.71	-1.20
HAITI	-0.0004*	n.a.	-0.90	1.59	-1.90
HONDURAS	1.07	0.64	1.95	2.48	-0.56
JAMAICA	1.75	5.32	4.57	-1.41	0.56
MEXICO	2.65	2.58	3.70	3.55	-0.15
NICARAGUA	0.18	2.75	4.12	-1.77	-4.00
PANAMA	2.64	2.12	2.64	1.64	-1.44
P. RICO	3.84	6.11	6.00	1.51	2.99
TR. & TOB.	2.52	6.20	1.50	4.98	-3.30
ARGENTINA	0.81	1.26	2.26	0.98	-2.34
BOLIVIA	1.23	-1.94	3.72	2.18	-1.44
BRAZIL	3.29	3.56	2.44	5.34	-0.0006
CHILE	1.18	1.25	2.21	-0.54	2.21
COLOMBIA	2.14	1.13	2.14	3.04	1.33
ECUADOR	2.56	1.83	3.06	6.41	-1.23
GUYANA	-0.46	-1.42	1.94	1.31	-4.42
PARAGUAY	1.90	-0.0004	1.60	5.36	-1.44
PERU	1.13	2.30	2.75	0.30	-2.73
SURINAM	1.10*	n.a.	4.78	3.80	-4.33
URUGUAY	0.52	0.75	-0.0005	2.03	0.34
VENEZUELA	0.37	3.44	1.95	0.52	-0.73
U.S.A.	1.85	1.04	3.10	1.74	1.69

* 1960-1992; n.a.: not available

TABLE 10. PER WORKER INCOME ANNUAL GROWTH RATE (%). CENTRAL AMERICA, SOUTH AMERICA, AND U.S.A.

	1950-1992	1950-1960	1960-1970	1970-1980	1980-1992
C. RICA	1.80	4.74	3.33	1.73	0.41
D. REPUB.	2.34	3.31	2.67	2.90	-1.05
E. SALVD.	1.07	2.57	2.70	2.11	-0.18
GUATEM.	1.56	1.70	2.22	3.32	-1.42
HAITI	0.90*	n.a.	-0.0008	3.03	-1.67
HONDURAS	1.34	1.12	2.55	2.73	-0.89
JAMAICA	1.59	8.14	5.29	-2.78	-3.54
MEXICO	2.37	3.35	4.22	2.31	-1.05
NICARAG.	0.34	3.38	4.51	-1.65	-4.48
PANAMA	2.50	2.70	4.57	1.66	-2.64
P. RICO	3.15	4.53	5.27	0.82	2.52
TR. & TOB.	2.18	7.09	1.53	4.11	-4.34
ARGENTINA	1.25	1.78	2.37	1.63	-1.64
BOLIVIA	1.63	-1.36	4.28	2.65	-1.62
BRAZIL	2.96	3.96	2.21	4.30	0.31
CHILE	0.98	1.97	2.74	-1.34	1.06
COLOMBIA	2.15	2.21	2.38	2.70	0.80
ECUADOR	2.89	2.43	3.61	6.73	-1.49
GUYANA	-0.96	-0.0004	2.03	-0.44	-5.11
PARAGUAY	1.97	0.81	1.76	5.15	-1.64
PERU	1.27	2.86	3.63	-0.28	-2.69
SURINAM	0.42	0.42	5.24	2.84	-5.36
URUGUAY	0.62	0.99	0.19	2.16	-0.27
VENEZUELA	-0.0009	4.19	2.62	-0.75	-1.93
U.S.A.	1.34	1.59	2.61	0.48	1.69

* 1960-1992; n.a.: not available

5. Explaining Growth

In this section we test a simple model with view to explaining growth in Latin America. This model posits that the growth process could be explained in terms of four different elements: the Kaldor-Verdoorn law, the catch up phenomenon, the share of investment in output, and openness. The relation is as follows:

$$y = a_1 + a_2 q + a_3 GAP_0 + a_4 (I/Y)_0 + a_5 OPEN_0 \qquad (4)$$

where "y" is the growth rate of labor productivity; "q" is the growth rate of total output; GAP_0 is the gap with the U.S. at the beginning of the period; $(I/Y)_0$ is the share of investment in output at the beginning of the period; and $OPEN_0$ is the share of exports plus imports in total output at the beginning of the period. Kaldor (1966) hypothesized that the growth rate of labor productivity of a country is determined by the growth rate of output. This is the so-called Verdoorn law. Kaldor interpreted it as empirical evidence in favor of the existence of dynamic economies of scale. In Kaldor's view, demand growth facilitates the reallocation of employment toward more productive sectors. Kaldor hypothesized $0<a_2<1$. Investment and openness are hypothesized to play positive roles in the growth process.

Estimation results are displayed in Table 11. The results clearly show that the most important variable explaining the variation in the growth rates of labor productivity in Latin America is dynamic economies of scale via the Kaldor-Verdoorn law (i.e., expansion of production opens the way to more rationalization). *Ceteris paribus*, our results indicate that an increase in overall output (q) of 5% will bring about an increase in labor productivity (y) of around 4%. For Central America, results indicate that countries with initially higher investment and openness levels have done better. For South America, openness is marginally significant. Initial gap with the US and initial investment share are insignificant. And finally, when all countries are pooled together, all four variables are significant. However, the initial gap with the US variable displays a negative and significant sign.[9]

TABLE 11. EXPLAINING GROWTH IN LATIN AMERICA
$$y = a_1 + a_2 q + a_3 GAP_0 + a_4 (I/Y)_0 + a_5 OPEN_0$$

CENTRAL AMERICA (96 observations)					
a_1	a_2	a_3	a_4	a_5	R^2
-0.028	0.835	-0.006	0.0007	0.00007	0.916
(-4.55)	(23.52)	(-0.96)	(6.03)	(2.54)	
SOUTH AMERICA (96 observations)					

a_1	a_2	a_3	a_4	a_5	R^2
-0.022	0.919	0.002	-0.0002	0.00009	0.920
(-3.09)	(25.52)	(0.29)	(-0.90)	(1.98)	
CENTRAL AMERICA, SOUT AMERICA, U.S.A. (200 observations)					
a_1	a_2	a_3	a_4	a_5	R^2
-0.024	0.868	-0.008	0.0005	0.00005	0.906
(-6.21)	(39.52)	(-2.66)	(3.32)	(2.42)	

White heteroscedastic-consistent standard errors. Periods: 1950-55, 195-60, 1960-65, 1965-70, 1970-75, 1975-80, 1980-85, 1985-92.

Central America and Car.: Costa Rica; Dom. Republic; El Salvador; Guatemala; Haiti; Honduras; Jamaica; Mexico; Nicaragua; Panama; Puerto Rico; Trinidad & Tobago.

South America: Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Guyana; Paraguay; Peru; Suriname; Uruguay; Venezuela.

6. Convergence and Integration: Past, Present, and Future

This section discusses the relationship between convergence and integration. We are not interested in the effect of trade integration on economic convergence, as is typically the case. Rather, we will utilize the convergence results to explain past and present trends in integration. In addition, we calculate per-capita GDPs and the growth-rate of population for the cases for the year 2020 based on historical growth rates and current population forecasts, and make some predictions about the future of trade agreements in the hemisphere and in the sub-regions.

We stated above the stylized fact that trade pacts are more likely amongst countries with similar levels of GDP per capita than amongst countries with wide disparities. Why is this so?

> Two sets of concerns confront a chief negotiator in weighing the pros and cons of a free trade agreement. First, it is necessary to solve for conditions under which the country represented would enter the FTA with a specific group of countries. At the same time, and perhaps more importantly, the negotiator must consider the situation "back home." From a negotiator's perspective, therefore, the political feasibility of an FTA is a "two-level game" (Putnam 1998; Evans et al. 1993; Grossman and Helpman 1995 employ a variation of this framework.). In other words, that negotiator must assess political and economic conditions at the regional level, while being attentive to what will fly with the

political elite and the key demand claimants on the home front. (Lee and Woodall
1998, 163).

The authors specify three sets of conditions that affect the likelihood of a successful free
trade pact; (1) close geographic proximity, (2) compatible political regimes, and (3) similarity in
the levels of economic development (163-164). Experience shows that when the economic
development gap is pronounced, producers in poor countries oppose trade liberalization for fears
that they will be overwhelmed by producers in the wealthier country while labor in the wealthier
country fears competition with low-wage workers in the poorer country (Schott 1991, 2).

In Figures 1 and 2 and in Table 1, we presented the results of tests for Beta and Sigma
convergence in the region. The raw data is presented in Table 10, along with projections for the
year 2020. In Central America and the Caribbean, there is a clear trend of sigma divergence for
both income per-capita and per-worker in the 1950-1992 period (Figures 1 and 2). That is, there
was an increase in the cross-sectional variance of income among the countries. In addition, there
is no evidence of beta convergence in the sub-region, the initially poorer countries did not grow
faster than the richer countries. The region is pulling apart economically and not converging.

This divergence is further illustrated by the raw data in Table 12. In 1950, the poorest
country of Central America and the Caribbean had a PCGDP of $903 while the wealthiest was
$3,046. In 1992, the range had exploded to between $610 and $9,675. Even amongst the
original 5 Republics of Central America (Costa Rica, El Salvador, Guatemala, Honduras, and
Nicaragua), the divergence is dramatic. In 1950 the range was from $981 (Honduras) to $1,532
(Guatemala). By 1992 the gap had widened to between $1,212 (Nicaragua) and $3,569 (Costa
Rica).

The hypothesis that integration is more difficult with wide economic disparities between countries is supported by the evidence from Central America. The Central American countries comprised a single federal republic in the years immediately following independence in 1821. The dream of a united Central America was a major theme of the region for many years. Indeed, the classic scholarly work on the region is subtitled "A Nation Divided" (Woodward 1999). In 1950, the five countries had similar levels of economic development and negotiations for a free trade agreement began in that decade. The Central American Common Market (CACM) was created in 1960 and met with early success. The 1969 "Soccer War" between El Salvador and Honduras and the endurance of protectionist policies led to its collapse in the early 1970s.

Today, the economic gap between Costa Rica and the other four countries makes integration and free trade unlikely. Costa Rican workers are weary of the flow of low-wage workers into their country. A census in 2000 will help clarify estimates of the numbers of Nicaraguans that have fled poverty and desperately low wages and emigrated to Costa Rica, but the number is likely between ten and twenty percent of the population. Xenophobia and anti-Nicaraguan discrimination is rampant and on the increase. As predicted, regional free trade efforts are limited and Costa Rica as the outlier is the least willing to support Central American integration. In 1950 Costa Rica had a commonality of interests with the other original Central American Republics. By 1992, Costa Ricans were different and more interested in trade with other countries such as Mexico and Chile than with integration with Central America.

The opposite has occurred in South America. Historically, trade was directed out of the region and based on primary products. Argentina and Uruguay exported beef to Europe; Brazil exported sugar, rubber, and coffee; Chile exported copper to the industrial world; Ecuador exported bananas; Peru exported guano and cotton; Venezuela exported oil, etc. Indeed, as late

as 1988, the total value of trade between Argentina, Brazil, Paraguay, and Uruguay was less than

US$3 billion (with US$45 billion in total exports from the four countries)(Lucángeli 1998, 99).

South American countries were often political and military rivals. Even more important,

Argentina and Venezuela had per-capita incomes many times that of their large neighbors in

Brazil and Colombia circa 1950. Trade integration was highly unlikely. As shown in Table 1

and Figures 1 and 2, South America experienced strong economic convergence, especially in the

1970-1992 period. The raw numbers are presented in Table 12. Convergence in the Southern

Cone is particularly dramatic between 1950 and 1992 (Argentina, Brazil, Chile, Paraguay, and

Brazil). This was certainly a precondition that led to the creation of the Mercosur customs union

in 1995 (see Roett 1999). Intra-Mercosur trade rose from under US$3 billion in 1988 to over

US$16 billion in 1996 (Lucángeli 1998, 99).

Table 12: Per Capita GDP (constant 1985 US$) and Population 1950, 1992, and 2020

Country	1950 PCGDP	1992 PCGDP	2020 PCGDP	1992 Populat. (1,000s)	Pop. Grwth Rate (%) 1950-92	2020 Populat. (1,000s)
SthrnCone						
Argentina	4,032	5,241	6,575	33,421	1.09	45,347
Brazil	1,265	3,882	9,752	152,641	1.17	211,882
Chile	2,431	4,890	6,804	13,545	1.17	18,774
Paraguay	1,253	2,178	3,708	4,460	2.33	8,570
Uruguay	3,451	5,185	5,998	3,131	0.69	3,793
Other SAm						
Bolivia	1,274	1,721	2,428	6,894	2.04	12,193
Colombia	1,503	3,380	6,153	33,887	1.83	56,569
Ecuador	1,194	2,830	5,795	10,741	1.62	16,904
Guyana	1,766	1,291	1,134	809	0.10	1,070
Peru	1,504	2,092	2,871	22,354	1.47	33,757
Suriname	1,765	2,708	3,685	409	1.04	574
Venezuela	4,799	7,082	7,855	20,441	1.70	32,911
CentAmer.						
Costa Rica	1,457	3,569	6,267	3,191	2.00	5,592
El Salvador	1,206	1,876	2,489	5,262	1.73	8,534

Guatemala	1,532	2,247	3,109	9,215	2.42	18,123
Honduras	981	1,385	1,868	5,180	2.30	9,865
Nicaragua	1,152	1,212	1,275	3,776	2.68	7,997
Panama	1,309	3,332	6,978	2,491	1.34	3,622
Caribbean						
Dom. Rep.	949	2,250	4,260	7,399	1.33	10,740
Haiti	896	610	609	6,754	1.96	11,677
Jamaica	903	2,465	4,024	2,398	1.04	3,210
Puerto Rico	2,023	9,675	28,353			4,542
Tri. & Tob.	3,046	8,839	17,900	1,264	0.91	1,632
Mexico	2,198	6,253	13,132	86,391	1.32	124,976
USA	8,772	17,945	30,124			

Table 12 also presents projected 2020 PCDGP based on 1950-1992 growth rates. Of course, growth projections are largely conjectural, though the best predictor of the future may be the past. If, 1992-2020 growth rates mirror those from 1950-1992, we can put forth predictions about the economic contours of the region and the likelihood of trade agreements. Prospects for a more united Central America and a free trade area are dim. In 1950, the per-capita income was roughly similar in Costa Rica and Nicaragua, countries that share a long border. By 1992, the two countries had diverged considerably, and Costa Rica sees little to gain from economic integration. The picture for 2020, is particularly bleak, with the Costa Rican per capita income nearly five times that of Nicaragua. The greater the divergence in these two neighbors, the lower the chances of economic integration in the Central American Republics.

Population projections enhance the likelihood of divergence. The Costa Rican population is projected to grow 2% while Nicaragua is projected to grow at 2.68%. While this may not seem large, the long-term effect is dramatic for two reasons. In the first place, even if the countries have identical levels of real output growth, per-capita growth in Nicaragua will be .68% less per year. Four percent output growth would be 2% per capita in Costa Rica but only

1.32% in Nicaragua. Table 7 shows the impact of small changes in pc-growth over a long

period. In addition, the wider the gap in PCGDP and wages between Costa Rica and Nicaragua,

the greater the pressure from immigration. The steady flow of Nicaraguan immigrants into Costa

Rica has already been the source of considerable tensions and backlash in Costa Rica, which has

contributed to diplomatic tensions. Perhaps Nicaragua could implement policies to achieve

slower population growth rates and higher income growth rates. Unfortunately, political

infighting, corruption, and scandals continue to be common in Nicaragua while Costa Rica has

made great strides in technology (producing latest generation Intel chips), has moved into non-

traditional exports (the highest per-capita exports in Latin America), and tourism receipts are an

important source of foreign exchange.

Projections for South America for the year 2020 also permit predictions about integration

in the region. Some countries such as Bolivia and Paraguay will have a difficult time catching

up to their more prosperous neighbors due to the highest population growth rates on the

continent (2.04% and 2.33% respectively). The emergence of Brazil as the regional hegemon,

already apparent in 2000, is even more obvious in the 2020 projections. Brazil will have the

highest per-capita income in the continent, $9,752; 212 million of the continent's 442 million

inhabitants; and a GDP of over US$2 trillion compared to US$1.3 trillion for the other eleven

countries combined. Brazil is and will continue to be pacesetter for regional integration.

Convergence in South America provides a favorable condition for regional trade and, presently,

the Brazilian government shows signs of leadership on integration issues. Policies in Brasilia

will be even more important in the future in determining the direction and speed of regional

trade.

We can also say a few words about the prospects for a free trade agreement for the hemisphere. The goal of a FTAA in 2005 was greeted with much fanfare. The optimism had turned decidedly cool with the refusal of the US Congress to grant Fast-Track authority to President Clinton. The widening gap between the United States and most of the region (outside of Mexico, Puerto Rico, and Trinidad and Tobago) will greatly decrease the likelihood of free trade agreement (FTA) along the lines of NAFTA or a customs union along the lines of MERCOSUR. Political and economic integration along the lines of the European Union is out of the question unless the forces of convergence take hold and Honduras and Nicaragua begin to catch-up with the United States.

7. Summary and Conclusions: *The Last will be First?*

This paper examines convergence and catch-up in Latin America and discusses their effect on integration and free trade agreements. While Latin America is often thought of as one large region, we have found very different trends in South America than in Central America and the Caribbean. South America exhibits sigma convergence of income per worker and per capita in the post 1970 period. Per worker and per capita income has diverged considerably in Central America and the Caribbean from 1950-1992. Similarly, South America also has experienced per worker and per capita beta convergence in the period, while Central America has not. The evidence is compelling that Central America is diverging while South America is converging. The poorer countries of South America in 1950 have grown faster than the richer countries and are closing the gap. In Central America and the Caribbean, the richer countries in 1950 are growing faster and widening the gap. Second, the gap with the technological leader, the US, has not been reduced, but is widening for the region or for sub-regions. However, there are some

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individual cases that are closing the gap. Third, outside of the special case of Puerto Rico, none

of the cases has a reasonable chance of catching up to the US for many, many generations. The

compounding effect of growth over the long-term is tremendous. If Brazil could maintain per

capita income growth of 3%, they could catch up to the US in 122 years if the US averaged

1.75% annual growth. Sustained long-term growth has proven difficult in the region, largely the

result of booms and busts--impressive decades followed by lost decades. Population growth

rates are also subject to the magic of compounding, and fast-growing populations in the region's

poorest countries contributes to per capita divergence. Fourth, there are dynamic economies of

scale at work in Latin America that provide potential for considerable growth. The large Kaldor-

Verdoorn coefficients indicate the importance of demand-driven growth, which results in rapid

increases labor productivity in Latin America.

Trends in convergence and divergence in Latin America 1950-1992 help explain the

deterioration of regional integration in Central America and the surprising momentum of

regional trade integration in South America. If convergence trends continue in the future,

extensive free trade agreements are unlikely in Central America and in the hemisphere as a

whole. Powerful political forces will exploit vast economic disparities as a justification for

opposing the free movement of goods and labor. A considerable period of convergence has

provided the economic foundation for integration in South America. The future speed and depth

of free trade agreements in South America will depend on continued forces of convergence,

political dynamics, and the leadership of Brazil.

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[1] These infrastructure and transportation improvements have been identified by Sachs (1997) as crucial for economic growth on large continents.

[2] The Greek government appealed to the Council of Ministers that EEC membership was crucial to secure democracy. The Council of Ministers rejected the Commission's opinion and negotiations began in 1976, paving the way for Greece's formal entry in 1981 (Nugent 1999, 29-30).

[3] Mexican President-elect Vicente Fox is campaigning for a deepening of NAFTA, including a freer flow of persons, but this is seen as a non-starter in the US largely because of wage-disparities and the fears of migration.

[4] Uruguay has been the exception, with a per capita GDP and a standard of living much closer to that of Argentina.

[5] There are, of course, dissenters. Krugman and Venables (1990) show that under some circumstances regional integration may actually widen disparities between neighboring countries.

[6] For an excellent overview of the commonalities and contrasts in Latin America see Skidmore and Smith (1997, Prologue). Rial also argues that in spite of the heterogeneity in the region..."Latin America exists and can (we might say *must*) be treated as a unit" (1990, 3).

[7] We refer to the notion of "absolute" convergence. The other notion of beta-convergence, "conditional" convergence, is that income per-capita in a given country converges to that country's steady-state value. This is what Solow's (1956) model predicts, not absolute convergence. Stated in different terms: Solow's model predicts convergence only after controlling for the determinants of the steady-state.

[8] "Latin America" has never been precisely defined. In some studies Latin America is defined as Spanish-speaking countries of the hemisphere plus Brazil and Haiti (For example Bowman 1996). Others, such as the standard textbook (Skidmore and Smith 2000), define the region more broadly, including Guyana, Suriname, and the English-speaking Caribbean. We use the broader definition in this section due to the importance of geographical proximity in the convergence debate (see Elmslie and Criss 1999 for a full discussion). The cases for Central America and the Caribbean are Costa Rica, the Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Puerto Rico, and Trinidad and Tobago. The cases for South America are Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela.

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[9] To avoid the criticism that the growth rate of labor productivity (y) is definitionally equal to (q-λ) where λ is the growth of employment (since q appears on both sides, this will impart a spurious correlation), we also ran the regression with the growth of employment as the left-hand side variable. This equation is derived by moving q (y=q-λ) in equation (4) to the right hand side. This yields the following estimating equation:

$\lambda = a_1 + (1-a_2)q + a_3\text{GAP}_0 + a_4(I/Y)_0 + a_5\text{OPEN}_0$. The estimates of a_3, a_4, and a_5 are obviously the same as those in Table 11, but with opposite sign. The estimates of $(1-a_2)$ in the three equations are (t-values in parenthesis) are: 0.165 (4.63), 0.081 (2.24), and 0.132 (5.99).