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Convergence Clubs in Latin America: A Historical Approach

by:

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Keywords: Latin America, economic history, convergence, growth.

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A Historical Approach

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Introduction

Although economic convergence is not a recent topic, it is crucial in economics and it is still ongoing (Sala-i-Martin, 2006; Welsh and Bonn, 2008; Hall and Ludwing, 2006, Owen et.al.,2009). It is important for development economists to find out if developing countries are catching-up, if the differences in income across countries tend to decrease or increase and if there are clubs where countries tend to converge. The detection of income disparities between economies and clubs of economies can help finding out how to speed-up the process of economic development.

*E-mail: pbarrientos@econ.au.dk. I would like to thank..

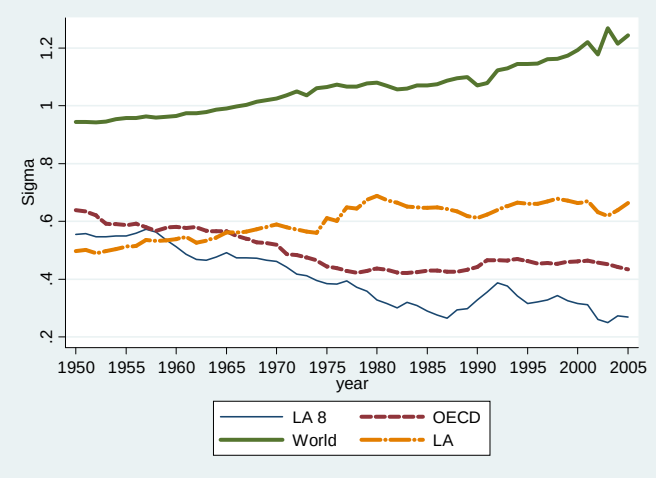

Figure 1: **GDP per capita dispersion in the World, OECD, Latin America and eight Latin American countries (LA8).** Standard deviation of the logarithm of GDP per capita.

For the case of Latin America, one could expect some sort of convergence since Latin American countries have few language barriers, similar culture, religion, and common history[1]. However, preliminary analysis of the income distribution, measured as the dispersion of the GDP per capita, shows that the dispersion among Latin American countries has become highly unequal over time, contrary to the OECD countries (see Figure 1). Nevertheless, when income dispersion is graphed only for the eight Latin American countries (LA8) that have complete data from 1900 until 2007 (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay and Venezuela), the pattern of dispersion is reversed, they actually converge (Figure 1). All this suggests that there are different patterns of convergence in Latin America, and, certainly, Latin American countries are not as similar as expected among all of them but perhaps between some of them.

Previous literature on Latin America is still scarce compared to other clubs of countries and their results are quite diverse[2]. Research tends to center on convergence among regions within a given country rather than across countries[3]. Almost none of the research relates convergence to the economic history of Latin America[4]. Usually one single parameter of speed of convergence is found. In this paper I analyze 32 countries and 108 years, more observations than any other study[5], which allows me to find more than one speed of convergence according to the respective club of convergence.

The new growth theory and already known evidence argue against convergence to a unique globally stable steady-state but rather to several multiple locally stable steady-states (See for example, Quah,1996 and 1997;

[1] In theory, countries with identical structural characteristics, such as preferences and technologies, are expected to converge (Barro and Sala-i-Martin, 2004).

[2] There are nine studies specialized on the region (discussed in detail further below).

[3] Studies within a given country are concentrated in few countries, such as Argentina, Brazil, Chile, Colombia, and Peru.

[4] The reasons for the lack of studies are the poor availability of data specially at the beginning of the century and that some studies focus on clubs with specific characteristics such as being part of an integration process or having a specific level of income. Astorga et.al.(2005) is the only other study where economic history events are introduced.

[5] Astorga et.al.(2005) analyzed the longest period: 100 years but only six countries while Dobson, Goddard and Ramlogan (2003) analyzed 24 countries but only 30 years.

Azariadis and Stachurski, 2005; Durlauf and Johnson, 1995). In oder words, new findings point towards a natural club clustering where countries tend to converge. However, economic theory does not guide us on the number of clubs or the way in which the different variables defining initial conditions interact in determining the clubs. To address this issue, most researchers (e.g. Durlauf and John, 1995; Bai, 1997; Hansen, 2000; Pesaran, 2006; Paap van Dijk,1998; and Desdoigts, 1998) lean towards the approach of letting the data decide the clubs. They usually study the shape of the distribution of income per capita and focus on finding an income threshold to divide clubs. This paper does not follow this approach. Instead, I use historical facts specific to the region to determine the historical convergence clubs.

The reasons of using historical facts to divide clubs are several. First, I have a long span of data, more than 100 years, which allows me to look back into history and see the natural clubs of convergence. Second, by dividing into clubs of similar characteristics I put less demand on the determinants of growth, which are less available specially at the beginning of the 20th century. Finally, I can analyze the institution hypothesis were recent literature and evidence has turned to (See for example Easterly (2003); Acemoglu et. al.(2001 and 2002) , Dollar and Kray (2003), Rodrik et al. 2004)). The argument is that institutions shape economic development, Easterly (2003) argues that technology is endogenous to the institutions that make adoption of better techniques of production likely. Therefore, the actions taken by institutions are the ones that shape the way production functions look like and the way resources are used. Moreover I argue that these actions are shaped by several factors, such as the resources a country has, the ideological trends, external shocks, and other events which historians work on capturing. Therefore is important to look at the historical aspects.

Thorp (1998) captures in depth the comparative reality within Latin America and places in a proper historical context, the development efforts, strategies, choices, successes and failures of the different Latin American countries. She emphasizes on the "political economy" part of the Latin American history, which term is shorthand for the interface between political forces, institutional inheritance and economic outcomes.

Based on Thorp (1998), I identify three important phases and two to three clubs within each phase[6]. The first phase ranges from 1900 until 1930 - when the Great Depression hit the Latin American economies - and it is characterized by the Latin American countries intensively exporting primary products. Two clubs are identified: the **mineral** and **agricultural** products exporters. This phase is called *exporting phase.* During the second phase, an inward-looking model was the response to the Great Depression. This model is known as Import Substitution Industrialization (henceforth simply *industrialization phase*) and goes from 1931 to 1974 when the oil crisis occurred[7]. Two clubs are identified: those that were able to **industrialize**, despite all the distortions that the model brought, and the **non-industrializers** which failed to industrialize for different reasons. The

[6] In fact, the division of periods and groups differs slightly from Thorp (1998). These differences are discussed further below.

[7] Thorp (1998) defined the period: 1945-1973 and called it "Industrialization and the growing role of the State", since the state took a greater role in the industrialization process. However, the industrialization process was triggered before, from when the Great Depression hit the world economy (1930). I discuss this later.

third phase ranges from 1975 to 2007. This phase is characterized by several features. First, Latin America experienced the debt crises in the early 80s, to which it responded with several "structural reforms". Then, from these reforms and from an accumulation of several factors during history, the need for a change in development to one with a more social outlook in a globalization context arose. I call this phase *The globalization phase.* Three clubs are identified: the **good institutions** club, where countries developed institutions that could deal with growth and/or welfare, the **painful** club, where countries were traumatized by the debt crises adjustment, and the **vulnerable** club, composed by the Caribbean countries who are different from the rest and are characterized by being vulnerable to external factors.

After defining the convergence clubs, I use the model setup of Barro and Sala-i-Martin (2004), the most common in the literature to test for convergence. I use single-cross section and panel data regressions with data from Madisson (2003) combined with the World Bank (2009).

I find that during the phase of industrialization, and globalization, there is strong evidence of convergence among those countries that succeeded in industrializing and/or building good institutions. The reason may be that technology diffusion is easier when these phenomena occur, allowing countries that were behind in the beginning to accumulate capital and catch-up.

I also test for convergence in the most advanced integration processes and geographical regions in Latin America. Here, convergence fails. The reason is that the integration processes are not yet developed to be able to reach convergence in real terms and the geographical location is not an issue for convergence.

This paper is laid out as follows. In the first section, I present a summary of convergence theory and a review of previous research on Latin America. In Section 2, I describe the methodology and data used to test convergence. Section 3 presents the most important events of the economic history of Latin America and describes each of the convergence clubs. In Section 4, I present the results of the speeds of convergence, and Section 6 discusses different issues that may call the validity of the results into question. Finally, I present the conclusions

1 Theory and Prior Research

Literature on economic growth defines four concepts of convergence. Absolute-β or catching-up convergence when a number of economies converge to one another in the long run, independently of their initial conditions. Conditional-β when per capita incomes of economies that have identical structural characteristics, i.e. preferences, technologies, rates of population growth etc., converge to one another in the long run independently of their initial conditions. Club is conditional β convergence conditioned on having similar initial conditions. Finally, σ-convergence across a club of economies exists if the dispersion of their real per capita GDP tends to decrease over time (For an extensive discussion of concepts see Galor (1996)).

The different concepts of convergence and their arguments behind have emerged from different theories of economic growth. The neoclassical growth models, such as Solow (1956) predict conditional convergence to a unique globally stable steady-state based on diminishing returns of capital (Barro and Sala-i-Martin, 2004). While the endogenous models, like the AK model, predict zero convergence since they do not assume diminishing returns to capital. However variations in the AK model predict conditional convergence.(Mulligan and Sala-i-Martin, 1992).

Furthermore, technology diffusion models predict convergence based on microfoundations. The main argument is the existence of lower costs of technology imitation than technology innovation such that followers can catch-up. Some researchers argue that the technology diffusion process goes via foreign investments (Barro and Sala-i-Martin, 2004), trade (Romer,1990; Aghion and Howitt, 1992), flows of people (Barnebeck and Dalgaard, 2006) or the type of institutions and geography (Acemoglu et al., 2004). Similarly, theory of integration predicts convergence based on the idea that common markets will allow countries/regions to catch-up. (Navarro and Sotelsek, 2001).

Finally, new growth theory, such as models of distribution dynamics, also referred to as polarization, persistent poverty (or poverty traps), stratification, and/or clustering models (Quah,1996; Quah, 1997; Azariadis and Stachurski, 2005; Durlauf and Johnson, 1995) recognize the possibility of multiple locally-stable steady- states. The reasons for the existence of different converging clubs/clubs may be several, such as the existence of some threshold level in the endowment of strategic factors of production, nonconvexities or increasing returns, similarities in preferences and technologies, and government policies, which become more similar over time within certain clubs (Canova, 2004).

In Latin America, there are only nine cross-country studies[8] specialized in studying convergence (Blyde,2005 and 2006; Holmes, 2005; Astorga, et.al 2005; Dobson and Ramlogan, 2002a and 2002b; Utrera, 1999; Dabus and Zinni, 2005; and Madariaga et.al,2003). Although they analyze the same region, they study different countries, periods, and apply different methodologies and theories of growth, making it difficult to compare results.

Some of the authors use methodologies that do not measure a specific speed of convergence, such as Blyde (2006) who studies 21 countries during 1960-2004 and uses a distribution dynamics approach. He finds that countries are converging to two clubs; one large for low and low middle income countries and another small for rich income countries[9]. Also, Dobson, Goddard and Ramoglan (2003) study the case of 24 countries during 1965-1998 by cross-section analysis and unit root with panel data tests, and find convergence but not a specific speed. The problem with these methodologies is that they cannot give an idea of the level of speed of convergence.

Other researchers find concrete results. For example, Astorga, et.al (2005) study six countries during the period of 1900-2000. They find convergence using panel data and error correction models, at a speed between 1%

[8]The number of studies within a given country is higher than across countries, usually concentrated in few countries as Chile, Argentina, Brazil and Colombia (e.g. Marina (2001), Azzoni et al.(2001), Anriquez and Fuentes (2001), Cardenas and Ponton (1995), Magalhaes, Hewings and Azzoni (2005), Serra et al.(2006)).

[9]The rich-income countries are Uruguay, Argentina, Chile, and Mexico, and the remaining 17 countries are in the other club.

and 1.9%, where the oscillation comes from the addition or subtraction of explicative variables that proxy for the steady-state[10]. Dobson and Ramlogan (2002a and b) study 19 countries and 28 and 30 years respectively (1970-1998 and 1960-1990) using cross-section regression and panel data analysis, and find speeds of convergence of 0.02% to 2%[11]. Helliwell (1992) analyzes 18 Latin American countries for the period 1960-1985 and finds convergence at a speed of 2.5%[12].

On the contrary, Dabus and Zinni (2005) analyze 23 countries from 1960 to 1998, and find absolute and very high conditional convergence. The authors argue that once controls are introduced and extremely high speeds of conditional convergence are found, compared to absolute convergence, then it is a signal of divergence. This is a good point since when controlling by many characteristics, a hypothetical speed of convergence is being calculated while the real speed of convergence would be absolute convergence. They conclude that convergence of any type is absent in Latin America. Regarding this, Durlauf and Quah (1999) mention that the choice of the steady-state proxies depends on the interest of the researcher and that can lead to wrong results.

Almost none of the nine studies relates economic history to convergence. One reason could be the lack of data in the region, especially at the beginning of the century, most of the papers start their analysis from around 1960, when more detailed data appears. Another reason could be that previous studies did not have the need to introduce economic history because they grouped few countries as part of a club with a specific characteristic, like being part of an integration process or having a specific level of income.

2 Methodology and Data

Based on the new growth theory of multiple steady-states, I analyze the different patterns of convergence in Latin America with a historical approach. First, I define the clubs where convergence is expected according to historical events and then I test for convergence. In the next section I describe the main characteristics of the convergence clubs. In this section I explain the methodology to test for convergence.

The model setup follows Barro and Sala-i-Martin (2004). The following equation measures the relation for countries $i = 1, ...N$ during periods $t = 1, ...T$:

$$\gamma_{it} = a - \frac{(1 - e^{-\beta\tau_{it}})}{\tau_{it}} \cdot \log\left[y_{0it}\right] + u_i \tag{1}$$

where γ_{it} is the average growth rate of period t, a is a constant for all countries and all periods and includes the common steady-state (useful to measure absolute convergence). In the case that a varies with each country, a_i, it would include the steady-state for each country and specific characteristics (useful to measure conditional

[10] They include human capital, external, institutional, and economic variables, together with dummy variables related to external events as the Great Depression and the Debt Crises. The countries are Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela.

[11] Their studies include, as proxies for the steady-state, sectorial decomposition variables, country dummies, population growth, savings, and human capital.

[12] He includes variables as investments, population growth, human capital, and scale effects

convergence[13]). Furthermore, y_{0it} is the initial output per capita of period t (measured in logarithms and instrumented by its lag), β is the speed of convergence if $\beta > 0$ (or divergence if $\beta < 0$) , τ_{it} is the total number of years within period t, and u_{it} is disturbance term with mean zero, finite variance, and independent over t and i.

Equation(1) is estimated, first, as a single-cross section regression ($t = 1$) in order to capture long term convergence, and then, the analysis is divided into subperiods ($t > 1$)[14], and panel data regressions are used.

Panel data allows using more information by including time variation, which may lead to more robust results. It also allows adding more variables, like the steady-state, which tests conditional convergence, and time dummies, which control for external conditions that affect all countries for specific periods. A drawback of panel data is that convergence is tested in shorter spans of data which may capture short-term adjustments around the trend rather than long-term convergence.

The analysis covers 32 countries, listed in Table 1, for the period 1900-2007. The potential number of observations is 3,456 but due to incomplete data for some countries, the number of real observations is reduced to 2,209. This is the largest data set used in the literature on convergence in Latin America. The second largest would be from Astorga et.al. (2005) with 606 observations, 6 countries and 100 years.

[13] As a matter of fact, the different concepts of convergence used here are mixed. Roughly speaking, absolute or catching-up convergence should only be measured among all countries and all years before making any sort of grouping or adding any controls. Absolute convergence measured for each period and club can be considered already as conditional convergence since implicit controls are introduced. Still, inside each group I measure absolute convergence in the sense that no extra explicit controls are included. Furthermore, when dividing the analysis by groups that vary across time, one refers to club convergence as well.

[14] The length of each sub-period was chosen according to the availability of data. In average, the subperiod lenght is 10 years.

Country	Observations	Missing observations	Starting year	Ending year
Argentina	108	0	1900	2007
The Bahamas	28	80	1975	2002
Belize	33	75	1975	2007
Bolivia	63	45	1945	2007
Brazil	108	0	1900	2007
Barbados	25	83	1975	1999
Chile	108	0	1900	2007
Colombia	108	0	1900	2007
Costa Rica	88	20	1920	2007
Cuba	76	32	1929	2004
Dominica	31	77	1977	2007
Dominican Republic	58	50	1950	2007
Ecuador	69	39	1939	2007
Grenada	28	80	1980	2007
Guatemala	88	20	1920	2007
Guyana	33	75	1975	2007
Honduras	88	20	1920	2007
Haiti	63	45	1945	2007
Jamaica	64	44	1913	2007
St. Kitts and Nevis	31	77	1977	2007
St. Lucia	28	80	1980	2007
Mexico	108	0	1900	2007
Nicaragua	88	20	1920	2007
Panama	63	45	1945	2007
Peru	108	0	1900	2007
Puerto Rico	52	56	1950	2001
Paraguay	69	39	1939	2007
El Salvador	88	20	1920	2007
Trinidad and Tobago	58	50	1950	2007
Uruguay	108	0	1900	2007
St. Vincent and the Grenadines	33	75	1975	2007
Venezuela	108	0	1900	2007
Total	2,209	1,247		

Table 1: **Description of the data set**

The main variable is the GDP per capita measured in constant 1990 International (Geary-Khamis) dollars[15]. This measure allows for comparison of standards of living of the countries; it takes into account the purchasing power parity of currencies and the international prices of commodities. The sources are the Madison Data Base (0) and the World Bank Data Base (0)[16].

[15] In order to avoid irregular values, I use two year annual averages of the GDP per capita. GDP growth, is calculated as the geometric annualized average growth of each period.

[16] The final data base has information from the Madison database (M) (from 1900 until 1989) and from the World Bank database (W) (from 1990 to 2007). A converter factor (C) is calculated as: $C_{(1990)} = M_{(1990)}/W_{(1990)}$ for each year and is kept constant from 1995. Then C is multiplied by the existent W. In the case of ten small Caribbean countries, M has no data, so C is taken constant, for the year 1995, from another country that heavily influenced these economies and is assumed to have a similar C. The one from USA is used for The Bahamas; from Great Britain for Barbados and Belize; from Haiti for Dominica St.Kitts and Nevis, St. Lucia, St.Vincent and the Grenadines; from Colombia for Guyana, and finally from The Dominican Republic for Grenada. In the case of Cuba, the available GDP from W was measured in constant 2000 local currency. Here, C was calculated with that kind of data and kept constant for the year 2001. The transformed data go from 2001 to 2007.

3 Historical Background and Convergence Clubs

Studying the development of Latin America for 108 years cannot avoid the study of its history. I divide the data into convergence clubs, with similar characteristics such that convergence is expected. I merge some clubs from Thorp (1998) in order to have at most three clubs in each phase. The idea is that each club's main characteristics matches each phase's description and that clubs differ from each other in a clear way. This section describes the historical background from where convergence clubs emerge[17].

3.1 The Exporting phase (1900-1930)

The first phase ranges from 1900 until 1930 - the year when the Great Depression whipped Latin American economies - and it is characterized by countries intensively exporting primary products. In this period, countries were vulnerable to world income and to fluctuations in primary products prices. I identify two clubs: those that exported agricultural products and those that exported mineral products[18]. Agricultural production was vulnerable to natural disasters and minerals to recessions in the industrialized countries, since minerals were used in construction, machinery, and chemicals production. While, the mining sector was characterized by using less land and less labor. It also required more capital and technological investments and had different transport needs than the agricultural sector.

The **agricultural** club is composed by ten countries: Argentina, Brazil, Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Honduras, Nicaragua, and Uruguay. They were producing mainly coffee, bananas, cocoa, sugar meat and/or wheat[19].

The **mineral** countries number four: Chile, Mexico, Peru and Venezuela. They exported mainly petroleum and copper[20].

3.2 The Industrialization Phase (1931-1974)

Thorp (1998) defines the period from 1945 to 1973 as: "Industrialization and the growing role of the State". However, the industrialization process was triggered before, when the Great depression hit the world economy. Therefore I expand this phase from 1931, and instead of 1973 as ending year I take 1974, when the oil crises occurred.

[17] Table 4 shows the membership of each country to the specific clubs.

[18] Thorp (1998) organized countries in a more detailed manner, according to their main export product. I merged them in these 2 groups.

[19] Those producing mainly coffee were Brazil, Colombia, El Salvador and Nicaragua. For Costa Rica and Guatemala, the main exports were coffee and bananas, while for Honduras it was bananas and precious metals. In general, Central American countries experienced higher production of bananas after the American multinational company, United Fruit, came to the region (in the 1920s). Cuba produced mainly sugar but also tobacco. Argentina and Uruguay were mainly producing meat and wheat.

[20] Petroleum was produced by all except Chile, and copper was produced by all except Venezuela. Before 1917, Venezuela was mainly producing coffee and cacao, but after that year petroleum became the most important source of revenue. Mexico was the most diversified export country in Latin America. They also exported lead, zinc, silver, gold, coffee, rubber, and cotton. Mexicans discovered oil in 1910.

The Great Depression provoked a fall in economic activity in the industrialized countries, which in turn reduced their demand for primary products and reversed the capital inflows to Latin America. This situation deteriorated the terms of trade of all primary products, leading to an increase of the Latin American real import prices. The natural mechanism would suggest a decrease in real export prices which should have stimulated the demand again, but due to the extreme circumstances of the Great Depression, the world demand could not recover. Instead, Latin American demand shifted from imported manufactured goods to domestic manufactured products, because the former were expensive. This process stimulated the import substitution phase of Latin America. Therefore, the Great Depression pushed many Latin American countries into a process of import substitution strategy by default (Cardoso and Helwege, 1992).

The process of industrialization via import substitution was reinforced by the second World War (1939-1945). Although WWII brought an increase of Latin American exports, there were constraints on their imports. Consequently, the scarcity of imports and the deterioration of the terms of trade of primary products encouraged new efforts to substitute imports, but these efforts were limited in turn by scarcity of imported inputs and capital goods. Additionally, the consensus on the importance of industrialization via import substitution found theoretical and institutional support in the United Nations Economic Commission for Latin America (ECLA).

The inward looking model consisted of substituting imports, and since imports were characterized by being highly industrialized, Latin America went into a process of industrialization. Therefore, two clubs emerged in this period: the industrializers and the non-industrializers[21]. The industrializers succeeded in creating capital goods and intermediate input industries, while the non-industrializers remained as primary exporters or created inefficient industrial sectors that were not able to succeed.

The **industrializers** are six countries: Argentina, Brazil, Chile, Colombia, Mexico and Uruguay. Only these few countries succeeded in creating capital goods and intermediate input industries, although they had different problems[22].

The **non-industrializers** are the countries that failed to industrialize. In total there are 17 countries: Ecuador, El Salvador, Guatemala, Nicaragua, Peru, Venezuela, Paraguay, Bolivia, Costa Rica, Honduras, Dominican Republic, Haiti, Panama, Jamaica, Puerto Rico, Trinidad and Tobago, and Cuba. The reasons for these countries not to industrialize were diverse. Some stayed as primary exporters because of their strong dominating primary export sector, which in the majority of the cases was overprotected by the government, or because the

[21] Thorp (1998) had four groups: "strong industrializers", "centrally planned" (Cuba), "primary product export models" and "export promotion and industralizing by invitation". Thorp mentions that the last two groups should be one group because both tried to industrialize but failed. The difference between them is that the first one had the government to promote the proccess of industrialization while the second invited foereign capital to do it. Therefore I merge these two groups together with Cuba into the group of countries that were not able to industrialize.

[22] Due to their larger domestic markets, Brazil and Mexico managed better than the other countries in the region. Both successfully created automobile industries. In fact, Brazil experienced the highest growth rates and went through a process of high and persistent growth rates, during the 60s and 70s, known as the "Brazilian Miracle". Efficient steel production was established in Argentina and Brazil. Chile had political and social structure problems but still promoted the production (and export) of forestry, fishing, mining, and engineering sectors. Colombia industrialized its coffee and was the only country without an overvaluation, inflation, or high levels of debt, but problems of violence during the 40s and 50s affected the industrialization process. Finally, Uruguay was already industrialized by 1945 but in mid-1950 they underwent stagnation.

government created inefficient industrial sectors that were not able to succeed (Ecuador, El Salvador, Guatemala, Nicaragua, Peru, Venezuela, Paraguay, and Bolivia). Others were based on different models, like Cuba and the Caribbean countries[23].

3.3 The Globalization phase (1975-2007)

The third phase ranges from 1975 to 2007. Due to the oil shock of 1974, Latin American accumulated debt and did not prevent the coming debt crises, which started in 1979 and 1981, when USA and other OECD countries kept their money supply tight and increased interest rates radically. Since countries acquired loans at floating interest rates, their debt obligations increased vastly. The adjustment left problems that reinforced each other, like capital outflows, fiscal deficits, inflation, overvaluation, and balance of payment crises.

Countries wanted to stabilize and gain access to foreign credit again, so they applied "structural reforms" to reach stabilization. These reforms were based on fiscal orthodoxy, liberalization, and reducing the role of the state. The IMF suggested to cut budget deficits by reducing expenses and increasing taxes, privatize, liberalize imports and exchange controls (devaluate), eliminate price controls, and increase interest rates. Although countries sooner or later followed the structural reforms, the results were not as good as expected. The export sectors of several countries failed to react positively to the exchange rate depreciation. Higher prices of imported goods reinforced inflation and consequently overvaluation. With higher interest rates it was hard to promote investments, and due to the tendency of overvaluation and weak export sectors was not possible to promote exports either. Furthermore, governments had to close factories, resulting in high rates of unemployment and large informal sectors.

Regarding welfare results, income distributions worsened in all countries outside of the Caribbean, except in Uruguay and Costa Rica. Poverty, which worsened during the 80s, hardly improved during the 90s. This situation encouraged rethinking the link between growth and equality. Different trends of thought arose around the mid 80s; some supported the idea that good institutions create complementaries between productivity growth and equality, others that policies that are linked to the political constituency will create a combination of economic

[23] Venezuela, Peru, Bolivia, Ecuador and Paraguay were not well prepared for industrialization. Bolivia and Paraguay were the worst cases in terms of results. Bolivia's strong and powerful tin sector took advantage of a weak state to concentrate resources (a lot of the debt was directed to pay expensive railroads for the sector).. After the revolution in 1952 the tin sector was nationalized and the government had immense difficulties managing it. In the 60s some investments went to the mining and petroleum sectors. Paraguay was dominated by a few families, protected by the military regime of Stroessner, that were producing the traditional goods (meat and tobacco), making it hard to change economic structures. Venezuela attempted to industrialize late, and the result was the creation of an inefficient industrial sector with strong rent seeking characteristics, which brought a lot of distortions. The Venezuelan economy was highly dependent on its oil, with characteristics of Dutch Disease. Ecuador's protectionism carried out in the 60s only benefited the traditional elite clubs and failed to industrialize the economy. Peru had good export prospects, so industrialization through import substitution was low.

El Salvador, Guatemala, and Nicaragua concentrated their efforts in the cotton sector, which required moving peasants from their own lands, making them worse off (Williams, 1986). All three countries had very low levels of GDP per capita, especially El Salvador and Honduras. In fact, El Salvador had the lowest GDP per capita of all Latin American countries. Based on a model of central planning, Cuba tried to diversify their sugar-concentrated economy to corn, rice, cotton, tomatoes, and soybeans, but the lack of skilled labor and shortages of materials pushed them back to the production of sugar.

The Caribbean countries were under a program of export promotion and industrializing by invitation. Headed by Puerto Rico, the Caribbean tried to search for different markets than sugar. They gave concessions to foreign firms, so they could invest and industrialize, but employment did not increase, and by the 60s foreign firms left.

and social development (Thorp,1998).

Following Thorp's line I divide countries during the third phase in three clubs: those that were able to provide the link between growth and welfare in a globalization context, the "good institutions" club, the ones that suffered serious consequences of the debt crises, the "painful" club, and the Caribbean countries which are different from the other clubs and are vulnerable to external factors, the "vulnerable" club[24].

The club of **good institutions** is composed by seven countries: Chile, Argentina, Uruguay, Mexico, Colombia, Costa Rica and Brazil. Although some of the countries in this club have had weakened institutions, such as Argentina, they have managed to reach either acceptable growth rates, good welfare standards, or both[25].

The **painful** club is composed of nine countries: Peru, Bolivia, Ecuador, Paraguay, Venezuela, Nicaragua, El Salvador, Guatemala, and Honduras. This clubs is characterized by having weak institutions that lead to bad results either in terms of growth, welfare, or both[26].

Finally, the **vulnerable** club includes 16 Caribbean countries: The Bahamas, Barbados, Belize, Cuba, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, Panama, Puerto Rico, St. Kitts and Nevis,

[24]Thorp (1998) had five groups that she called: "using the paradigm shift", "reluctant converters", "other radical stabilizers", "pain without gain", "the Caribbean: greatest vulnerability". I merged the first two groups into the good institutions group. The next two were merged into the painful group and the last was kept as the vulnerable group. More details regarding this union, are in the description of each group.

[25]On the one hand, Chile, Argentina, Uruguay, and Mexico were able to link economics with welfare in a creative and effective way thanks to the prior conditions they met. Although Chile has a high degree of inequality and poverty, they managed to build strong institutions, and good relations among the public and private sector. The state promoted exports and investments. Even though they have applied radical orthodox policies and hosted radical violent military regimes, they have built a political consensus afterwards. They truly committed to the rules of the free market game, gaining investor's confidence. Moreover Chile has developed a process of consultation to identify poorly designed policies.

Argentina and Uruguay had a similar experience to Chile. Both underwent military regimes but Argentina did not learn from this experience as Chile did, while Uruguay built its political consensus from it. Argentina had a lot of political problems and adopted both orthodox and heterodox policies (as Mexico). In the 90s it implemented the "convertibility plan", the purpose of which was to establish strict discipline on the monetary and fiscal policy. The plan was the keystone for entry into the international system. This attracted investments, and together with the privatization, the quality of public services improved. Nevertheless, in 2001 Argentina went into a crisis. The weak fiscal policy and high fiscal deficits from the provincial governments were reflected in an increasing public debt burden, and the growing overvaluation led to a debt crisis.

Furthermore, Uruguay and Argentina were part of the trade union MERCOSUR , which helped them promote dynamic firms. Uruguay was the only country to improve welfare indicators during this period and was known by the democratic process of using popular consultation to approve policies. Mexico could provide the link between economics and welfare, particularly because of its strong international orientation. Mexico became part of the NAFTA-North American Free Trade Agreement, which involves USA and Canada.

On the other hand, Brazil, Colombia, and Costa Rica progressed because they had been coherent with their earlier policies. Colombia, for example, managed to build very strong and qualified institutions that managed the economic issues very well. They did not borrow too much and they did not have hyperinflation. In fact, Thorp (1998) points out that Colombia is the only country where liberalization coincides with a growing state, reflected in the rapid growth of social spending. Nevertheless, corruption and drugs were serious social problems. Costa Rica is characterized by their democratic values, good relations with the private sector, and high standards of education. Finally, Brazil, due to its size, was allowed to integrate to the global market in its own way and its own speed, as everybody wants to have access to Brazil´s big market.

[26]Bolivia and Peru did not meet the prior conditions that link growth with welfare. They applied orthodox policies and their structural problems exposed them dramatically to the perils of globalization. Peru had institutional weakness, lack of experience, and lack of democracy to sustain the reforms. Bolivia spent a lot of time to recover from its hyperinflation, which was a hard process. Moreover, their levels of poverty are still very high.

Ecuador, Paraguay, Venezuela, Nicaragua, El Salvador, Guatemala and Honduras lacked good institutions, had social conflicts with guerrilla forces (Guatemala and El Salvador), and problems of contraband and corruption (Paraguay). As an oil country, Venezuela mismanaged several oil booms, provoking a banking crisis in 1991. Although they liberalized, there was a lack of political support and proper communication of the reforms, resulting in social resistance. Venezuela, Ecuador, and Paraguay faced strong opposition in abolishing all protection. After 34 years of a military regime, until 1989, Paraguay could not build an efficient system of government.

The central American economies were severely affected by the debt crises (except Costa Rica), because they had a lot of oppression, corrupted military, and civilian regimes. They tried to undertake market reforms, but due to political fragility they could not succeed. Moreover, poverty and exclusion are a common denominator for these countries.

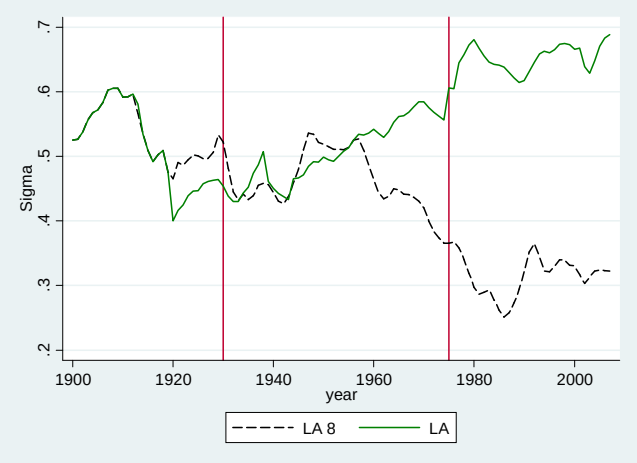

Figure 2: **GDP per capita dispersion in Latin America.** Standard deviation of the logarithm of the smoothen GDP per capita for all available countries and for the eight countries with most data (LA8). The vertical lines show each of the three phases.

St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago[27].

4 Results

Figure 1 revealed that the distribution of the World income as for Latin America has become increasingly unequal. On the contrary, the OECD countries have converged among them. Surprisingly, among the LA8 countries with most data, the dispersion has decreased to even lower levels than the OECD countries in 2007. Nevertheless, when taking a closer look in the region before 1950 (Figure 2), Latin America's high dispersion during the last phase is also observed at the beginning of the 20th century, during the exporting phase. Certainly there are different patterns of convergence. In this section I discuss the main results of convergence for all clubs and phases.

Income dispersion of each club and phase is showed in Figure 3 . The only club that shows a clear pattern of σ - divergence is the non-industrializers, and the only one that shows a clear pattern of σ-convergence is the industrializers. The agricultural and the mineral clubs, from the first phase, show a less clear pattern but still one of convergence. The rest of the clubs, from the third phase, illustrate null convergence being the good institution club the one with the lowest levels of dispersion and the vulnerable with the highest. The distribution of income is the most unequal for all Latin American countries during the last phase, showing very high and

[27] The Caribbean countries were more severely affected by the adverse trends of the 1970s and 1980s than the rest of Latin America. While one or two countries could benefit by developing financial services (the Bahamas, for example), most acquired debt and vulnerability to capital flight and international interest rate changes. These economies are characterized by being too vulnerable to external shocks. They are quite open and primary products producers. Their agricultural sector performed so poorly that they are net food importers. Although Cuba is different from the other countries, it is still extremely vulnerable to external factors. When the Soviet Union collapsed, Cuban exports were reduced dramatically. Additionally, Caribbean countries are exposed to natural disasters. Equality and human development in the Caribbean countries are characterized by very poor indicators, as the case of Haiti.

Figure 3: **GDP per capita dispersion in Latin America per period and group.** Standard deviation of the logarithm of the smoothen GDP per capita for all periods and groups. The vertical lines show each of the three phases.

persistent levels of dispersion.

The results on β-convergence are validated by the replication of other studies to show that my data and techniques are good enough to expand the data set. First, I replicate the regressions of Astorga et. al. (2005), the longest period study, 1900-2000, but only for six countries. Then, I replicate the results of Dobson and Ramlogan (2002b), the study with most countries, 19, but only for 30 years, 1960-1990. The results are satisfactory (see last lines in Table 3)[28]. Then, the expanded data set and techniques are consistent with the existing literature using smaller data sets.

Table 2 shows the results of the speeds of convergence. The first column display the results of absolute convergence with single-cross section regression, and the rest show panel data estimations of absolute and conditional convergence with and without time-effects (I don't report the coefficients for country nor time-effects).

[28] In Astorga et. al. (2005), their absolute convergence is 1.4%, and mine around 1%. Their conditional convergence is 1.9% and mine here 2%. In Dobson and Ramlogan (2002b), their absolute convergence is 0.5% and mine 0.3%. Their conditional convergence is 1.2% and mine 2.8% (my conditional convergence with time effects is the one used to compare to their highest speeds of convergence).

Groups of countries			Single cross section	Panel data			
				Absolute		Conditional	
			t=1	t>1	Time Effects	t>1	Time Effects
All periods		β	**0.00%**	**0.21%**	**0.12%**	**1.11%**	**2.31%**
1900-2007		se	0.0041	0.0024	0.0031	0.0032	0.0035
		N	28	267	267	267	267
		t			12		
		T			18,10, 7,7,6,7,7,9,7,7,8,10		
	8 LA	β	**0.80%**	**0.72%**	**1.05%**	**0.94%**	**3.35%**
		se	0.0037	0.0039	0.0036	0.0061	0.0093
		N	8	56	56	56	56
		t			7		
		T			15,15,16,15,15,15,17		
Phase 1		β	**0.81%**	**0.13%**	**0.43%**	**-0.47%**	**-3.22%**
1900-1930		se	0.0066	0.0057	0.0075	0.1999	0.0629
		N	13	21	21	21	21
		t			2		
		T			18,10		
	Agricultural	β	**-0.13%**	**-0.32%**	**-0.39%**	**-0.24%**	**0.76%**
		se	0.0027	0.0040	0.0045	0.0825	0.0145
		N	9	13	13	13	13
		t			2		
		T			20,10		
	Mineral	β	**5.22%**	**0.36%**	**6.28%**	**-0.52%**	**-5.62%**
		se	0.1114	0.0171	0.0832	0.2136	0.0565
		N	4	8	8	8	8
		t			2		
		T			20,11		
Phase 2		β	**-0.02%**	**0.07%**	**0.12%**	**3.72%**	**4.10%**
1931-1974		se	0.0057	0.0039	0.0039	0.0099	0.0129
		N	23	120	120	120	120
		t			6		
		T			7,7,6,7,7,9		
	Industrialized	β	**1.74%**	**0.97%**	**1.27%**	**0.19%**	**-0.23%**
		se	0.0091	0.0050	0.0034	0.0152	0.0339
		N	6	24	24	24	24
		t			4		
		T			11,11,11,11		
	Non-Industriliz	β	**-0.32%**	**-0.19%**	**-0.13%**	**3.93%**	**4.26%**
		se	0.0079	0.0047	0.0045	0.0126	0.0143
		N	17	84	84	84	84
		t			6		
		T			7,6,6,7,7,9		
Phase 3		β	**0.56%**	**0.03%**	**0.07%**	**3.48%**	**3.76%**
1975-2007		se	0.0060	0.0037	0.0038	0.0050	0.0088
		N	28	126	126	126	126
		t			4		
		T			7,7,8,10		
	Good Institutions	β	**1.99%**	**2.06%**	**1.41%**	**3.09%**	**7.08%**
		se	0.0137	0.0139	0.0187	0.0092	0.0693
		N	7	28	28	28	28
		t			4		
		T			7,7,8,11		
	Painfull	β	**0.47%**	**0.95%**	**0.53%**	**4.44%**	**3.88%**
		se	0.0018	0.0032	0.0049	0.0072	0.0092
		N	9	27	27	27	27
		t			3		
		T			10,10,13		
	Vulnerable	β	**0.27%**	**0.19%**	**0.13%**	**3.23%**	**3.29%**
		se	0.0075	0.0046	0.0047	0.0089	0.0095
		N	12	62	62	62	62
		t			4		
		T			6,7,8,10		

Table 2: **Results**. The Table reports the speed of convergence, standard errors, number of observations, number of periods for the panel data estimations, and the average lenght of each period.

Results of **absolute convergence** are robust since under single-cross section and panel data regressions they coincide in finding either convergence or divergence . The difference in levels of speeds of convergence is small. In general, the speeds of convergence under the single-cross section regression are very similar to the panel data estimations with time-effects and these ones are higher than the estimations without time-effects. The models including time-dummies control for time differences so that the speed of convergence rises and approaches the single-cross section results. Both, the single-cross section regression and panel data with time-effects regression can be interpreted as long-run convergence concepts because they omit time variation. However, as mentioned before, the exclusion of time variation is not always desirable. In any case, it seems that the difference is not an issue for the absolute convergence case. Inside almost all clubs absolute convergence is present under all methods, except for the agricultural and non industrialized clubs, where both have negative speeds of convergence but close to zero.

Regarding **conditional convergence**, the results are also robust between the models with and without time-effects. In general they don't contradict each other regarding convergence or divergence but they differ more in their rates compared to the absolute convergence results. Conditional convergence including time-effects is, in general, higher than without time-effects, since what is left after controlling for country and time-effects is, of course, a very high speed of convergence which could be interpreted as artificial since it gets rid in a way of time and country variation. For this reason I focus more on the non time-effects models. All clubs show conditional convergence (without time-effects) except the agricultural and the mineral clubs, with negative speeds of convergence but close to zero. Conditional convergence tends to be higher than absolute convergence. The explanation is that countries converge faster after their steady-state and country specific effects are controlled for.

During the **first phase**, countries converge in an absolute way (1%) but diverge in a conditional (-0.5%), and σ-converge in overall. After controlling for each country specific characteristic including the steady-state, and time variation, countries diverge. This could imply that their observed absolute convergence is due to common factors determined by the international markets and their demand for Latin American products, rather than the specific country characteristics. One can also say that there is long-run convergence rather than short-run convergence.

In the same way, the **mineral** countries converge in an absolute way (6%), diverge in a conditional (-0.5%), and σ-convergence in overall. One crucial common factor for the mineral countries to converge in an absolute way is the WWI (1914-1918). The WWI accelerated the shift in trade and investment structures in Latin America, specially for the mineral sector. The demand for Latin American minerals increased together with investment in the mineral sectors. According to Furtado (1981) the war stimulated the industrial growth in Latin America.

On the contrary, the **agricultural** countries diverge in the long run and short run (without time-effects). Furthermore, Figure 3 shows that the agricultural club have high levels of dispersion, which stay constant

for around the first 20 years, and then decrease in levels. This overall divergence may be due to the lack of accumulation of capital and technology investment that characterizes the agricultural sector, compared, for example, to the mineral sector. Besides the agricultural countries are more heterogenous than the mineral, they were producing more different goods, which can explain the lack of convergence together with the fact that the WWII benefited mostly the mineral sector.

During the **second phase** of industrialization, countries show an absolute convergence rate close to zero but a conditional of around 4% (with and without time-effects), and income dispersion increased. The reason for the lack of absolute convergence and the presence of conditional convergence may be that during this phase, countries went on their own way of development by industrializing or not, such that each country's own experience was more important in determining convergence than the external common factors that had been important during the frist phase. Therefore, once country specific characteristics (and time-effects) are controlled for, countries converge.

With or without controlling for country specific characteristics, the **industrializers** do not diverge. Their absolute speed is around 1% , conditional 0.2% (without time-effects), and a very strong pattern of σ-convergence. The reason for their non divergence could be the industrialization process. They were able to succeed, despite all the distortions that the industrialization via import substitution brought, in innovating some industries and creating capital such that technology transmission was more fluent, even though countries went on in their own way and had big differences among them.

On the contrary, the **non-industrializers** diverge in an absolute way (at speeds below -1%), converge only after controlling for country and time specific effects, at a speed of around 4%, and there is a clear σ-divergence pattern. This implies that they diverge between them but each country converge to their own steady-state. There was a lack of a common factor that allowed them to converge like in other cases. Each country went in their own way diverging from each other. Instead of industrializing by producing capital goods and creating intermediate input industries, some stayed as primary exporters.

Lastly, during the **third phase**, countries converge in an absolute and conditional sense but at very different speeds. Their absolute convergence is less than 1% and conditional around 3.5%, meaning that common external factors were determining the path, like the debt crises, but also that each country's own experience was important for convergence, such as the link between globalization and welfare that each country provided. Regarding income dispersion, it has been constant but at rather high levels.

The **good institution** club could develop a connection between globalization and welfare by having acceptable welfare standards of living, good relations between the public and private sector, democratic values, and integration to the global markets among others. All of this characteristics are certainly helpful for capital accumulation and technology diffusion. Therefore, the results show absolute and conditional convergence. Both are close to each other, around 2%, which is a sign of strong convergence. As for the total phase, the income

dispersion is constant but at very low levels.

The **painful** club is characterized by having had weak institutions that lead to bad results either in terms of growth, welfare, or both, which most likely did not motivate technology diffusion nor capital accumulation. Nonetheless I find convergence by all means but at verydifferent rates. Their absolute convergence is around 0.6% and their conditional is around 4%. This implies that they vaguely converge between them but each converge to their own steady-state. Their income dispersion is constant.

In a similar way, the **vulnerable** club, composed by the Caribbean countries which were more severely affected by the adverse trends of the 1970s and 1980s than the rest of Latin America, converge vaguely(around zero) in an absolute, strongly in a conditional way (around 3%), and a constant rather high income dispersion compared to the other clubs of this phase. The absolute non-convergence shows no common convergence factors stronger than their own experience.

From all the clubs, two showed more similar speeds of absolute and conditional convergence than the others: the industrializers and the good institutions[29]. Both clubs are composed by almost the same countries, namely six: Argentina, Brazil, Chile, Colombia, Mexico and Uruguay, which are all included in the LA8 group. Therefore, the observed strong σ-convergence found among the LA8 is due to the presence of these six countries (LA6).

The speeds of convergence for the six countries for the whole period are shown in Table 3. All types of convergence are found, and the absolute and conditional convergence are quite similar, around 1%. Notice that the speeds of convergence are lower than in the 8LA. The reason is that 8LA includes Venezuela that benefited from the oil to catch-up to the others[30].

5 Discussion

In this section I discuss the controversial points of this paper, such as the validity of the grouping and econometric issues like endogenity problems, and unbalanced panel data issues.

Validity of the grouping

The validity of the division of clubs based on economic history can be questioned. The idea of organizing countries into clubs is not new and have been addressed by several authors, like for example Durlauf and Johnson (1995), Hansen (2000) Pesaran, H (2006). Most researchers study the shape of the distribution of income per capita and find an income threshold to divide convergence clubs. This paper let historical facts to decide the natural groupings instead of letting the data do it. However there may be other ways than the historical approach and

[29] In order to compare speeds I take into account only panel data estimators. For absolute convergence I consider the one with time-effects, since is closer to the single cross sections regression-the long run convergence, and for conditional convergence, I take the one without time-effects, because as seen before, the concept with time-effect does not take into account the time variation which actually interests us.

[30] Note as well that four out of the six countries are included in the list of the rich club found by Blydes (2006). The author found this club because of their level of income but did not explain the forces, events, or background behind his findings.

in this section I try different ways of grouping.

I cluster countries according to their membership to an integration process. In the region, the most advanced economic integration processes are 4 custom unions: the MCCA (*Mercado Común Centroamericano*-Central American Common Market), CAN (*Comunidad Andina*-Andean Community), CARICOM (Caribbean Community) and MERCOSUR. (*Mercado Común del Sur* - Southern Common Market)[31].

Inside all unions there is a clear pattern of sigma divergence except for CARICOM (See Fig.4). Regarding absolute convergence (Table 3), there is null convergence for CARICOM, and there is divergence for the rest of the unions (at least under the single-cross section). Regarding conditional convergence, it is found in all unions with or without time-effects, except for MERCOSUR which shows conditional divergence without time-effects. Overall, the results of absolute and sigma divergence validate what was expected, that there is a low degree of integration in the region in order to reach absolute output convergence[32].

[31] MCCA was created in 1960, and it is composed by five countries: Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica. CAN was installed in1969, and nowadays has four members: Bolivia, Ecuador, Colombia, and Peru. Chile and Venezuela were members as well, but Chile withdrew in 1976 and Venezuela in 2006. CARICOM was created in 1975, and includes: Antigua and Barbuda*, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat*, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname*, and Trinidad and Tobago (* indicates the countries are excluded from the analysis due to lack of data). MERCOSUR was founded in 1986 and currently has five members: Argentina, Brazil, Paraguay, Venezuela and Uruguay.

[32] Holmes (2005) and Madariaga et.al.(2003) found convergence for the MCCA and the MERCOSUR unions, which results can be compared to the conditional convergence results in this paper. Blyde (2005) found increasing dispersion in MERCOSUR, which can be compared to the σ-divergence here.

Groups of countries			Single cross section	Panel data			
				Absolute		Conditional	
			t=1	t>1	Time Effects	t>1	Time Effects
Integration Process							
1975-2007	CARICOM	β	**0.09%**	**0.23%**	**0.21%**	**4.93%**	**4.56%**
		se	0.0095	0.0047	0.0047	0.0115	0.0091
		N	10	47	47	47	47
		t			4		
		T			7,8,8,8		
1960-2007	MCCA	β	**-1.09%**	**-0.10%**	**-1.19%**	**4.36%**	**0.57%**
		se	0.0088	0.0082	0.0051	0.0156	0.0099
		N	5	30	30	30	30
		t			6		
		T			8,8,8,8,8,8		
1969-2007	CAN	β	**-0.17%**	**0.60%**	**0.38%**	**1.76%**	**6.13%**
		se	0.0161	0.0076	0.0102	0.0182	0.0291
		N	4	20	20	20	20
		t			5		
		T			8,8,8,8,7		
1986-2007	MERCOSUR	β	**-1.70%**	**-2.50%**	**-1.90%**	**-4.90%**	**4.12%**
		se	0.0011	0.0063	0.0028	0.0046	0.1508
		N	4	12	12	12	12
		t			3		
		T			7,7,8		
Others							
	6 LA	β	**0.73%**	**0.20%**	**0.66%**	**0.04%**	**1.46%**
		se	0.0020	0.0019	0.0018	0.0019	0.0097
		N	6	42	42	42	42
		t			7		
		T			15,15,16,15,15,15,17		
		β	**1.15%**	**0.47%**	**0.85%**	**0.56%**	**2.28%**
	Astorga et.al. (2005)	se	0.0047	0.0032	0.0028	0.0049	0.0060
		N	6	60	60	60	60
		t			10		
		T			10x10		
	Dobson et.al.(2002)	β	**0.39%**	**0.31%**	**0.00%**	**4.25%**	**3.04%**
		se	0.0043	0.0026	0.0028	0.0081	0.0184
		N	19	114	114	114	114
		t			6		
		T			5,5,5,5,5,5		

Table 3: **Results**. The Table reports the speed of convergence, standard errors, number of observations, number of periods for the panel data estimations, and the average lenght of each period.

Another interpretation of these clustering is that the custom unions are also showing grouping by geography. The MCCA clubs all countries from Central America, CAN countries from the Andean region, CARICOM the Caribbean countries and MERCOSUR the southern cone countries. Therefore, it seems that geography does not determine convergence either.

Grouping by economic history is the preferred choice. It makes sense that economic processes that change in time according to policies, external shocks, and regional trends draw different patterns of convergence. Regarding the success of the grouping, only two clubs, the agricultural and the non-industrializers, showed non convergence

under at least two concepts.

Econometric Issues

The results presented here could be biased and inconsistent if there were endogeneity problems. There are three potential sources of endogeneity: Omitted variables, measurement error and/or simultaneity (Wooldridge, 2002). Regarding omitted variables, it may not be convincing not to have other explicit variables in the growth equations than the initial output[33], country-specific characteristics, including the steady-state, and the time-effects. However, I have introduced implicit controls when dividing the countries into periods and clubs. These variables are external shocks, sector dummies, export product characteristics, degree of industrialization, and institutions information. Having in mind both the implicit and explicit variables, the omitted variable problem can be undermined.

Measurement errors in the GDP per capita at the beginning of each period (the explicit regressor that could show some sort of measurement error) can be present due to poor calculations and they may be temporary. This problem is diminished by smoothing the data such that the temporal errors tend to disappear.

Finally, simultaneity in the case of single-cross section regression (contemporaneous) is not possible because the average growth rate of a period of 30 years, for instance, cannot determine the initial conditions of that period, unless the growth rate of the period was expected 30 years before, which is not likely. Remember that the initial conditions are understood as the explicit and implicit explanatory variables. Similary, simultaneity (sequential) in panel data is absent. The average growth rate of a period of 30 years, for example, cannot determine the initial conditions of the same period, as explained above, or the initial conditions of past periods but it can determine the initial condition of the next period. Therefore, panel data estimations are appropriate as well.

Another topic is unbalanced panel data, some countries do not have information, specially for the first years. This can be a problem if the reason for missing information is related to the error term, but since the reason is connected to the regressor, our panel data estimators are valid. It is clear that the reason for the lack of data is due to the development of each country. At the beginning of the century, only strong economies had data. Therefore, missing information is due to low levels of GDP at the beginning of each period.

Conclusions

This paper, based on Thorp (1998), analyzes the most important and known historical facts of 32 Latin American countries over more than a century (1900-2007), from where different phases and several convergence clubs are identified. I use the model setup from Barro and Sala-i-Martin (2004), which is the most used in the literature

[33] Actually, the initial output of a period has a strong explanatory power on the average growth in general. Barro and Sala-i-Martin (2004) make a BACE analysis where the intial output is strongly related to growth.

and reaches concrete results about convergence. Then, with data from Madisson (2003) and the World Bank (2009), I use single-cross section and panel data regressions to estimate the speeds of convergence for each phase and convergence club. In this way, by grouping countries with similar characteristics, I avoid using arbitrary determinants of growth, I solve the problem of lack of data at the beginning of the century, and I expand the usual range of data analyzed so far.

During the first phase, from 1900 to 1930, since Latin American countries development was focused on primary product exports, two clubs were identified: the mineral and agricultural products exporters. Throughout the period and for the mineral countries, there is absolute but not conditional convergence, and a degree of σ-convergence. This suggests that their convergence is determined by common factors as the international markets and the demand for Latin American products, rather than by specific country characteristics. For the mineral club, the WWI is crucial since it increased their exports and investments on their sector. On the contrary, the agricultural countries converged only after controlling for specific country characteristics, which suggests that there was not enough capital accumulation nor technology diffusion to ease the convergence process.

Throughout the second phase, from 1931 to 1974, when countries followed a model of import substitution by industrialization, two clubs are identified: those that were able to industrialize and the non-industrializers which failed to industrialize for different reasons. During the entire period and for the non industrializers there is strong conditional convergence compared to absolute and σ-convergence. Each country specific characteristic is more important for convergence than the common factors. For the industrializers club there is absolute, conditional, and σ-convergence. This suggests that the process of industrialization, despite the distortions, brought innovation and capital which eased the process of convergence.

During the third phase, from 1975 to 2007, after the arise of a more social concern of development and a willingness to participate in the globalization process, three clubs are identified: good institutions countries, which developed institutions that could deal with growth and/or welfare, painful processes countries, which were traumatized by the debt crises adjustment, and vulnerable countries, the Caribbean, which are different from the rest and are characterized by being vulnerable to external factors. Throughout the whole period and for all clubs there is absolute, conditional, and constant σ-convergence. However, the only club with similar rates of absolute and conditional convergence and with low levels of dispersion is the good institution club. This robust convergence among the good institution countries show that their ability to develop a connection between globalization and welfare helped for capital accumulation and technology diffusion, the main forces behind convergence.

Overall, two clubs show strong evidence of convergence under all concepts. Their speed of β-convergence is around 2%. Countries in these clubs were able to succeed in industrializing and/or building good institutions. Therefore, as long as countries follow appropriate policies on physical and human capital accumulation, the difference between countries in Latin America will slowly disappear over time, as it did between some countries

already.

The idea of having convergence clubs from a historical approach is new and can be controversial. Despite that it makes sense that economic processes that change in time according to policies, external shocks, and regional trends draw different patterns of convergence, there are other ways of finding convergence clubs. I analyzed two other alternatives, by integration agreements and geographical vicinity and found no evidence for convergence. The other possibility is to analyze the income distribution and find thresholds that divide clubs. However the idea from this paper is to have different clubs based upon prior knowledge of the shared history and not based on post information of income. In anyway, the correct way of dividing the clubs is unknown, so the validity of the grouping by history or other way can be easily questioned.

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Appendix

Groups of countries		Argentina	The Bahamas	Belize	Bolivia	Brasil	Barbados	Chile	Colombia	Costa Rica	Cuba	Dominica	Dominican Republic	Ecuador	Grenada	Guatemala	Guyana	Honduras	Haiti	Jamaica	St. Kitts and Nevis	St. Lucia	Mexico	Nicaragua	Panama	Peru	Puerto Rico	Paraguay	El Salvador	Trinidad and Tobago	Uruguay	St. Vincent and the Gre	Venezuela
	8 LA	1				1		1	1														1			1					1		1
	New	1				1		1	1														1								1		
Period 1 1900-1930																																	
	Agricultural	1				1			1	1	1					1		1						1					1		1		
	Mineral							1															1			1							1
Period 2 1931-1974																																	
	Industrialized	1				1		1	1														1								1		
	Non-Industriliz				1					1	1		1	1		1		1	1	1				1	1	1	1	1	1	1			1
Period 3 1975-2007																																	
	Good Institutions	1				1		1	1	1													1								1		
	Painfull				1									1		1		1						1		1		1	1				1
	Vulnerable		1	1			1				1	1	1		1		1		1	1	1	1			1		1			1		1	
Regional Blocks																																	
1960-2007	MCCA									1						1		1						1					1				
1969-2007	CAN				1				1					1												1							
1975-2007	CARICOM		1	1			1					1			1		1		1	1	1	1								1		1	
1986-2007	MERCOSUR	1				1																						1			1		
Other literature																																	
	Astorga et.al.	1				1		1	1														1										1

Table 4: **List of countries per group and period**. 1 Indicates the participation in the groups and periods

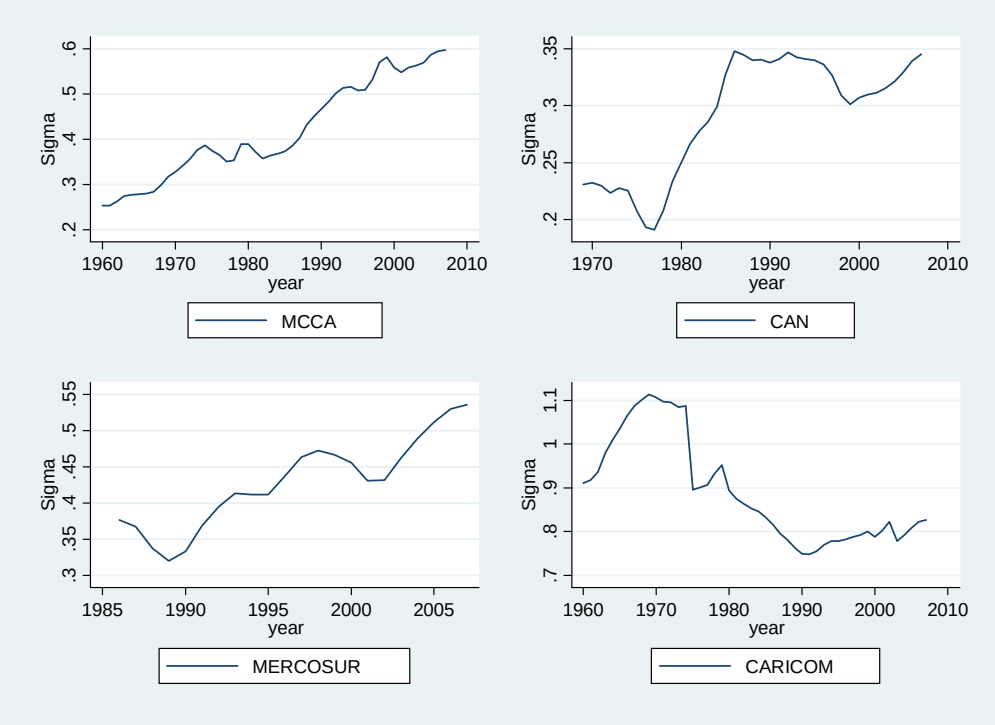

Figure 4: **GDP per capita dispersion in Latin America per custom union.** Standard deviation of the logarithm of the smoothen GDP per custom union.