

CONVERGENCE, TRADE AND INDUSTRIAL POLICY: ARGENTINA, BRAZIL AND
URUGUAY IN THE INTERNATIONAL ECONOMY, 1900-1980*

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RESUMEN

El artículo discute el desempeño económico de largo plazo de tres países latinoamericanos (Argentina, Brasil y Uruguay) desde una perspectiva comparada, tomando como referente a un grupo de cuatro países desarrollados (Alemania, Francia, el Reino Unido y los EUA). El foco está puesto en el período 1900-1980, tanto desde el punto de vista del desempeño al interior del grupo de países latinoamericanos como entre estos y los avanzados. Se argumenta que Argentina y Uruguay se beneficiaron de una privilegiada inserción en los mercados internacionales a principios del Siglo XX, lo que les permitió mantener o mejorar sus posiciones relativas. Sin embargo, ellos fracasaron en ajustarse a los grandes cambios de largo plazo de los patrones del comercio mundial que se pusieron en marcha a partir del período de entreguerras, lo que implicó una persistente reducción relativa de sus mercados de exportación. Por otra parte, Brasil, habiendo sido mucho menos exitoso antes de 1930, logró posteriormente crecer a un buen ritmo, sobre la base de un rápido cambio estructural y la creación de ventajas competitivas en nuevos sectores industriales. La más vigorosa política de industrialización y diversificación exportadora brasileña logró cambios en el patrón de especialización, en tanto Argentina y Uruguay quedaron bloqueados en el viejo patrón de especialización productiva. Sobre la base de las experiencias de crecimiento relativo de estos países, se sugiere una tipología de regímenes de convergencia.

Palabras clave:

Regímenes de convergencia; crecimiento restringido por la balanza de pagos; dependencia de trayectoria; Argentina; Brasil; Uruguay.

ABSTRACT

This paper discusses the economic performance of three Latin American countries (Argentina, Brazil and Uruguay) from a comparative perspective, using as a benchmark a group of four developed countries (France, Germany, the United Kingdom and the United States). The focus is on the relative performance within the region and between the Latin American countries and the developed countries in the period 1900 -1980. The paper argues that Argentina and Uruguay benefited from a privileged position in international markets at the beginning of the 20th century and this allowed them to keep or even improve their relative position. However, they failed to adjust to the major long-run change in the pattern of world trade brought about during the interwar period and after, which implied a persistent decline of their export markets. On the other hand, Brazil, after having been much less successful until 1930, grew at higher rates thereafter based on rapid structural change and the building up of competitive advantages in new industrial sectors. The more vigorous Brazilian policy for industrialization and export diversification may explain why Brazil succeeded in changing its pattern of specialization, while Argentina and Uruguay were locked in to the old pattern. A typology of convergence regimes is suggested based on the growth experience of these countries.

KEYWORDS

Convergence regimes; balance-of-payments-constrained growth; path-dependency; Argentina; Brazil; Uruguay.

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1. INTRODUCTION

This paper addresses the economic performance of three Latin American countries, namely Argentina, Brazil and Uruguay, from a comparative perspective. The comparison uses a group of four developed countries as a benchmark: France, Germany, the United Kingdom and the United States (G-4). The focus of the paper is on convergence and divergence in terms of GDP *per capita* between the three Latin American countries and the group of advanced countries between 1900 and 1980. Convergence (divergence) is defined as the process by which the difference in GDP *per capita* of the Latin American countries and the average GDP *per capita* of the reference countries falls (increases) through time. In addition, the paper discusses why Brazil was able to attain a more favorable growth performance than Argentina and Uruguay. It is argued that different patterns of international trade and differences in industrial policy after World War II help to explain why Brazil was a case of moderate success in catching-up with the developed countries until 1980, while Argentina and Uruguay clearly lagged behind.

France, Germany, the UK and the USA are taken as a benchmark for the convergence analysis. The literature suggests that convergence arises from combining the development of domestic, scientific and technological capabilities, the learning activities derived from the pattern of trade specialization, and the technological spillovers induced by international trade and capital flows (Fagerberg, 1994; Verspagen, 1993). The four countries mentioned represented high shares of the three Latin American countries' exports and imports and they were also the main destination and origin of capital flows. They represented the frontier, the developed economies towards which the region struggled to approach during the last century.

The period considered in this study goes from 1900 to 1980. It thus embraces the last decades of the classical liberal era, its collapse following the Great Depression, and the heydays and subsequent collapse of the Bretton Woods system. The paper does not consider the last quarter of the 20th century, in which the pattern of technical change shifted significantly. From a Latin American perspective, the work concludes with the end of the process of import-substituting industrialization. In effect, the 1980s represented a moment of profound discontinuity in Latin America's growth trend. The pattern of growth changed substantially thereafter, due to the debt crisis and to the implementation of free-market economic reforms in the 1990s. These critical new dimensions of economic growth in the region justify the decision not to continue the study beyond the beginning of the debt crisis.

The paper argues that the asymmetric performance of Brazil compared with its neighbors in Southern Latin America during this period can be explained by combining the balance-of-payments-constrained growth theory (Thirlwall, 1979; Cimoli, 1988; McCombie and Thirlwall, 1994, chapter 5) and the theory of path-dependency and lock-in in specialization, as proposed by David (1985) and Arthur (1994). In a nutshell, for a country to converge it has to be competitive in sectors of high demand growth in the international economy. Argentina and Uruguay benefited from a privileged position in international markets at the beginning of the 20th century. However, they failed to adjust to the major long run change in the pattern of world trade (negative demand shock) beginning with World War I and the Great Depression which implied a persistent decline of their export markets. On the other hand, Brazil, after having been much less successful until 1930, grew at higher rates thereafter based on rapid structural change and the building up of competitive advantages in new industrial sectors. The more vigorous Brazilian policy for industrialization and export diversification could explain why Brazil succeeded in changing its pattern of specialization, while Argentina and Uruguay remained locked-in to the old pattern.

A caveat is necessary at this point. Brazil can hardly be considered a case of undisputed success in the international economy. After fifty years of convergence, it was still behind Argentina in terms of real GDP *per capita*. Moreover, Brazil was a relative failure when compared with the South East Asian economies which converged with the developed economies at a very high rate after World War II (Palma, 1996). On the other hand, Brazil did represent a case of convergence (even if this process was slow and began from a very low initial GDP *per capita* level), while Argentina and Uruguay diverged most of the time with respect to the G-4. Thus, although Brazil will be considered in this paper as a case of relative success at a regional level, this by no means implies that its growth path was optimal or desirable.

This paper is divided into seven sections including the introduction and the concluding remarks. Section 2 offers a brief theoretical review of the Balance-of-Payments-constrained growth model (BPC) and path-dependency, relating this literature with the Schumpeterian (technology-driven) approach to international competitiveness. Section 3 presents some stylised facts, focusing on phases of convergence and divergence between the Latin American countries and the group of four advanced economies (G-4). Section 4 tests the BPC growth model and discusses how external shocks and structural change after the Great Depression and World War II affected the rate of growth compatible with external equilibrium in Latin America. Section 5 addresses the changes suffered in the international context in the 1930s and discusses why this had a particularly negative impact on Argentina and Uruguay. Section 6 focuses on industrial policy as an explanation of why structural change in the post Second World War period was slower in Argentina and Uruguay than in Brazil. A preliminary typology of convergence and divergence regimes is proposed in the concluding remarks.

2. BALANCE-OF-PAYMENT-CONSTRAINED GROWTH, SPECIALIZATION AND PATH-DEPENDENCY

This work takes as its point of departure the theory of balance-of-payments-constrained (BPC) growth (Thirlwall, 1979; Cimoli, 1988; McCombie and Thirlwall, 1994), formally stated as follows:

$$X = \left(\frac{P}{P^* E} \right)^\phi Z^\varepsilon \quad [1]$$

$$M = \left(\frac{P^* E}{P} \right)^\nu Y^\pi \quad [2]$$

$$PX + PF = PM \quad [3]$$

$$a(p + x) + (1 - a)(p + f) = p + m \quad [4]$$

$$x = \phi(p - p^* - e) + \varepsilon z \quad [5]$$

$$m = \nu(p^* + e - p) + \pi y \quad [6]$$

$$y^* = \frac{(1 + a\phi + \nu)(p - p^* - e) + a\varepsilon z + (1 - a)f}{\pi} \quad [7]$$

where X is the volume of exports, M is the volume of imports, P is the domestic price level, P^* is the international price level, E is the nominal exchange rate (units of local currency per dollar), Z is real world income, Y is real domestic income, F represents real net capital inflows, ϕ and ν are (negative) price elasticities, ε and π are (positive) income elasticities and $a = PX / (PX + PF)$ is the participation of exports in total foreign exchange earnings (denominated in domestic currency units). Equations [1] and [2] are constant-elasticity equations of demand for exports and imports respectively. Equation [3] gives the condition for equilibrium in the balance of payments. Lower case letters represent the rate of growth of the

variables (vg: $x = \frac{dX}{dt} \frac{1}{X} \equiv \frac{\dot{X}}{X}$ is the rate of growth of the quantity of exports, p is domestic inflation and p^* is foreign inflation). Equations [4] to [6] are obtained through logarithmic differentiation with respect to time of equations [1] to [3]. y^* is the rate of growth which keeps the balance of payments in equilibrium, defined by equation [7] which is obtained by substituting [5] and [6] in [4].

Lack of data for capital flows for the period prior to the 1950s makes it extremely difficult to include this variable in the analysis in an appropriate way. Provisional evidence (unfortunately limited for so long to the Uruguayan case) suggests, however, that it is reasonable to assume that capital inflows and outflows cancel each other out in the long run. Capital flows fluctuated significantly in the Latin American countries. Although the external constraint on growth may be temporarily alleviated by capital inflows, this positive influence would be reversed in subsequent periods by a corresponding outflow of foreign exchange with a view to servicing the debt and due to capital exports in search of more profitable and reliable markets. Therefore, in the long run, a may be assumed to be equal to unity in equations [4] and [7]. In other words, the cyclical movements in capital flows, following the well documented long swings prevailing in the region in the period 1870-2000 (Bértola & Lorenzo, 2003), are excluded from the analysis, implying that the focus lies in current account equilibrium rather than in balance of payments equilibrium.

If the principle of purchasing power parity (PPP) holds in the long run, the real exchange rate will remain stable and therefore $(p - p^* - e) = 0$. Although there is no consensus on this point, most empirical studies suggest that the PPP hypothesis does work well in empirical tests (Rogoff, 1996). However, the evidence also suggests that terms of trade may remain off-equilibrium for about six to ten years (Cashin and Mac Dermott, 2003). For this reason, in this paper empirical exercises will include the terms of trade in the calculation of the demand functions. This should avoid the risk of using biased estimates of the parameters of the model due to misspecification problems (omitted variables) in the demand function.

Although the concern of this paper is mainly centered on long-run trends, the existence of Kuznets-type swings is not ignored. They are, generally speaking, determined by restrictions related to current account equilibrium, but are also shaped by movements in capital flows and terms of trade, as well as by policy decisions affecting the exchange rate. All these factors influence the growth rate of the economy, produce differences in the relative response of tradables and non-tradables and indirectly affect the income elasticity of demand for exports and imports themselves.

Back to the long-run, assuming $a = 1$ then:

$$y^* = \frac{(1 + \phi + \nu)(p - p^* - e)}{\pi} + \frac{\varepsilon z}{\pi} \quad [8]$$

In addition, assuming PPP, equation [8] gives:

$$y^* = \frac{\varepsilon z}{\pi} = \frac{x}{\pi} \quad [8']$$

Equation [8] amounts to a simplified model of international GDP convergence, where $1/\pi$ represents a dynamic version of the foreign trade multiplier originally set forth by Harrod (1933). The ε/π ratio is the country's non-price competitiveness, which depends on its economic structure, the pattern of specialization and the development of technological capabilities (McCombie and Thirlwall, chapter 4). y^* is the rate of growth compatible with current account equilibrium. If non-price competitiveness is higher than unity [*i.e.* $(\varepsilon/\pi) > 1$], then $y^* > z$ and the GDP of the less developed country will converge towards that of the advanced country.

How is non-price competitiveness determined? In the very long run, income elasticity parameters are not constant but evolve with demand and supply forces. On the demand side, the institutional framework in which international markets work may change, as may consumer preferences. On the supply side, capital accumulation and technological learning reshape competitive advantages. Therefore, it is necessary to combine Keynesian demand-led growth with Schumpeterian structural change to explain economic growth (Abramovitz, 1986; Dosi and Fabiani, 1994). The latter will depend on the ability of each country to promote structural change in such a way that the pattern of specialization evolves towards sectors that exhibit high rates of demand growth in the international markets as well as high rates of productivity growth. The effort required for technological learning and catching up is a key variable behind why some countries succeed while others fail to promote structural change (Nelson and Phelps, 1966; Fagerberg, 1994). There is an increasingly large amount of literature pointing out the key role of the diversification of the productive structure (structural change) in fostering growth in the long run¹.

In addition, the literature on increasing returns and path-dependency suggests that specialization tends to show considerable inertia² (Arthur, 1994, chapter 1; David, 1988). Positive feed-backs may give rise to lock-in effects: when a major shift in demand or technology occurs, entering new dynamic sectors is a slow, painstaking process. In particular, technological learning is highly localized and cumulative which means that barriers to entry increase when firms move towards sectors not closely related to their core field of expertise (Cimoli and Dosi, 1995). Moreover, externalities related to technological complementarities between industries may produce multiple equilibria and slow-growth traps. In this case, institutions could play a key role in guiding the economy towards a high growth-rate equilibrium (Durlauff, 1992; Dosi and Orsenigo, 1987).

To sum up, changing the pattern of specialization is a difficult process in which institutional change and policy innovation play crucial roles. Otherwise, cumulative forces may lead to a process of growing

¹ A classical reference in this respect is Pasinetti (1984). See also Saviotti and Pyka (2004).

² This can be considered a stylised fact in the empirical literature on patterns of trade (Dalum *et al.*, 1998)

divergence in which technological capabilities and market shares shrink through time. This paper argues that the failure to encourage structural change in Argentina and Uruguay was a critical dimension of the reason why these two countries fell behind after World War I, while Brazil was more successful in this respect.

3. STYLISTED FACTS

Convergence is defined in terms of reducing differences in the real GDP *per capita* between the laggard country and the advanced country. Convergence and divergence between Argentina, Brazil and Uruguay (ABU) and the average real *per capita* GDP of four selected developed countries used as a benchmark (France, Germany, UK and USA, the G-4) is shown in Figure 1.

FIGURE 1 HERE

Since the mid-1910s, Argentina and Uruguay diverged from the G-4. Considering the whole 1900-1980 period, they diverged at a similar rate, of about -0.8 % *per annum*. On the contrary, Brazil converged at an annual rate of 0.9 %. Brazilian convergence was significant but nevertheless unable to compensate for the difference in real GDP *per capita* which existed in the region at the beginning of the 20th century. The Brazilian relative real *per capita* GDP with respect to Argentina increased from about 20% in 1900 to 60% in 1980. This gap would almost disappear by the end of the century.

The dynamics of convergence and divergence were far from uniform and significantly different sub-periods can be identified representing different convergence and divergence regimes. Between 1900 and 1914, Argentina and Uruguay were improving their relative position with respect to the G-4 while Brazil remained unchanged, implying that Argentina and Uruguay increased their real GDP *per capita* advantage with respect to Brazil. However, after World War I the relative positions of Argentina and Uruguay started to worsen and this became a steady process of divergence following the Great Depression. At exactly the same time, Brazil began its process of convergence with the G-4 and as a consequence (at a more rapid pace) with its neighbours.

After the 1930s Brazil converged most of the time with the G-4. Although some temporary setbacks took place during the war and in the early 1960s, these were followed by periods of vigorous recovery. On the other hand, each external shock seems to have reduced the ability of Argentina and Uruguay to grow for longer periods. The divergence process was especially intense after World War II, although it receded for a few years in the 1960s in Argentina and in the 1940s and 1970s in Uruguay.

The process of divergence can also be seen when the USA real GDP *per capita* is used as a benchmark instead of the G-4 (see Figure 2).

FIGURE 2 HERE

Argentina and Uruguay both fell to much lower levels of GDP *per capita* with respect to the USA after World War I and World War II and continued to fall behind this country for the rest of the period. As has already been seen in the case of the G-4, a clear convergent trend prevailed in Brazil, although during some short periods of time this country also diverged from the USA.

World War I and especially the Great Depression and World War II were turning points for Argentina and Uruguay, not only in terms of *per capita* GDP levels, but also in terms of subsequent rates of economic growth. On the other hand, Brazil suffered these shocks but reacted in such a way that it managed to maintain its higher rates of growth afterwards. In the next section, the performance of the three countries in the international economy will be addressed from the perspective of the evolution of the capacity to take advantage of the opportunities offered by international trade.

4. CONVERGENCE AND NON-PRICE COMPETITIVENESS

As mentioned above, balance-of-payments-constrained growth models suggest that in the long run it is the ratio of the income elasticity of the demand for exports and imports (what McCombie and Thirlwall, 1994 call non-price competitiveness) which defines the rate of growth consistent with external equilibrium. Argentina and Uruguay suffered a major negative long run demand shock as a result of World War I and the Great Depression which drastically reduced the income elasticity of the demand for exports and, as a consequence, their long run equilibrium growth rate. Brazil also suffered this shock but the impact was less damaging than in Argentina and Uruguay. In contrast, after World War II, Brazil was more successful than Argentina and Uruguay in promoting structural change. This reshaped (to a larger extent in Brazil) the production and export structures in favor of manufactured goods which were technologically more dynamic and represented an increasing share of international trade. This section addresses the impact of changes in the international economy and of structural change on growth in the three Latin American countries.

With this objective, equation [8] was estimated including two dummy variables: D1 equals zero for the years before 1930 and unity otherwise, while D2 adopts the value zero for the years before 1939 and 1 otherwise. Therefore, the dummies capture the transformation in the pattern of growth related to two key events in the international economy —the years after the collapse of the classical liberal era in 1930 and the workings of the Bretton Woods regime after World War II.

Before running the regression based on equation [8], the degree of integration of the variables was tested. It is observed that all variables are $I(1)$, *i.e.* variables in levels have a unit root and are stationary in first differences (Table 1). Since this is a dynamic model in which the variables are expressed in terms of rates of growth, then all the variables included in the model are stationary. The estimation of the parameters of equation [8] —the income elasticity ratio (ε/π) or non-price competitiveness, and the price elasticities (ϕ and ν)— is calculated using GLS in a panel data approach in which the effects of external shocks are specific to each country but in which the coefficients of the independent variables are assumed to be the same for all countries.

TABLE 1 HERE

TABLE 2 HERE

From table 2 it can be concluded that:

- i) Growth in the international economy has a significant positive effect on the rate of economic

growth in the Latin American countries. According to the BPC-growth theory, this effect is related to non-price competitiveness (ε/π in equation [8]) which in turn reflects the patterns of production and trade in the Latin American countries.

- ii) The influence of the terms of trade is not significant. This result is, in general, compatible with the literature (see McCombie, 1997) and supports the simpler version of the balance-of-payments-constrained growth model, as expressed in equation [8’].
- iii) The dummy variables which seek to capture changes in the patterns of growth related to different phases in the international economy give different results for Argentina and Uruguay compared to Brazil. The dummy which represents the effect of the end of the classical liberal era (*D30*) was negative and significant in Argentina and Uruguay, but insignificant in Brazil. The change in the intercept with respect to the first two decades of the century is negative in all cases, but in Argentina and Uruguay it is almost double (in absolute value) the Brazilian figure.
- iv) Inversely, the dummy which represents the influence of the Bretton Woods system after World War II was positive and significant in the case of Brazil but insignificant in Argentina and Uruguay. This strengthens the idea that Brazil was better able to reshape its pattern of growth after 1946 in such a way that it took more advantage than its neighbors of a rapidly expanding international economy.

In the next sections we will discuss why Argentina and Uruguay suffered most from the fall of the classical liberal era in the 1930s and why these countries failed to promote structural change in order to achieve dynamic integration in the post-Second World War years.

5. CHANGING PATTERNS IN INTERNATIONAL TRADE: THE FALL OF THE CLASSICAL LIBERAL ERA

The origins of the demand shock suffered by Argentina and Uruguay were related to their specialization in beef and temperate agricultural goods and with their close connection to the UK market. This connection was virtuous while the UK was the leading trade and financial centre, as well as the largest source of foreign investment to the region. In addition, the expansion of railways and technological change in the agricultural and industrial sectors (especially the production of chilled beef) implied that supply did not fall short of demand (Adelman, 1991; Lewis, 1998; Thorp, 1998). However, the dynamic stimulus resulting from the British market shrank after World War I and especially in the 1930s when the UK began to impose trade restrictions after the 1930 crisis³.

In May 1933 Argentina signed the Roca-Runciman Agreement to protect its share of the British market then threatened by the preferences granted to the British Dominions by the Ottawa Treaty of 1932. Argentina agreed to give preference to UK exports and investments in exchange for an import quota for Argentine meat and other tariff concessions⁴. However, the terms of the agreement meant only partial relief for Argentine difficulties⁵.

³ Abreu (1984), pp. 144-62; Gravil & Rooth, (1978), pp. 337-378.

⁴ The UK promised to consult Argentina if it became necessary to apply further restrictions on imports from this country. UK restrictions on imports of chilled beef from Argentina should not exceed 10% of the imports of the period June 1931 - July 1932. For frozen meat and mutton, progressive restrictions would be imposed, from 10% to 35%. In turn, Argentina was expected to apply sterling earnings buying

Argentina's position in international trade had become remarkably weak as no country could take the place of the UK in its foreign trade. Exports to the UK represented more than one third of total Argentine exports in 1934-39, while the USA, on the other hand, absorbed less than 10 %.

Moreover, Argentina's trade balance with the USA was chronically unbalanced. This would represent a key problem for Argentine trade when European currencies in general, and sterling in particular, became inconvertible and hence a triangular scheme was no longer possible. Between 1918 and 1940 Argentina obtained a surplus with the USA in only three years: 1935, 1936 and 1937. This changed during the Second World War, but the dollar shortage was again severely felt in the post-war years.

The competitive nature of agricultural production was a stumbling block in trade negotiations between Argentina and the USA. The proximity of war led the USA to seek a trade agreement with Argentina between June 1939 and January 1940 but no significant progress was made subsequently. This failure was strongly resented by the Argentines⁶. The British, whose bilateral practices were usually criticized by the USA, observed that «negotiations [...] broke down because America was prepared to give away very little and wanted too much. Despite these lofty ideals about unhampered development of world trade they insisted upon a system of quotas with a corresponding obligation of Argentina to buy American goods»⁷. Reporting on a conversation with the Argentine Economic Minister Federico Pinedo, US Ambassador Armour suggested that the main challenge in Argentina-USA relations was to open the US market to Argentine products. He pointed out that «what Argentina needs is a minimum of economic security and an opportunity to sell more in the Western hemisphere.[...] The greater problem that will have to be faced eventually is the question of markets for wheat, meat and other products that the USA cannot absorb»⁸.

Bilateral trade problems were compounded by diplomatic conflict during World War II when Argentina refused to declare war on the Axis powers. This brought about an economic boycott on Argentine exports that would be extended after the end of the war. Only in the early 1950s did bilateral Argentine-US diplomatic relations begin to return to normal.

The situation of Brazil in the international system was more comfortable than that of Argentina (Malan, 1984). Firstly, the US market had absorbed about 40 % of Brazilian exports (USA was the main market for Brazilian coffee) and supplied more than 40 % of Brazilian imports since the late 1930s. Secondly, Brazil could exert strong market power on the coffee market in which it was a leading world exporter. In addition, the USA adopted a

British goods and paying dividends and interests to British capital in the country - after the deduction of debt charges owed to other governments. Further concessions to the UK were granted when the Treaty was renewed in 1936. Uruguay, in turn, negotiated an extension of this agreement to protect its own market share for beef in the UK.

⁵ The Roca-Runciman Agreement aroused strong criticism in Argentina. It was considered that too many concessions had been given to the UK in order to defend a group of exporters (basically, the exporters of chilled beef) which in practice accounted for a relatively small part of Argentine total exports. Some authors have pointed out that the Agreement was the price the government had to pay to preserve the so-called «*concordancia*», the political coalition which backed the conservative governments of the 1930s. Cf. J. Fodor and A. O'Connell, (1973), pp. 3-65. Alhadeff (1985, pp. 367-93) has argued that the Agreement was instrumental to economic recovery after 1933 as the Roca Funding Loan made it possible to finance a price support program for the agricultural sector.

⁶ President Cantilo severely condemned US protectionism as the USA only offered to reduce tariffs on meat and linseed up to a restricted quota (Porcile, 1995).

⁷ Cf. FO 371 2416, 22 January 1940.

⁸ Cf. Armour to the Secretary of State, 611.531/1538 in US State Department (1961), pp. 462-463.

more flexible approach towards Brazil in the 1930s than that adopted by the British towards Argentina. In particular, as observed by Abreu (1984), the USA followed a multilateralist policy which relieved Brazil from having to offer preferential concessions. As a British official at the Bank of England put it: «In Brazil, [US officials argued that] their position was as dominating as ours in Argentina and they were pleased to point out that they had deliberately refrained from canalising trade and payments there as, they claim, we have done in Argentina»⁹. The US «multilateralist» approach towards Brazil persisted despite the fact that Brazil traded with Germany on a bilateral basis. The June 1936 bilateral treaty for compensated trade with Germany opened a market for Brazil's cotton exports—which the USA could not absorb—and diversified Brazil's sources of industrial goods and military equipment.

These factors explain why Argentina and Uruguay suffered a major negative shock which significantly reduced their equilibrium growth rate, while for Brazil the shock was milder. These facts contradict what could have been expected, given the much better performance of the UK economy in the 1930s in comparison with the USA. However, what seemed to be important were not just relative growth rates in the US and the UK, but the specific dynamics of each market, in which other variables, such as foreign policy arrangements and competitive forces, especially the monopoly power that Brazil held in the market for coffee, played a significant role. It should also be borne in mind that this was a long term shock, not a transitory fluctuation. Markets remained closed for temperate agricultural goods after World War II (Warley, 1976). The common agricultural policy of the European Economic Community, agricultural protectionism in the USA, subsidised agricultural exports and, in general, the fact that agriculture was excluded from the GATT system of trade liberalisation, implied that developing countries specialising in temperate agricultural exports suffered most from protectionism in the developed world (Tussie, 1987). The handmaiden of growth was not in the pampas any more. In order to achieve convergence the Southern countries had to change the basis of their international competitiveness. However, as will be argued in the next section, in general they failed to foster structural change in the post-war period.

6. INDUSTRIAL AND EXPORT DIVERSIFICATION AFTER WORLD WAR II

6.1 The co-evolution of structural change and *per capita* GDP convergence

Since patterns of trade change through time, convergence will depend on the ability of laggard countries to promote structural change so as to adjust to long run trends in international demand. Structural divergence and GDP convergence may occur together if international trade develops on an inter-industry basis, as in the classical liberal era in which Argentina and Uruguay achieved rapid growth. However, the advantages of classical specialization dwindled after World War I and the Great Depression. In the «Golden Era» of the post World War II period, trade relied on manufactures and, to a significant extent, on intra-industry specialisation. For a country to find a niche in international trade a certain degree of structural

⁹ Cf. FO 371 2416, 22 January 1940. As mentioned, the «enlightened hegemonic» view of US policy towards Brazil cannot be extrapolated to the case of Argentina. The USA did not liberalize imports of agricultural products which could have harmed producers in the USA. This should be kept in mind not only to understand tension in the US-Argentina-UK triangle, but also to understand tension in the Bretton Woods trade system, especially regarding agricultural goods and textiles.

convergence was required. The mechanisms of convergence changed and industrial learning became a necessary condition for *per capita* GDP catching-up.

The 1960s were years in which technological catching up and the rapid expansion of international trade offered significant opportunities for growth. In this period many regions closed the technological gap with the USA, Europe and Japan being the most successful cases (Gilpin, 1987). On the other hand, many developed countries faced economic recession and lower productivity growth in the 1970s which may have reduced the potential technological spillover to the rest of the world. Still, it should be observed that the Latin American countries remained far from the technological frontier during the whole period. In this sense the opportunities for catching up were not erased by a slower pace of technological change in the industrialized world. As in the 1960s, there was a potential for technological and industrial upgrading which the laggard countries could exploit (or fail to exploit) depending on the type of economic policy adopted.

There is no comparable long term time series for the economic structure of ABU. For this reason, only evidence on structural change for 1963-80 will be produced. As mentioned above, for this period it is argued that structural convergence was a necessary condition for *per capita* GDP convergence with developed economies to be achieved. There should be a positive association between GDP *per capita* convergence (divergence) and convergence (divergence) in the industrial structure.

A Cross-Country Structural Change Index (CCSC) was computed in order to obtain a proxy for structural convergence. Each ABU country was compared with each G-4 country, namely France, Germany, the UK and the USA¹⁰.

$$CCSC = \sum_k (|ski - skj|) \cdot (1/2)$$

where ski and skj are the percentage participation of the industrial sector k in the total value added of countries i and j , respectively. Country i is one of the ABU countries, and country j is one of the G-4 (France, Germany, the UK or the USA). The data are drawn from the UNIDO Industrial Statistics Database which presents information on the structure of the manufacturing sector at a three-digit level. As a result, there are 24 observations corresponding to the bilateral CCSC index of the three Latin America countries with each of the four developed countries ($3 \times 4 = 12$ observations per period) and 2 periods (1963-73 and 1973-1980).

FIGURES 3a, 3b and 3c HERE

The CCSC index increases when differences in the industrial structures increase. In order to obtain a measure of the intensity of structural convergence the rate of growth of the CCSC index is taken with the opposite sign. Thus, a positive rate of structural convergence means that the CCSC index is falling. Figures 3a, 3b, and 3c plot structural convergence against income convergence in 1963-1973 and 1973-1980 for Argentina, Brazil and Uruguay with respect to each of the G-4 countries. As expected, the graphs indicate a positive association between structural convergence and *per capita* GDP convergence (change in the relative *per capita* GDP).

To complement the graphical analysis, income convergence was regressed on structural convergence on the basis of the data presented in Figures 3a-3c. Such a regression is only indicative since the number of

¹⁰ This is similar to the index suggested by Krugman (1991). The reference countries were chosen as two mature economies which at the same time display important structural differences.

observations available is very small. Using GLS panel data estimation with fixed effects it was found that *per capita* GDP convergence increased by about 0.12 % when structural convergence increased by 1 %. The association between the two variables was highly significant.

FIGURE 4 HERE

Figure 4 shows the evolution of the CCSCI with respect to the USA from 1963. Brazil converged with the USA while Argentina experienced almost no change and Uruguay diverged, especially at the end of the period. Brazil was the country with the lowest values of the CCSC index by the mid-1960s and confirmed this position throughout the 1970s.

The results suggest that structural convergence and *per capita* GDP convergence were related in the post-war period. Policies aimed at structural change in favour of sectors with higher rates of demand and productivity growth may have been important for post-war convergence. To the extent that they helped to overcome lock-in effects and generated externality effects related to technical complementarities between industries, they played a role in the selection of a more efficient equilibrium growth path. This is the next topic to be addressed.

6.2 Industrial policy in ABU

Structural change responds to the set of incentives in place for private and public investment. Economic policy in general, and industrial policy in particular, help to shape these incentives. The ability of each country to implement policies successfully and build institutions conducive to international competitiveness is crucial for convergence (Evans, 1992; Haggard, 1990; Nelson, 1994; Reinert, 1994). It will be argued that industrial policy in Argentina, Brazil and Uruguay can explain many of the differences between these countries in terms of structural change and convergence. More specifically, Brazil pursued a more consistent, continuous and comprehensive policy in favour of industrial and export diversification than Argentina and Uruguay.

The late 1950s witnessed the implantation of new capital-intensive industries in Argentina and Brazil, led by the metal-mechanical (especially automobiles) and the chemical industries (the so-called second phase of import-substitution, ISI-2). The direction of structural change was similar in both countries, but the intensity of the process was different¹¹.

In Brazil, industrial development took place within the framework of Kubitschek's *Plano de Metas* (Targets Plan) which provided consistent support for industrial development, including subsidies and closed markets for new industries for five years¹². The domestic political environment was always favourable to the

¹¹ For a comparison of the institutional and political environment in Argentina and Brazil in this period see Sikkink (1991).

¹² The implementation of the Targets Plan was under the control of the so-called «Executive Groups», *ad hoc* bodies which managed policies for specific sectors such as automobiles, agricultural machinery, naval construction, heavy machinery, transport and railways. These Executive Groups operated with considerable autonomy and were quite effective in overcoming bureaucratic resistance as they were formed by representatives from the various governmental agencies. An especially important role was played by the GEIA (Executive Group of the Automobile Industry), which offered significant benefits —exchange rate and tariff exemptions for imports of inputs and machinery, tax rebates and subsidized official credits by the Bank of Brazil and the National Development Bank— in exchange for a certain level of «nationalization» in car production. The National Development Bank (BNDES), in turn, played a key role in the coordination of investments by the public and private sectors (Leopoldi, 1991).

«developmentalist» project which was pushed forward even when mounting disequilibria on both domestic and external fronts became evident. There was a broad consensus in Brazil regarding the need for rapid industrial growth which sustained the «developmentalist» coalition despite macroeconomic disequilibrium¹³. Moreover, the policies applied by the military governments which ruled Brazil after 1964 did not substantially change the industrialist drive of the previous governments (Malan, 1984). Conversely, in Argentina ISI-2 was conflictive and traumatic, haunted by political instability. President Frondizi himself believed that he had at most a couple of years to advance his industrial projects without courting political unrest (Szusterman, 1993). By mid-1959 the Frondizi administration had already been checked by domestic political opposition¹⁴. He then adopted a severe stabilisation plan which led to a sharp contraction of the economy and halted the «developmentalist» project (Petrecolla, 1989). Two years later, Frondizi was ousted by a military coup amidst growing political conflict and economic downfall.

These differences in the institutional environment in which ISI-2 took place in Argentina and Brazil were not without consequences. Their effects were clearly reflected in the average rate of investment in 1956-61, significantly higher in Brazil than in Argentina¹⁵.

As already mentioned, it is not being suggested that the industrial policy then adopted by Brazil was «ideal» in any sense. Other policy alternatives could have avoided such high levels of protection and macroeconomic instability¹⁶. However, given the policy strategy that both countries adopted (namely, import-substituting industrialization), it is clear that Brazil pursued this objective in a more consistent manner and this had an impact on the relative success of the strategy in each country. Moreover, Argentina and Brazil did not merely seek to substitute imports, they also encouraged export diversification. Yet Brazilian policies in favour of manufacturing exports continued during the 1970s while in the Argentine case they were confined to the 1960s.

The case of Uruguay was different from those of its two bigger neighbours. Clearly, in this case, there was no place for industrial policies of the kind adopted in Brazil and Argentina. Uruguay's narrow domestic market did not allow for a strategy of advancing import-substituting industrialization. The advance of ISI would have implied a much higher cost in terms of inefficiency than in Argentina and Brazil. Therefore, the only avenue open to Uruguay was to diversify exports in order to enter more dynamic international markets in sectors with higher value added. In the 1940s and 1950s Uruguay's export structure was reoriented towards wool products and some agricultural products exported to the dollar area. A system of multiple exchange rates was adopted in order to encourage the industrialisation of primary goods including wool. The government of Luis Batlle, in the first half of the 1950s, was also concerned with promoting diversification in the agricultural sector, offering subsidies and loans for the production of wheat, milk and

¹³ The classical work on the political conditions of the Targets Plan is Benevides (1976).

¹⁴ On one hand, the Peronist unions looked suspiciously at Frondizi's policies, which relied heavily on foreign investment, especially in the oil sector, where the President openly broke his previous electoral promises of keeping this sector under exclusive state control. On the other hand, groups in favor of more orthodox policies were alienated by the strong industrialist drive adopted by Frondizi. Cf. Potash (1980).

¹⁵ A qualitative variable whose importance for industrial policy in subsequent years is difficult to assess had to do with the collective perception held in each country regarding the worth and significance of the policies of the late 1950s. While in Brazil the Kubitschek period is seen with pride, as a phase of «heroic» industrialization and stable democracy, in Argentina assessment of the Frondizi period is largely dominated by controversy and criticism. See Sikkink (1991).

¹⁶ Brazil cannot be considered a successful case when compared to the South East Asian developing countries, such as Taiwan and Korea. This comparison will not be pursued here as there are already detailed studies available in the literature (see for instance Amsden, 1985, Haggard, 1990 and Rodrik, 1993).

vegetables. However, this strategy was challenged by the persistence of protectionist barriers on temperate agricultural goods in the USA and Europe and by the US tax applied on Uruguayan exports of wool products¹⁷. Thus, Uruguay's competitive advantage remained in sectors facing increasing barriers in the international economy which reduced the income elasticity of its exports. Moreover, domestic policies did not help. The overvaluation of the exchange rate and high levels of industrial protection during the *Neo-Batllista* period held back the growth of exports (Bértola, 1991). Only in the mid 1970s would Uruguay implement a new and more successful drive towards export diversification which positively affected growth rates (Bértola and Porcile, 1998).

Brazil proved more able to move towards a diversified economic structure, but some other features of the Brazilian economy may help to explain why it achieved higher rates of growth. Brazil is a populous country whose foreign sector represents a smaller share of total demand. Since income levels were lower, income growth increased the demand for basic consumption goods which can be produced with mature technologies. Moreover, rather low real wages made production based on mature technologies internationally competitive in terms of unit labour costs. Even durables and consumption goods aimed at high income groups were able to reach a relatively large scale of production in Brazil due to the size of the domestic market, in spite of the highly unequal pattern of income distribution.

Divergence in industrial policy between Argentina and Brazil became especially significant in the second half of the 1970s. While in the 1950s Argentina and Brazil moved in the same direction (albeit with a different degree of success), in the second half of the 1970s they moved in completely opposing directions. In 1974 Brazil adopted an especially ambitious program of industrial development, the PND-II (Plano Nacional de Desenvolvimento), aimed at implanting a new set of capital-intensive and technology-intensive industries, mainly in the intermediate and capital goods sectors¹⁸. This move was prompted by the 1973 oil crisis and sought to «complete» the industrial matrix through a new wave of import-substituting industrialisation. In addition, Brazil made an effort to further diversify its export structure by increasing manufactured exports, especially to other developing countries. As a result, the import coefficient of the economy was further reduced while the export coefficient increased. In order to achieve this objective, a comprehensive array of policy measures was adopted, including financial subsidies for the new industries, stricter import restrictions (based largely on non-tariff barriers managed by the Foreign Trade Bureau, Portuguese acronym CACEX) and subsidies to manufactured exports, combined with active diplomacy towards developing countries in Africa, the Middle East and Latin America¹⁹. The abundance of foreign capital was instrumental in broadening the degree of autonomy needed by Brazil to finance this new wave of industrialization. This new industrialisation effort in Brazil succeeded in promoting the convergence of its industrial structure with that of the industrialised countries.

Like Brazil, Argentina used the relative abundance of foreign loans to set up an ambitious program for industrial restructuring but these programs moved in opposing directions. Argentina sought to regain competitiveness by dismantling its system of industrial protection and by increasing exports based on static comparative advantages²⁰. In addition, the exchange rate was managed in accordance with the so-called

¹⁷ The USA argued that the system of multiple exchange rates represented an implicit subsidy for wool exports. For an account of the policy dilemmas of the period and the difficulties of exporting to the closed US markets, see Batlle (1965).

¹⁸ Cf. Barros de Castro & Souza (1985), Suzigan & Villela (1997) and Suzigan (2000).

¹⁹ In addition, Brazil strengthened its diplomatic and economic links with Europe, especially with Germany, in order to set up nuclear projects.

²⁰ See Katz & Kosacoff (1989) and Kosacoff (1992).

«monetary approach to the balance of payments» with devaluation occurring at a pre-announced declining rate. This led to a combination of overvaluation of the real exchange rate with rapid trade openness which severely affected the competitive capacity of Argentine industry (Kosacoff and Beszinchsky, 1993).

The Argentine liberal experience led to deep recession. Moreover, the drastic contraction of the metal-mechanical industries halted the previous process of slow cumulative industrial learning. Except for a few cases (involving industries which were both energy-intensive and natural resource-intensive) no industry received special support as the policy was explicitly aimed at providing a neutral environment from the point of view of the allocation of factors of production (Aspiazu, 1989). Yet no new export-oriented sector appeared to play the leading role in economic growth previously played by the import-substituting industries.

The contrasting experiences in industrial transformation of Argentina and Brazil ended with the 1982 debt crisis. Both countries had followed policies which, for different reasons, threatened competitiveness and external equilibrium. In the case of Brazil, the array of subsidies provided by the PND-II represented a source of tension as the government faced a growing fiscal deficit. The fall in the import coefficient burdened industrial efficiency and specialisation (Bonelli *et al*, 1992). In the case of Argentina, the reversal of structural change towards agricultural and industrial commodities inhibited industrial learning and the possibility of entering more dynamic international markets. Moreover, both policies were sustained on the basis of a growing external debt. The drastic increase of interest rates in 1979 and the subsequent 1982 Mexican default triggered the debt crisis which put an end to the policies of the 1970s and opened up «the lost decade». Argentina and Brazil converged towards a turbulent period of economic decline.

7. CONCLUDING REMARKS

Convergence and divergence in Argentina, Brazil and Uruguay (ABU) occurred in different historical scenarios defined by different combinations of technological diffusion, openness, specialisation and institutional arrangements at domestic and international levels. Three different regimes of convergence can be identified.

The first convergence regime is associated with a dynamic integration into the golden era of classic liberalism. Convergence occurred on the basis of inter-industry specialization in primary goods with high income elasticity of demand. The international context was characterised by openness and growing demand. Competitive advantages were classical, related to the relative abundance of factors of production. This was the case of Argentina and Uruguay in 1870-1913, efficient producers of meat and temperate agricultural goods. Not only did Argentina converge in this period but it also forged ahead in relation to the European countries, following a path which, in its early phases, resembled (with less intensity) the successful experience of the United States.

The second convergence regime corresponds to a period during which international trade collapsed because of major international crises (the Great Depression, World Wars I and II) but the countries were able to grow thanks to import-substitution. In effect, modest convergence was achieved by Brazil in the 1930s by means of import-substituting industrialization and Uruguay achieved a short period of convergence on this basis after World War II. However, this regime of convergence was inevitably short-lived as the international economy recovered and import-substitution imposed increasingly higher costs. A change in the pattern of trade was therefore necessary to sustain convergence.

The *third convergence regime* is defined by structural convergence with the leaders, based on a process of catching-up in new metal-mechanical and chemical industries implanted in the late 1950s. The only ABU country to display such a pattern of convergence is Brazil. Structural transformation in the «developmentalist» period changed the growth trends of Argentina and Brazil irreversibly and gave rise to incremental, cumulative industrial learning. Although the domestic market remained as the principal outlet for industrial production, a slow but continuous process of export diversification occurred, especially in Brazil. This regime emerged in a period in which international trade grew at very high rates (1960-1973) or in which international capital flows expanded, compensating for the loss of dynamism of international trade (1973-78).

A critical question is why Argentina and Uruguay were not able to move from the first type of convergence regime to the second. Clearly, path-dependency phenomena were important. Not only specific physical capital but also expectations about the composition of growth are part of the «shadow of the past» constraining investment decisions. However, cumulative processes can be slowed down and sometimes reversed with the introduction of policies favouring structural change which may help the country to escape from the endogenous cycle of economic decay. Brazil adopted policies for structural change in a much more vigorous way than Argentina and Uruguay and this is part of the explanation for the relative success of Brazil until 1980. On the other hand, the experience of the decades following the debt crisis suggest that, in all cases, policies aimed at structural change in the region were too weak to secure long run catching-up.

This paper combined supply-side and demand-side variables to explain why three Latin America countries failed to achieve convergence with the developed world in the 20th century. Demand-side variables were related to changes in patterns of demand and to institutional arrangements in the international economy which brought an end to the classical liberal era of British hegemony, redefining the rules of the game in international trade. Supply-side variables were related to path-dependency and the failure of the Latin American countries (particularly Argentina and Uruguay, and to a lesser extent Brazil) to build up an institutional framework conducive to rapid structural change and rapidly growing exports of manufactures. Although it is argued that these variables are helpful for understanding differences in the growth performance of Argentina, Brazil and Uruguay between 1900 and 1980, they should be seen as a first step in a cumulative research agenda on long run growth in Latin America. Some key dimensions of the determinants of growth were not included in this paper and should be addressed in the future. The evolution of the terms of trade, the influence of income distribution on demand growth and human capital accumulation and the impact on the external constraint of foreign capital flows (either in the form of foreign direct investment or that of short term capital movements) are just some of these dimensions. They would enrich the characterization of the different convergence and divergence regimes to be found in Latin American economic history.

TABLE 1
UNIT ROOT TESTS OF THE VARIABLES OF EQUATION [8]

GDP <i>per capita</i> levels in Argentina (log)			
ADF Test Statistic	-2.52458	1% Critical Value*	-4.2165
		5% Critical Value	-3.5312
		10% Critical Value	-3.1968
includes trend, intercept and one lag			
GDP <i>per capita</i> in Argentina, first difference			
ADF Test Statistic	-3.2618	1% Critical Value*	-3.6171
		5% Critical Value	-2.9422
		10% Critical Value	-2.6092
includes intercept and two lags			
GDP <i>per capita</i> levels in Brazil (log)			
ADF Test Statistic	-2.91857	1% Critical Value*	-4.2165
		5% Critical Value	-3.5312
		10% Critical Value	-3.1968
includes intercept, trend and one lag			
GDP <i>per capita</i> in Brazil, first difference			
ADF Test Statistic	-3.77373	1% Critical Value*	-3.6228
		5% Critical Value	-2.9446
		10% Critical Value	-2.6105
includes intercept and two lags			
GDP <i>per capita</i> levels in Uruguay (log)			
ADF Test Statistic	-3.08711	1% Critical Value*	-4.2165
		5% Critical Value	-3.5312
		10% Critical Value	-3.1968
includes intercept, trend and one lag			
GDP <i>per capita</i> in Uruguay, first differences			
ADF Test Statistic	-4.74741	1% Critical Value*	-3.6228
		5% Critical Value	-2.9446
		10% Critical Value	-2.6105
includes intercept and two lags			
GDP main markets, Argentina (levels in log)			
ADF Test Statistic	-3.60837	1% Critical Value*	-4.2242
		5% Critical Value	-3.5348
		10% Critical Value	-3.1988
includes intercept, trend and two lags			
GDP main markets, Argentina (first difference)			
ADF Test Statistic	-3.60792	1% Critical Value*	-3.6228
		5% Critical Value	-2.9446
		10% Critical Value	-2.6105
includes intercept and two lags			
GDP main markets, Brazil (levels in log)			
ADF Test Statistic	-3.24384	1% Critical Value*	-4.2242
		5% Critical Value	-3.5348
		10% Critical Value	-3.1988
includes intercept, trend and two lags			
GDP main markets, Brazil (first difference)			
ADF Test Statistic	-3.1405	1% Critical Value*	-3.6228

		5% Critical Value	-2.9446
		10% Critical Value	-2.6105
includes intercept and two lags			
GDP main markets, Uruguay (levels in log)			
ADF Test Statistic	-2.83327	1% Critical Value*	-4.2165
		5% Critical Value	-3.5312
		10% Critical Value	-3.1968
includes intercept, trend and intercepts			
GDP main markets, Uruguay (first difference)			
ADF Test Statistic	-3.00286	1% Critical Value*	-3.6228
		5% Critical Value	-2.9446
		10% Critical Value	-2.6105
includes intercept and two lags			
Terms of trade levels, Argentina (in logs)			
ADF Test Statistic	-0.45427	1% Critical Value*	-3.6171
		5% Critical Value	-2.9422
		10% Critical Value	-2.6092
includes intercept and two lags			
Terms of trade, Argentina (first difference)			
ADF Test Statistic	-3.48036	1% Critical Value*	-3.6228
		5% Critical Value	-2.9446
		10% Critical Value	-2.6105
includes intercept and two lags			
Terms of trade levels, Brazil (in logs)			
ADF Test Statistic	-1.82598	1% Critical Value*	-3.6171
		5% Critical Value	-2.9422
		10% Critical Value	-2.6092
intercept and two lags			
Terms of trade, Brazil (first difference)			
ADF Test Statistic	-3.13148	1% Critical Value*	-3.6228
		5% Critical Value	-2.9446
		10% Critical Value	-2.6105
includes intercept and two lags			
Terms of trade levels, Uruguay (in logs)			
ADF Test Statistic	-2.66834	1% Critical Value*	-3.6171
		5% Critical Value	-2.9422
		10% Critical Value	-2.6092
includes intercept and two lags			
Terms of trade, Uruguay (first difference)			
ADF Test Statistic	-4.40928	1% Critical Value*	-3.6228
		5% Critical Value	-2.9446
		10% Critical Value	-2.6105
includes intercept and two lags			

TABLE 2**BALANCE-OF-PAYMENTS CONSTRAINED GROWTH AND STRUCTURAL CHANGE**

Variable	Coefficient
C	0.038***
DLW	0.156**
DLTT	-0.014
A--D30A	-0.024*
B--D30B	-0.015
U--D30U	-0.030**
A--DWAR2	0.015
B--DWAR2	0.040***
U--DWAR2	0.010
R2	0.20***
Adj R2	0.17

Notes: These coefficients were obtained by running equation [8] using an unbalanced panel data for the period 1900-1980, including Argentina, Brazil and Uruguay. Coefficients are common for all countries but external shocks are allowed to have country-specific effects. The dependent variable is the rate of growth of GDP *per capita*. The panel data is unbalanced because there are no data for Uruguayan terms of trade before 1935. Number of observations: 205. A GLS procedure was used to correct for heteroscedasticity.

Key to the variables: *DLW* = rate of growth of the external market of each country; *DLTT* = rate of growth of the terms of trade; *D30* = country-specific dummy which adopts the value 1 for years after 1930 and zero otherwise; *DWAR* = country-specific dummy which adopts the value 1 for years after 1946 and zero otherwise. A = Argentina, B = Brazil, U= Uruguay.

TABLE 3

**INCOME CONVERGENCE AND STRUCTURAL CONVERGENCE: ARGENTINA, BRAZIL,
URUGUAY AND THE G-4**

Variable	Coefficient
Structural Convergence	0.13***
Fixed Effects	
AF—C	-0.72
AG—C	-0.53
AUK—C	-0.04
AUS—C	-0.09
BF—C	0.10
BG—C	0.30
BUK—C	0.67
BUS—C	0.25
UF—C	-0.52
UG—C	-0.39
UUK—C	-0.02
UUSA—C	0.03
Weighted Statistics	
R-squared	0.92***
Adjusted R- squared	0.83

Notes: Independent variable: Rate of convergence in GDP *per capita* defined as: $\log(\text{GDP per capita } i / \text{GDP per capita } j)_t - \log(\text{GDP per capita } i / \text{GDP per capita } j)_{t-1}$

Structural convergence defined as: $-(\text{CCSC index } t - \text{CCSC index } t-1)$

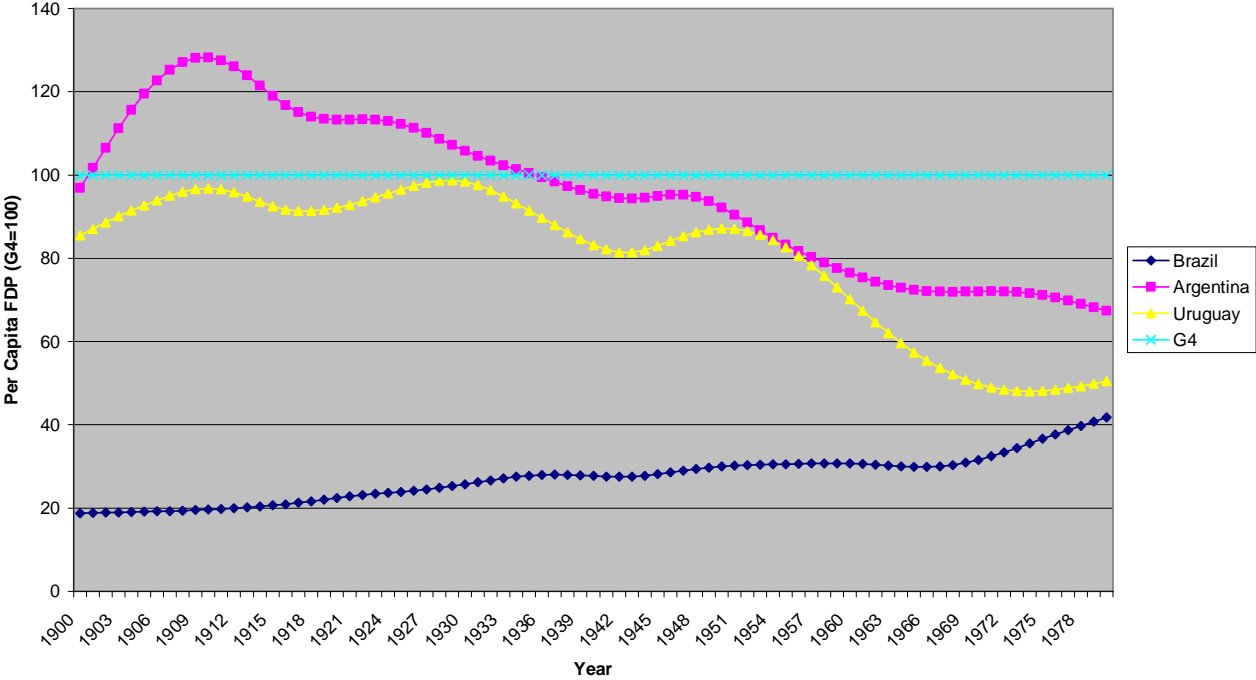
Balanced Panel, 24 observations. Sources: see graphs 31-3c.

i = Argentina, Brazil, Uruguay; j = France, Germany, United Kingdom, United States.

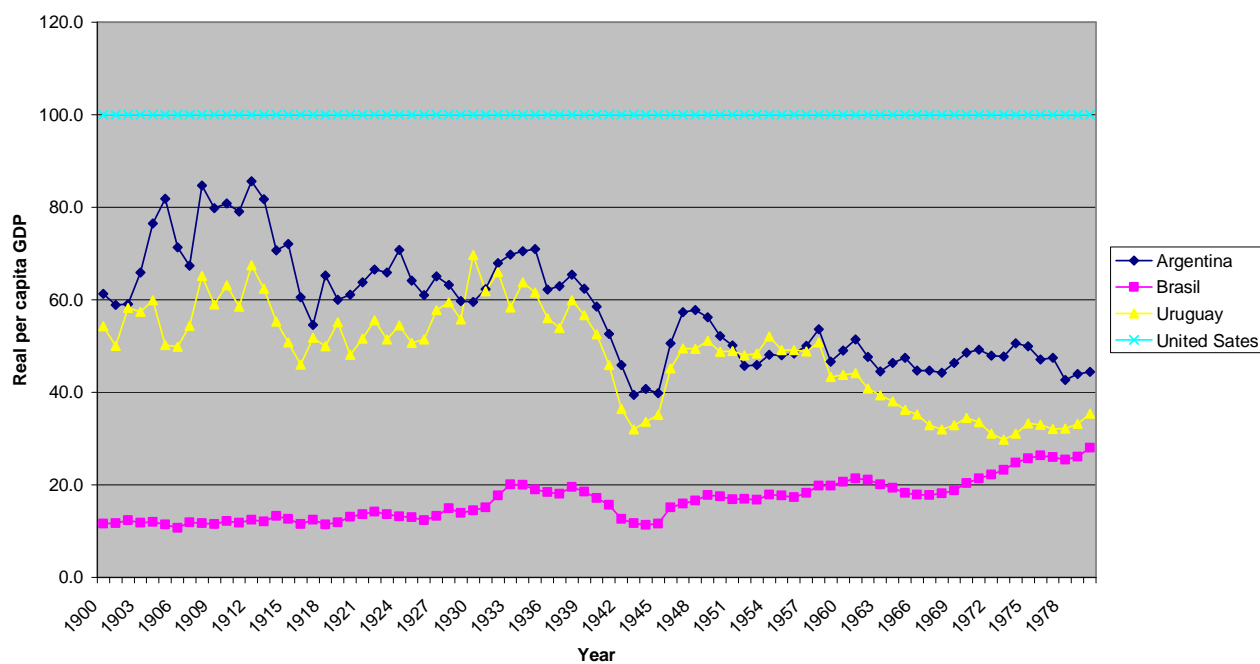
A=Argentina, B=Brazil, U = Uruguay, F = France, G = Germany, UK = United Kingdom, US = United States.

Cross section units defined by pairs of countries.

Graphic 1. Convergence and Divergence: Argentina, Brazil and Uruguay, 1900-1980

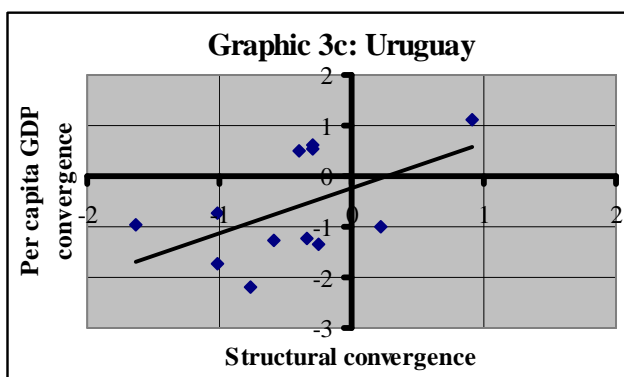
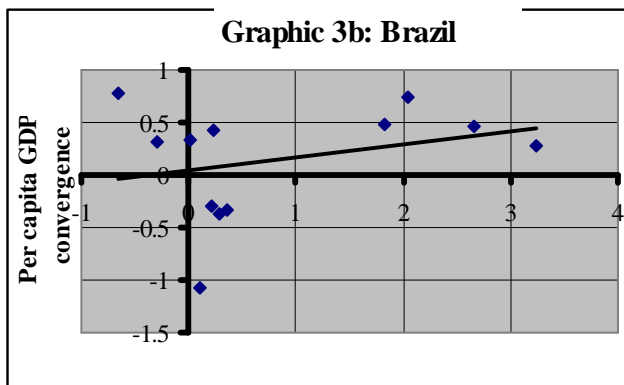
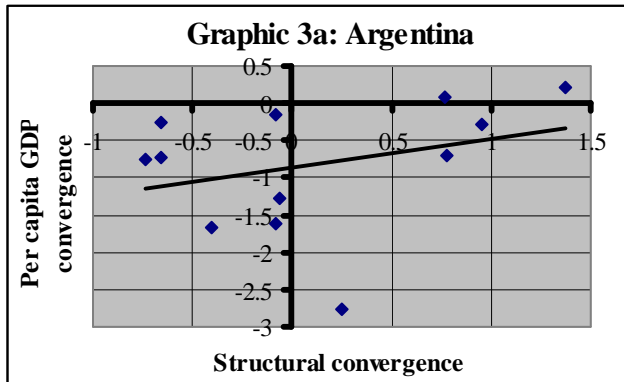


Graphic 2. Real per capita GDP convergence and divergence with the United States



Sources: Heston et al (2005) and Maddison (1991). See also Bértola & Porcile (2000), Statistical Appendix.

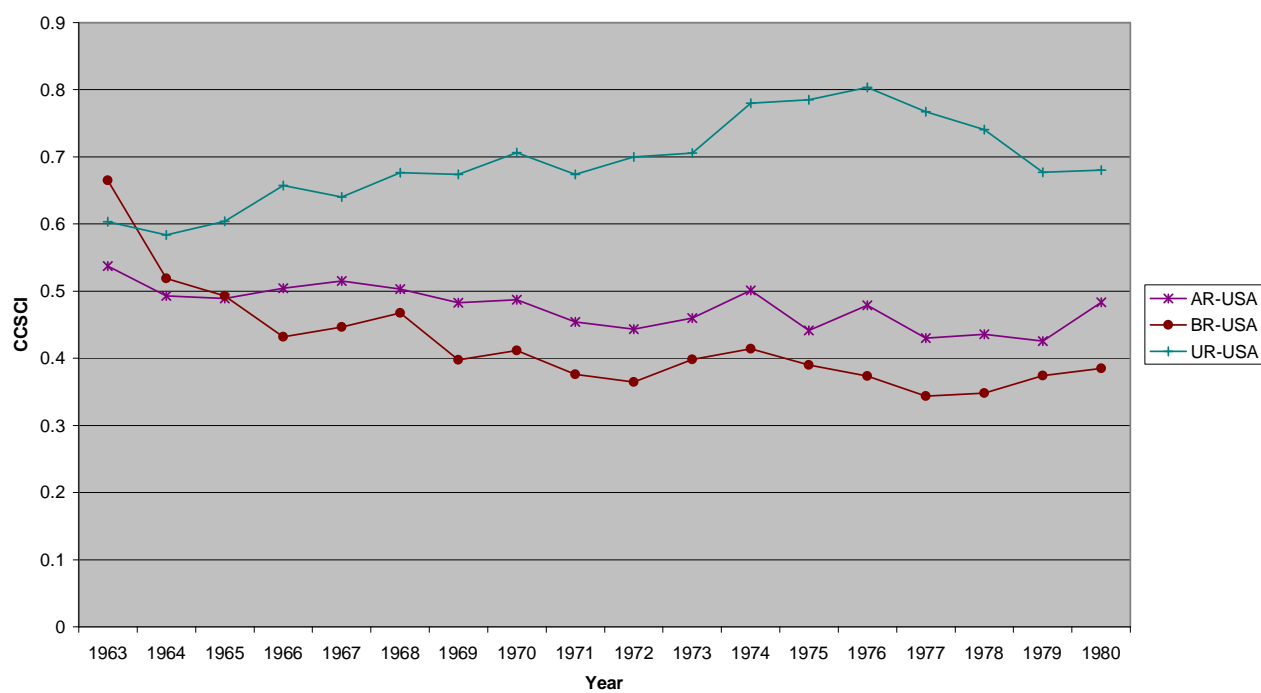
Graphs 3a-c. Cross-country Structural Change Index (CCSC), 1963-1980



Note: Structural convergence is given by the cross-country structural change index, $CCSC = \sum k (|ski - skj|) \cdot (1/2)$, where ski and skj are the percentage participation of the industrial sector k in the total value added of countries i and j , respectively, i represents Argentina, Brazil or Uruguay and j represents France, Germany, the United Kingdom and the United States.

Source: Own estimates based on *UNIDO Industrial Statistics Database*

Graphic 4. Structural Convergence and Divergence with the USA: Argentina, Brazil and Uruguay



Source: Own estimates based on *UNIDO Industrial Statistics Database*

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