

ARGENTINA, BRAZIL, URUGUAY AND THE WORLD ECONOMY: AN
APPROACH TO DIFFERENT CONVERGENCE
AND DIVERGENCE REGIMES

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Argentina, Brazil, Uruguay and the World Economy: an approach to different convergence and divergence regimes

Luis Bértola* & Gabriel Porcile**

I. INTRODUCTION

The debate on the international convergence and divergence of levels and growth rates of output and income has been reinvigorated in recent years by new theoretical developments in the theory of economic growth and international trade.¹ These developments have focused on the conditions that stimulate the process of technological catching-up and the increase in international competitiveness. First, it has been observed that countries differ widely in terms of their ability to learn from and improve on foreign technology,² which, in turn, depends on the features of the technological paradigm and on the institutional framework shaping investment decisions in technology.³ Secondly, differences in growth rates may arise as well from different patterns of international specialisation, which affect the expansion of domestic and external markets.⁴ If a country is to achieve higher rates of economic growth, it should be able to successfully compete in fast-growing markets and sectors. Finally, path-dependency and lock-in effects can have a large impact on growth.⁵ Structural and institutional change at a certain moment may give rise to a bifurcation of the growth trajectory, contributing to the diversity of patterns of convergence and divergence that can be found in the international economy.⁶

In this paper these theoretical contributions will be used to analyse the experience of convergence and divergence of three Latin American countries -Argentina, Brazil and Uruguay- with respect to a group of four advanced countries -France, Germany, the United Kingdom and the United States- between 1870 and 1990. The basic argument to be developed is, that technological learning as well as structural and institutional change, combined and interacted in different forms, for each country and in different historical periods, defining specific scenarios of convergence and divergence. This diversity of the growth trajectories challenges the usual assumption found in the literature about a clear-cut relationship among convergence, trade openness and the international context. But it is consistent with a broader theoretical perspective on the various forces shaping technological learning, catching-up and specialisation patterns. The study of how these forces combined to define changing growth scenarios constitutes the main focus of the article.

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¹ Cf. Nelson, R., "What Has Been the Matter With Neoclassical Growth Theory?"

² Abramovitz, M., "Catching Up, Forging Ahead and Falling Behind".

³ Nelson, R., "Economic Growth via the Co-Evolution of Technology and Institutions".

⁴ Cimoli, M., "Technological Gaps and Institutional Asymmetries in a North-South Model With a Continuum of Goods"; McCombie, J.S. & Thirlwall, A.P., *Economic Growth and the Balance of Payments Constraint*, Chap.3.

⁵ Arthur, W.B., *Increasing Returns and Path-Dependency in the Economy*, Chap.1.

⁶ Verspagen, B., *Uneven Growth Between Interdependent Economies*.

In section I a brief review of recent theoretical contributions is presented. Section II identifies and discusses phases of convergence and divergence among the Latin American countries and a group of four advanced economies. Section III discusses how these phases were related to trade openness in Argentina, Brazil and Uruguay. Section IV analyses the impact of structural change and international specialisation on convergence, while section V addresses the role of institutional change -focusing on industrial policy. Finally, the main conclusions of the work are summarised.

II. Convergence and Divergence: Some Theoretical Guidelines

The Thirlwall's Law

A useful point of departure is the so-called Thirlwall's Law, which can be seen as a highly simplified model of convergence and divergence. Assuming that the influence of price and compensatory capital movements can be ignored in the long run, the relationship between economic growth in country "i" and in the rest of the world boils down to the following expression:

$$y_i^* / z = \epsilon_i / \pi_i$$

where y_i^* is the growth rate of income with balance of payments equilibrium in country "i", z is the growth rate of income in the rest of the world, ϵ_i is the income elasticity of the demand for exports and π_i the income elasticity of the demand for imports in country "i".⁷ Income convergence requires this ratio to be higher than the unity ($\epsilon_i > \pi_i$). As observed by McCombie and Thirlwall, this apparently very simple result expresses a key feature of economic growth in interdependent economies. If a country displays a pattern of specialisation in which the income elasticity of the demand for exports is lower than the income elasticity of the demand for imports, then this country will have to grow more slowly than its trade partners in order to keep its balance of payments in equilibrium. The ϵ_i/π_i ratio reflects the non-price competitiveness of country "i", defined as its ability to improve the quality of production and finance exports on a competitive basis.

The "Thirlwall's Law" suggests that the dynamics of growth depends on the behaviour of demand, which is consistent with the Keynesian inspiration of the model. Fagerberg in turn points out that this insight should be complemented with the analysis of the variables that concur to define international competitiveness.⁸ The income elasticities of the demand for exports and imports are not entirely exogenous variables but they are a function of technology and the pattern of international specialisation. The effects of international trade on growth and convergence will critically depend on the evolution of these income elasticities through time.

This argument challenges the assumption that openness and convergence should always go hand by hand. As it is well known, according to conventional models of growth and trade, an international economy characterised by the free mobility of factors and goods achieves conditional convergence in factor prices and growth rates. Under certain conditions poor countries will accumulate capital and grow at higher rates than rich countries during the transitional dynamics towards their steady-state positions. The existence of decreasing returns to capital accumulation is assumed, which implies that

⁷ McCombie J.S. & Thirlwall, A.P., *Economic Growth and the Balance of Payments Constraint*, Chap.3

⁸ Fagerberg, J., "Technology and International Differences in Growth Rates" and "International Competitiveness".

the marginal product of physical capital and hence rates of investment will be higher in poor countries. For convergence to occur, however, the parameters that define the steady state position of each country must be similar. This requires (i) the equality of saving rates and (ii) the equality of the rates of technological progress in rich and poor countries.⁹ If technology is an international public good immediately available for all countries, then technological asymmetries could not prevent convergence from taking place. The implicit assumption in the openness-convergence hypotheses is that open markets will allow for the flow of technology and capital so as to sustain higher accumulation rates in the less advanced countries.¹⁰

Economic historians like Maddison and Williamson¹¹ have given empirical support to these ideas as they found that periods in which the international order provided a liberal framework for trade and migration displayed higher growth rates and higher convergence coefficients than periods of increasing protectionism and scarce factor mobility. More recently, Taylor has argued, within a tradition initiated by Little *et al*¹², that if a country deliberately closes its economy, convergence will be compromised out of the static and dynamic inefficiencies produced by a distorted allocation of resources. In the same line, Taylor stresses that the poor performance of the Latin American countries can be explained by the adoption of import-substituting industrialisation policies which closed their economies to international trade, thereby hampering growth.¹³

New Neo-classical and evolutionary theories of growth, on the other hand, point out that international differences in technology may be a key factor in explaining why growth rates differ.¹⁴ They abandon the assumption of a freely available flow of technology. The Keynesian-Schumpeterian tradition reviewed in this work aims at opening the “black box” of technology and analysing how international differences in technological capabilities emerge and how they affect growth. Clearly, an open international economy will be related to higher growth rates in both poor and rich countries by allowing for a faster expansion of demand and productivity. But convergence (relative growth) will depend on the relative intensity of technological learning in poor and rich countries, and on its impact on the evolution of the demand elasticities of imports and exports.

Models with endogenous technical change offer more ambiguous results as regards how convergence and openness are related. They suggest that convergence depends on the relative rates of technological innovation by the leaders and diffusion in the laggard countries. These rates are a function of a larger set of relevant institutional and structural variables than those reflected in the degree of openness. Convergence and openness may combine in different ways in these models, giving rise to different scenarios.

The Thirlwall's Law, Technology and Institutions

From one hand, an open international economy can stimulate convergence by enhancing different

⁹ Barro R. & Sala-i-Martin, X., *Economic Growth*, pp.28-30.

¹⁰ On standard results regarding conditional convergence see Sala-i-Martin, X. “The Classical Approach to Convergence Analysis”.

¹¹ Maddison, A., *Dynamic Forces in Capitalist Development. A Long Run Comparative View*; Williamson, J., “The Evolution of Global Labor Markets Since 1830. Background Evidence and Hypotheses”.

¹² See on this Edwards, S., “Openness, Trade Liberalization, and Growth in Developing Countries”.

¹³ Taylor, A., “On the Costs of Inward-Looking Development”.

¹⁴ Bernard, A.B. & Jones, C.I., “Technology and Convergence”.

forms of technological spill-overs towards technologically less advanced countries. The existence of a technology gap implies an opportunity for the imitation of technology. Imports of capital goods spread new vintages of foreign technology, while international migration and investment propagate certain kinds of tacit skills. These processes enhance international competitiveness and growth in laggard countries.

On the other hand, the existence of a technology gap implies that the leading countries enjoy a competitive advantage in international markets and could benefit more from a growing international demand.¹⁵ Moreover, if the technological frontier is moving fast enough, technological spill-overs could not prevent this gap to continuously increase.¹⁶ Whether the cumulative forces of technological innovation will prevail over diffusion depends on the characteristics of technology and the institutional setting for learning in the laggard countries. When technology is characterised by a high degree of technological opportunity, a high degree of "tacitness" of relevant capabilities and a high degree of "cumulativeness" in terms of learning, it will be less probable that laggard countries could catch-up with the leaders, and divergence would prevail.¹⁷ In terms of the Thirlwall's Law, the intensity of technological learning by the followers will be unable in this case to reshape the income elasticities of demand for exports and imports so as to increase the ϵ_i/π_i ratio (non-price competitiveness) above the unity.

Technological progress affects the elasticity ratio by both improving the quality of the goods produced¹⁸ and by changing the pattern of international specialisation. The theoretical literature has increasingly sought to take into account the influence of specialisation in growth models.¹⁹ In the old standard models trade increases welfare on a "once and for all" basis, by fostering the optimal allocation of resources and the equalisation of factor prices. But trade does not affect the long run growth rates, which depend on the supply of factors of production -which, in addition, are supposed to be homogeneous-. In the so-called Smithian wing of the new growth theory, the perspective is different: trade allows countries to concentrate on the production of fewer goods and this leads to increasing returns and faster productivity growth. In this case trade favours growth, but specialisation has yet no role to play. Finally, in the Ricardian-type of growth models, productivity growth is sector

¹⁵ Verspagen, J., *Uneven growth*, Chap.5.

¹⁶ Dosi G. & Fabiani, S., "Convergence and Divergence in the Long Term Growth of Open Economies".

¹⁷ Verspagen, B., *Uneven Growth*, pp.129-32. Technological opportunity is defined as the potential of a technological paradigm to give rise to innovations for a given amount of investment in research and development (the "easiness" of innovation). The degree of tacitness of technological capabilities is related to the extent to which these capabilities depend on the operational routines and experience of people and organisations and therefore cannot be obtained from blueprints and other codified sources of knowledge. Cumulativeness means that the probability of obtaining an innovation by a certain firm is a function of its current position with respect to the technological frontier. See on this Dosi G. & Orsenigo, L. "Market Processes, Rules and Institutions in Technical Change and Economic Dynamics", pp.14-15 and Nelson R. & Winter, S., *An Evolutionary Theory of Economic Change*, pp.76-82. Clearly, the higher the degree in which these variables are present in technological learning, the more difficult imitation will be and the slower the rate of technological diffusion. In addition, given the features of the technological paradigm, learning will depend on how the institutional setting affects investments in technological learning. Cf. Nelson, R., "Economic Growth via the Co-Evolution of Technology and Institutions".

¹⁸ McCombie J.S. & Thirlwall, A.P., *Economic Growth and the Balance of Payments Constraint*, Chap.4.

¹⁹ S. Dowrick, "Innovation and Growth: Implications of the New Theory and Evidence", as referred in Dalum, B. Laursen, K. & Verspagen, B., "Does Specialisation matter for Growth", p. 2; M. Cimoli, "Technological Gaps and Institutional Asymmetries..."

specific. This implies that international specialisation can affect long term growth. To the extent that international technological spill-overs and the diffusion of productivity gains vary across sectors, patterns of specialisation can contribute to explain why growth rates differ.²⁰

As put by Dalum *et al*, Fagerberg²¹ bridged the gap between, on the one hand, Keynesian and, on the other, Neo-Schumpeterian and evolutionary theories, by introducing endogenous and sector-specific technological change as a basic determinant of international competitiveness and productivity growth. Firstly, technical progress sustains the process of structural change in favour of sectors that display higher income elasticities of demand and thereby enhances growth. Secondly, a country specialised in sectors which are technologically less-dynamic and which produce less external economies and learning effects will tend to grow at slower rates.²²

It should be borne in mind that not only is structural transformation a process of building up new industries and capabilities, but it also entails the redistribution of power and wealth and is therefore permeated by political conflict. Encouraging structural change in most cases demands the devise of new institutions which significantly affect the position and interests of the various economic agents. Thus, the nature of state-society arrangements and the ability of each country to reshape its political and economic institutions, along with the institutional arrangements of the international economy, will play a key role in bringing about either convergence or divergence in different historical periods.²³ In particular, the role of this state-society arrangements cannot be reduced to a problem of securing governmental neutrality with respect to the price system and international trade. A successful policy involves a combination of support for and pressure on firms and sectors with a view to stimulating the processes of learning and structural change which are at the basis of international competitiveness.²⁴

Finally, increasing returns, threshold effects, the influence of past experience on current policies and the slow change of ideas imply that the trajectories of growth are path-dependent, subject to a considerable degree of inertia.²⁵ These forces mediate the country's response to changing economic conditions and contribute to shape diverging trends in growth, trade and income distribution.

Therefore, there is no clear-cut conclusion to be drawn from the theoretical literature with respect to the type of relationship that should be expected between openness and convergence. The latter will depend on the evolution of the technology gap and international competitiveness. As a result, convergence and openness can appear combined in different scenarios which can be described in a fairly simple manner using the basic model provided by the Thirlwall's law. Assuming that GDP per capita is lower in a less developed country (Y) than in the leading countries (Z), convergence requires $y > z$ --where small letters represent proportional rates of growth of GDP in the follower and the leader, respectively.²⁶ According to this model, convergence will occur when $\epsilon > \pi$ (see also section

²⁰ Dosi G. & Fabiani, S. "Convergence and Divergence".

²¹ Fagerberg, J. "A Technology Gap Approach To Why Growth Rates Differ".

²² Reinert, E.S., "Catching-Up from Way Behind: A Third World Perspective on First World History".

²³ Haggard, S., *Pathways From the Periphery*, Chap.2.

²⁴ See Evans, P., "The State as a Problem and as a Solution" and I. Adelman, "Prometheus Unbound and Developing Countries", p. 496.

²⁵ David, P., "CLIO and the Economics of QWERTY", pp. 332-337.

²⁶ If convergence is defined in terms of GDP per capita, then the rates of population growth in country i and in the rest of the world must be considered. In this case, convergence requires that (ϵ/π) should be higher than $[1 + (\pi_i - \pi)/z]$,

III). In addition, assuming that in equilibrium the rates of growth of exports and imports are equal, then the openness coefficient, defined as $OC = (X+M)/Y$, will increase with y when $\pi > 1$.²⁷

The different scenarios of convergence can be summarised as follows:

- a) Convergence with increasing openness: $\varepsilon > \pi$; $\pi > 1$;
- b) Convergence with decreasing openness: $\varepsilon > \pi$; $\pi < 1$;
- c) Convergence and stable foreign trade coefficients: $\varepsilon > \pi$; $\pi = 1$.

Conclusions

Convergence and divergence are related to the ability of the laggard countries to promote structural and institutional change in such a way that they enhance competitiveness in sectors characterised by higher rates of demand growth and technological dynamism. Rather than assuming a general, unique relationship between openness and convergence, the focus of the analysis should rest on the evolution of the underlying forces that shaped the demand elasticities for exports and imports in different historical contexts.

III. Some stylised facts

In this session convergence and divergence trends will be discussed in terms of GDP *per capita*, as is usual in the current literature on this topic.²⁸ The evolution of convergence and divergence between Argentina, Brazil and Uruguay (ABU) and four selected developed countries is shown in Graphs 1 and 2.²⁹ Graph 1 shows ABU's GDP *per capita* relative to the weighted average of that of France, Germany, UK and USA.³⁰ In Graph 2 the USA was excluded from the set of advanced countries in order to obtain an idea of the relation between Old and New Countries in 1870-1913.

During the period of reference, Brazil grew at a rate 20% higher than the Argentine and 70% higher than Uruguay. In spite of its impressive records, Brazilian *per capita* real income was in 1992 still 59% and 86% of that of Argentina and Uruguay, respectively.³¹

Within ABU, and especially considering the relation between Argentina and Brazil, two different periods can be identified. Until 1913 a process of sharp divergence prevailed, in which Argentina increasingly left Brazil behind. From then until the late seventies there was a process of steady

where π_i is the proportional rate of population growth in country i and p is the proportional rate of population growth in the rest of the world.

²⁷ If the openness coefficient is logarithmically differentiated with respect to time, and recalling that in equilibrium $x = \pi \cdot y = m$, then we get: $[d(OC)/dt]/OC = y(\pi - 1)$.

²⁸ Fagerberg, J. "A Technology Gap Approach To Why Growth Rates Differ". In a future work the authors intend to analyse convergence from the point of view of real wages, as suggested by Williamson, J., "The Evolution of Global Labor Markets...".

²⁹ The original series, sources and methodology used in the construction of the convergence index are presented and discussed in a Statistical Appendix.

³⁰ Weighted average in the sense that the same growth rate has a greater incidence if a country has an above average per capita GDP than if it has a below average one. The size of population is not considered.

³¹ Real per capita GDP (PPA dollars), according to *Human Development Report 1995*, p. 177. This work just addresses average per capita income, without any consideration to income distribution. It is worth keeping in mind that in 1990 Brazil's top tenth earned 48.7% of national income, while the bottom fifth earned solely 2.6%. See Baer, W., *A Economia Brasileira*, p. 22.

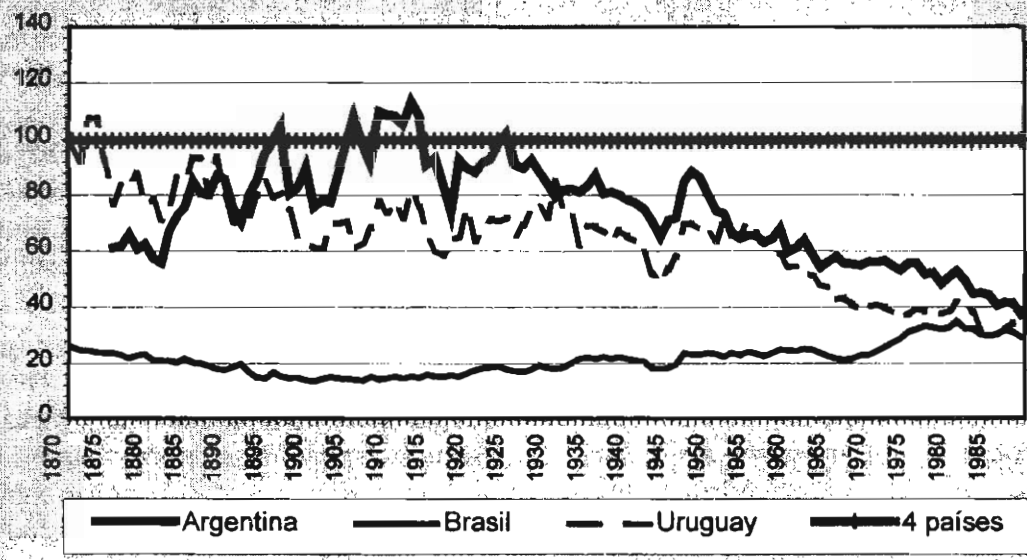
convergence that was gradually narrowing the gap.

In turn, the relations between the ABU countries and the core countries were clearly differentiated.

Argentina achieved a rapid process of catching up with the leaders, forging slightly ahead in the first decade of the twentieth century. Moreover, if the USA is removed from the sample of advanced countries, the Argentine advantage in terms of GDP *per capita* further increased and persisted for more than three decades (1895-1929). Argentine relative growth lost momentum in the first decade of this century. A constant and persistent decline started around 1913. By the end of the 1980s, this decline implied that the Argentine GDP *per capita* had fallen from being on average 10% above that of the four selected advanced countries to less than 40%.

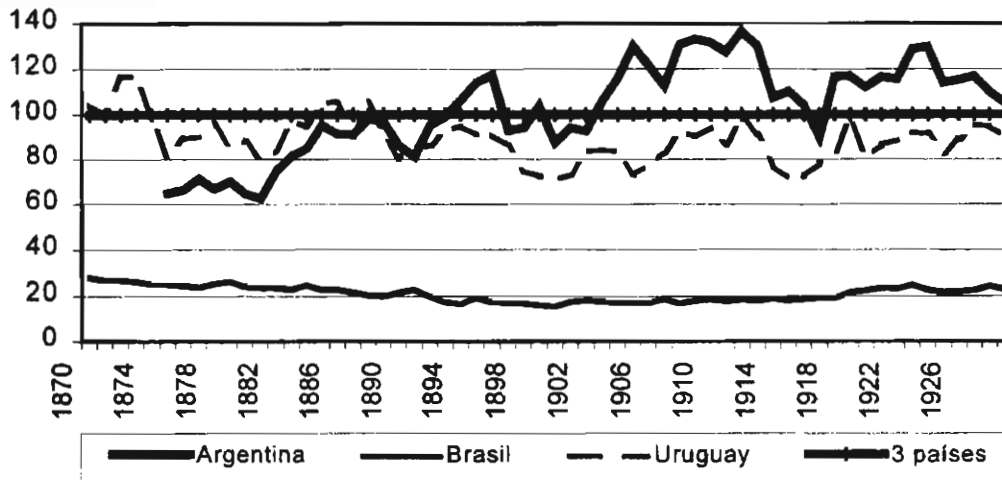
Brazil diverged from the core countries in the last decades of the nineteenth century, but started a process of slow convergence at the beginning of the twentieth century, which lasted until the late 1970s. In spite of this continuous process of convergence, Brazil hardly succeeded in raising its GDP as a percentage of the average of the four advanced countries considered. This percentage first decreased from 25% in 1870 to 12% in 1900, and subsequently increased to 32% in 1980 -a figure which was only moderately above the dismal levels of the nineteenth century-

Graph 1. Argentina, Brazil and Uruguay, 1870-1988 : *per capita* GDP relative to the average of France, Germany, the U.K. and the U.S.A. (100)



Sources and comments : Statistical Appendix.

Graph 2. Argentina, Brazil and Uruguay, 1870-1929 : *per capita* GDP relative to the average of France, Germany and the U.K. (100)



Sources and comments : Statistical Appendix.

As Brazil, Uruguay diverged in 1873-1900, but it did so from GDP *per capita* levels which were similar to or even higher than those achieved by the sample of advanced countries. During the three first decades of the twentieth century, Uruguay kept pace with growth in the core. Thereafter, she followed, with minor differences, the same growth path as Argentina. Still, Uruguay was successful in halting divergence in 1945-54 and 1974-78, which represented, respectively, the heydays of import-substitution (during the democratic governments of the *Neo-Batllista* period) and of export promotion (during the initial phase of the military government of the seventies). Conversely, Argentina diverged at a less intense rate in the sixties than in any other period after World War II.

IV. Convergence and divergence: does openness matter?

It was mentioned that economic historians such as Maddison and Williamson suggest that growth and convergence were higher in 1870-1913 and 1950-1973, when freer trade prevailed, global factor markets expanded and the institutional setting stimulated factor movements and thereby a more efficient resource allocation. It is open to discussion whether technological diffusion associated to openness played a more or less important role than the “venerable factor price equalisation theorem”, to quote Williamson.³²

The first conclusion we can draw from our data is that the trajectory of ABU is not consistent with Maddison’s phases. Growth rates and convergence trends displayed patterns which were rather different from those suggested by this author. In order to analyse the relation between convergence and openness more carefully, we constructed some indices with a view to obtaining an idea of the co-evolution of these variables.

In Graphs 4.A, 4.B and 4.U the evolution of both the export coefficient and the convergence coefficient since 1870 (1881 in the case of Argentina) for the ABU countries are presented. The export coefficient (X/GDP) is a proxy for openness: from the classical perspective, the export and

³² Williamson, J., “The Evolution of Global Labor Markets...”.

convergence coefficients should be expected to move together.

Still, the international economy is not a single entity and each country faces different external stimulus to growth. A relatively poor performance of a certain country could be related to the lack of dynamism of her specific export markets. In order to assess this variable, an index of the relative growth of Argentina, Brazil and Uruguay with respect to their main export markets was constructed (see Graph 3). This index was calculated as the ratio between the real GDP of each one of the ABU countries and the real GDP of the nine (ten in the case of Uruguay) countries which represented their main markets (World GDP(i) , where i stands for Argentina, Brazil or Uruguay). The World GDP(i) is defined as the real GDP of the nine (ten) countries weighted by their participation in the total exports of country i. This weight was adjusted on an annual basis. Therefore, each ABU country gets a World GDP of her own, expressing the particular structure of her trade relations.

It should be observed that the influence of population was not expurgated from these indices. Thus, countries with higher population growth will tend to show a better performance than it would have been the case if *per capita* indicators were used.

Finally, convergence trajectories may differ because the international competitiveness of each country is different. In other words, the ABU countries may have exhibited a different ability to exploit the expansion of international demand through growing exports (see bellow). In Table 1 we present the World GDP elasticity of demand for exports ($\omega(i)$), which is intended to provide a rough measure of the evolution of the international competitiveness of Argentina, Brazil and Uruguay. This index expresses the export response of the country to the expansion of its main markets, and is computed as follows:

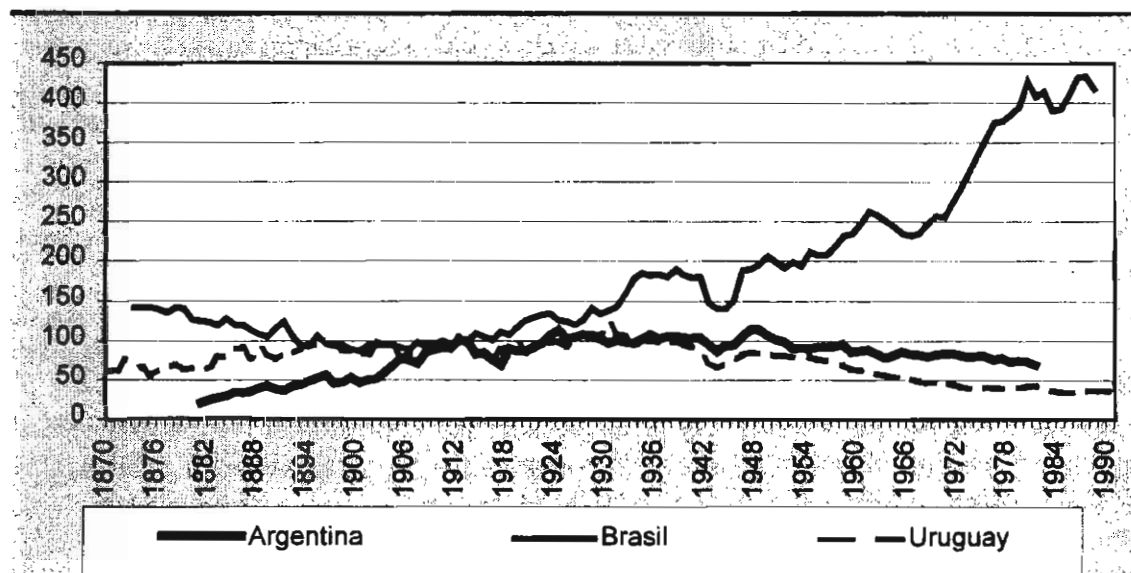
$$\omega(i) = \log [X_i/WGDP(i)]$$

where X_i are the exports of country i (i stands for Argentina, Brazil or Uruguay) and $WGDP(i)$ is the GDP of the main markets of each country, as above mentioned.

It should be observed that in this context export elasticities cannot be interpreted in the usual fashion. They do not reflect the sole influence of changes in income levels, but also the influence of supply forces (McCombie and Thirlwall's non-price competitiveness, related to technological learning and the patterns of specialisation) and the institutional setting for international trade. They thus provide a concise idea of the net effect of a complex set of variables on the relative performance of each country in the international economy. From the point of view of an economic history approach, keeping this in mind is specially useful. As a condensed, highly aggregated measure of the dynamism of the international insertion of a certain country, $\omega(i)$ is an interesting point of departure for a careful scrutiny of how supply and demand forces combined in different historical periods in order to generate convergence or divergence.



Graph 3. Argentina, Brazil and Uruguay, 1870-1988 : GDP relative to WGDP, weighted according to shares in ABU :s exports (1913=100)



Comments and sources : Statistical Appendix.

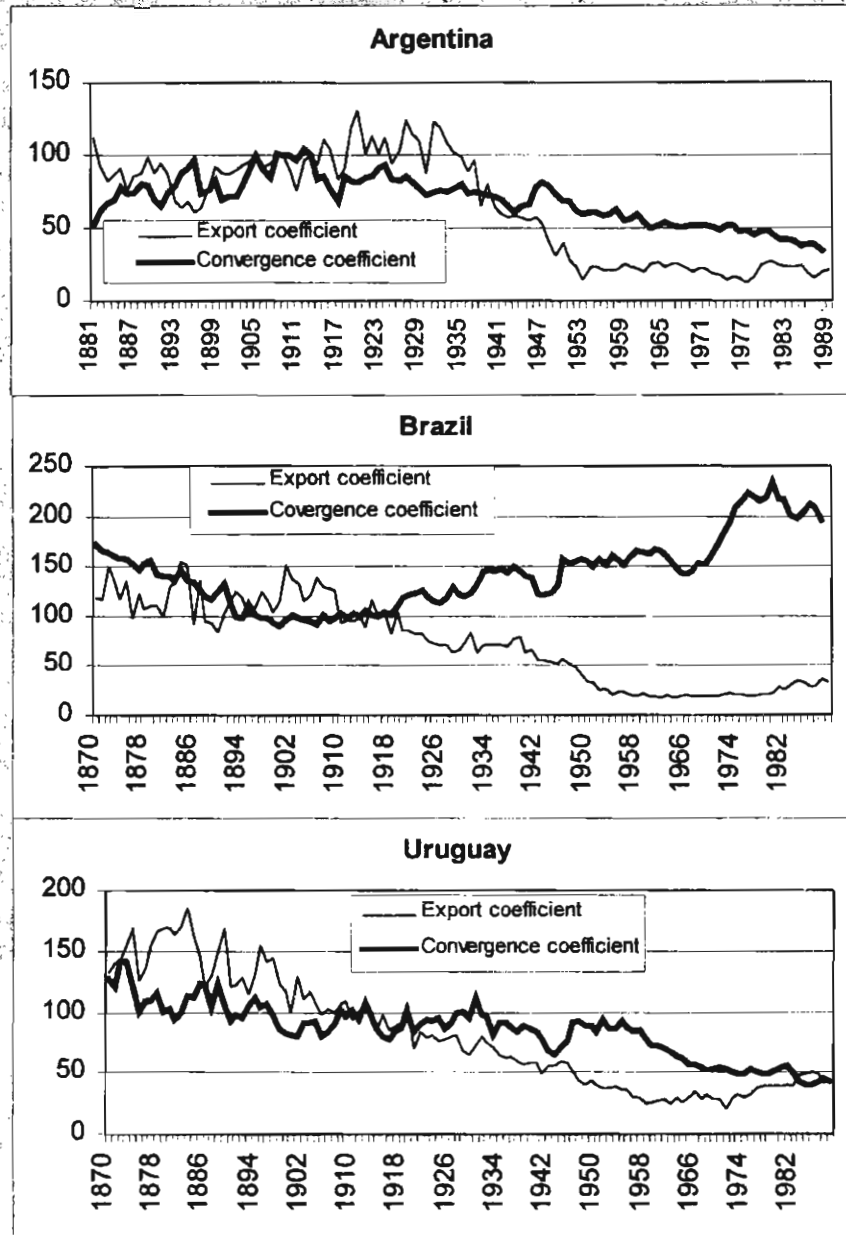
Table 1. Argentina, Brazil and Uruguay, different periods 1870-1988 : WGDP elasticity of demand for exports (ω)

Argentina	ω	Brasil	ω	Uruguay	ω
1881-1913	3,05	1873-1900	0,27	1873-1895	1,35
1913-1927	2,26	1900-1929	0,59	1897-1930	0,54
1927-1939	-0,55	1929-1939	1,42	1930-1971	-0,08
1939-1951	-0,87	1939-1954	-0,44	1971-1990	1,90
1951-1989	0,64	1954-1975	1,33		
		1975-1988	3,40		

Comments and sources : Statistical Appendix.

In the rest of the section, these different pieces of empirical evidence will be used to discuss the relationship between convergence and openness. We will argue that the traditional approach to convergence and openness as measured by the export coefficient does not match the historical experience of the ABU countries. Neither can relative performance be explained by the different dynamism of external markets. On the other hand, this evidence is broadly consistent with the role of international competitiveness in shaping relative growth rates.

Graph 4.a.b.u., Argentina, Brazil and Uruguay, 1870-1988 : export and convergence coefficients (1913=100)



Export coefficient is the index resulting of the relation between de volume of exports index and the Real-GDP index. Convergence coefficient is the index resulting of the relation between the domestic Real per capita GDP and the average of 4 advanced countries Real per capita GDP.

Sources : Statistical Appendix.

IV.1. Argentina

The only country that showed similar phases as those of the core was Argentina. But even in this case some deviations from the expected trend were visible. In the *Belle Epoque*, Argentina did not

only converge but it forged ahead, specially in relation to those countries with which she traded on the other side of the Atlantic, as shown in Graph 2. This fact is difficult to explain in terms of classical convergence theory. Argentina not only grew faster than the average of the four considered countries, but even faster than WGDP(a) weighted according to shares in the Argentine exports (Graph 3). Argentine export coefficient remained relatively constant in this period, but the WGDP(a) achieved very high figures (Graph 4).³³ In 1895-1912, Argentina increased its per capita GDP to a level which was almost 40% above of that of the core countries. The USA moved in the same direction, at a much more impressive rate.

Argentine divergent trend was constant since WWI. However, this process of divergence proceeded within different environments. Until the early 1930s, the export coefficient did not experience significant variations. Argentina grew at similar rates as WGDP(a) (Graph 3), while exports continued to grow, albeit at a slower rate than that of WGDP(a) (Graph 4).

Contrary to the pre-1913 period, in 1930-1950 the world was growing "wrong" for Argentina: those countries to which she was linked through exports grew more slowly, and, in addition, spent a declining share of their incomes in the type of goods that Argentina produced. Income elasticity of demand for her exports fell sharply, as a result of the combined effects of changes in demand, loss of competitiveness and less favourable institutional arrangements.³⁴ In the 1930s Argentine export coefficient fell dramatically, but inwards-oriented growth made it possible to avoid divergence with the leaders, specially if World GDP is viewed from the exports window (Graph 3). Structural change then produced a reduction of income elasticity of the demand for imports.³⁵ The sources of growth in this period were the expansion of domestic demand and import substitution.³⁶

A new dramatic fall of the export coefficient occurred in the immediate post-war period and until the mid-sixties, when divergence was very intense. Since then, the divergent trend continued to dominate the scene in spite of the stability of both the export coefficients and the income elasticity of demand for exports. This represented another deviation from what can be expected from Maddison's phases: in the heydays of the Bretton Woods system, Argentina continued to fall behind the leading countries--in sharp contrast with the relative stability of the convergence coefficient during the "beggar-thy-neighbour" era of the thirties.

³³ The income elasticity of demand for exports do not only take into account the demand side of exports, but it also considers the interaction of demand and supply forces, along with the influence of the institutional setting of international trade.

³⁴ It should be recalled that Argentina was specially harmed by the spread of restrictive bilateral practices in the international economy. In particular, the United Kingdom granted trade preferences through the 1932 Ottawa Treaty to the British Dominium, which competed with the Argentines in the British market. Not even the Roca-Runciman Agreement of 1933--for which the conservative Argentine government payed a substantial political cost in the domestic front--succeeded in reverting the relative closure of Argentina's principal market. This was a remarkably setback to the Argentine export-led growth, as the USA would remain a closed market for temperate agricultural goods. See on this point Abreu, M.P., "Argentina and Brazil During the Thirties".

³⁵ As in the case of the income elasticity of demand for exports, income elasticity of demand for imports is seen as the result of the characteristics of the productive structure, interacting with income levels and the international trade regime

³⁶ In 1929-1938 the contribution to growth of domestic demand, import-substitution and exports, were 51, 84 and --36%, respectively. Bulmer-Thomas, V., *The Economic History of Latin America since Independence*, Table 7.5, p. 214.

IV.2 Brazil

The phases of Brazilian development do not fit at all the phases of convergence and divergence that should be expected from the conventional perspective. An adequate explanation of this trajectory must consider other variables besides openness and the international trade regime.

The Brazilian economy was hardly a closed one in the last decades of the 19th Century. Nevertheless it stagnated and lagged behind the leaders. On the other hand, growth accelerated and convergence significantly advanced in a context of increasing barriers to trade and falling capital inflows in 1900-1950. Until the mid-1950s, convergence took place hand in hand with a steady decline in the export coefficient. In this period, as it was the case for Argentina before 1913, the world was growing "right" for Brazil: the WGDP(b) grew at higher rates than the WGDP(a). This certainly represented a significant advantage for Brazil as compared to Argentina and contribute to explain their different trajectories. In addition, the GDP elasticity of demand for Brazilian exports was at least constant, probably reflecting the relatively more favourable international environment for Brazil³⁷ in this period and her higher ability to diversify her export structure³⁸ than in the Argentine case (Graph 4).

Between the mid-fifties and early 1970s Brazil experienced a dramatic increase in her export coefficient. This allowed Brazil to keep pace with the Golden Age high rates of international economic growth. The income elasticity of demand for Brazilian exports was then very high. The export coefficient continued to grow even after the oil crisis and during the international recession of the second half of the seventies. The World GDP elasticity of demand for Brazilian exports further increased, possibly due to the effort made in the direction of structural change since 1974. But the crisis of the 1980s brought about a process of sharp divergence. The export coefficient continued to grow (although the import coefficient fell), but this reflected the need of paying the debt rather than an increase in the international competitiveness of Brazil.

IV.3 Uruguay

Uruguay displayed a moderate negative trend in terms of relative growth until 1930 (if the USA is excluded). If this is compared to the strong divergent trend observed after 1930, the Uruguayan case could be considered a striking example supporting the orthodox view on convergence and divergence. However, taking the USA into account, the Uruguayan case is almost an antithesis: Uruguay showed an almost steady divergent trend since the 1870s until now (Graph 2). Such a trend conceals, however, significant changes in the scenarios of convergence and divergence.

Until the early 20th century falling export coefficients were followed by divergence. Since the 1880s until World War I, WGDP elasticity of demand for the Uruguayan exports was declining. The export coefficient continued to fall in the 1900-1930 period, but Uruguay succeeded in keeping pace with core countries growth rates. The economy was in a process of diversification, which may have

³⁷ In particular, the principal export market for Brazilian coffee, the USA, remained open in the thirties—a remarkable difference with what happened to Argentine and Uruguayan principal exports. Brazil also managed to export cotton to Germany through a bilateral agreement. Moreover, in the forties, as a strategic ally of the USA in Latin America, Brazil obtained significant support for her industrial projects, which contrasted with the economic boycott the USA imposed on Argentina since 1942.

³⁸ This included iron goods and textiles during the war, when the production of other countries was diverted by the war effort.

contributed to maintain constant the income elasticity of demand for imports between WWI and 1930.³⁹ The 1920s were also characterised by significant capital inflows.⁴⁰

The whole 1930-1950 period witnessed a sharp deterioration of the export coefficient. World GDP(u) grew much more than World GDP(a) and World GDP(b). However, the World GDP(u) elasticity of demand was then extremely low and this compromised the stimulus that the world could provide to exports and growth. As in the Argentine case, exports suffered from demand changes, falling competitiveness and an unfavourable institutional setting.⁴¹ Divergence was sharp until mid-WWII. Since then and until the mid-1950s, and in spite of a falling export coefficient, an intense process of structural change reduced the elasticity of the demand for imports and divergence was temporarily halted. But the process of divergence was resumed in the late fifties and persisted until the mid-1970s.

In the 1960s the export coefficient recovered. But it should be observed that the GDP elasticity of the demand for exports continued to be very low until the 1970s. Therefore, a higher export coefficient seems not to have provided a significant relief in the external sector. Divergence was curbed in the 1970s, although, again, this improvement was just temporary. Divergence would reappear with stronger intensity in the 1980s. As in the case of Argentina and Brazil, the improvement in the export coefficient in this period concealed a drastic transfer of resources to creditor countries. Therefore, it did not represent at any rate any alleviation of external constraints on growth.

IV.4 In short

Our figures show a wide range of possible scenarios of convergence and divergence (Graph 4a, b and u): Brazil converged with either inward or outward looking strategies; Argentina diverged with stable export coefficients while succeeded in stopping divergence in periods in which the export coefficient was falling; Uruguay diverged in all possible regimes and stopped divergence--on a temporary basis--with both decreasing and increasing export coefficients. Clearly, other variables should be considered in the analysis in order to find a plausible explanation for these alternative scenarios.

The World GDP elasticity of demand for imports and exports offers an interesting, concise measure of the net effect of a complex set of variables, whose role in convergence and divergence has been highlighted by recent theoretical contributions. Patterns of demand, specialisation and institutions interact with openness to produce alternative growth trajectories. The behaviour of the World GDP elasticity of demand reflected underlying changes in international competitiveness and in the international trade regime. Competitiveness, in turn, is related to structural change when trade grows on an intra-industry basis. The relation between structural change and growth will be analysed in the next section. Subsequently, we will discuss whether industrial policy could have played a role in explaining differences in structural change and competitiveness- and therefore in explaining the different rates of convergence--in the ABU countries.

³⁹ Bértola, L., et al., "Estimación, ..."

⁴⁰ Bértola, L., *La Industria Manufacturera...*, Chap. IV.

⁴¹ The Uruguayan case was very similar to the Argentine. She suffered from the bilateral practices of the UK and from agricultural protectionism in the USA. Yet at variance with Argentina, Uruguay did not go through an economic boycott during the war and early post-war periods.

V. Convergence and divergence: does specialisation matter?

In this section we will present a preliminary attempt to empirically relate the convergence-divergence debate to structural change. We construct Cross-Country Structural Change indices (CCSC) for the manufacturing sector in pairs of countries in order to measure the intensity of the process of structural convergence or divergence. Each ABU country was compared with the four advanced countries used in the GDP *per capita* comparisons (France, Germany, UK, and USA). The CCSC indices provide a measure of the degree of similarity in the sectoral composition of manufacturing and thus offer a rough idea of the quality of the investment effort.⁴² They will be used to analyse whether structural convergence and GDP convergence were associated. The raw data was obtained from the UNIDO Industrial Statistics Database, which presents information on the structure of the manufacturing sector at a three-digit level for 1963-1991.

Before looking at the results it is worth recalling that we do not expect to find a positive relation between structural convergence and growth in all cases. The income elasticity of the demand for exports can suffer dramatic changes through time and a pattern of specialisation which encourages rapid growth in a certain period may lose dynamism and lead to relative backwardness in a different period. Convergence depends on the ability of each country to promote structural change so as to adjust her pattern of specialisation to prevailing trends in the domestic and international demand. Structural divergence and GDP convergence may occur together if international trade develops on an inter-industry basis and if this type of trade displays enough dynamism to avoid external constraints on growth.

This was the case of the pattern of structural divergence and increasing inter-industry trade that characterised the international system before 1913, which sustained rapid growth until WWI and dwindled thereafter. In the golden years of the post-WWII period, economic dynamism tended to rely more on intra-industry specialisation and structural convergence across countries than on inter-industry specialisation. The patterns of international trade and the mechanisms of convergence then changed dramatically. Thus, it seems more useful to aim at identifying changing historical scenarios in which the sources of convergence were different, than to propose a model of convergence and divergence of permanent validity for the whole period.

There is no comparable long term time series data on the economic structure of a large group of countries at a relatively high level of dis-aggregation. For this reason, only evidence on structural change for the post-WWII period (1963-91) will be produced. We assume that the world order characterised by a dynamic integration to the world economy through the specialisation in primary goods had then gone for good and that trade was increasingly upon intra-industrial basis. Therefore structural convergence was necessary for GDP convergence with developed economies—a perspective very much in line with the tenets of the Latin American structuralist tradition and consistent with the insights of the Thirlwall's Law as well.⁴³ We expect a positive correlation between convergence (divergence) of *per capita* income levels, on the one hand, and convergence (divergence) of

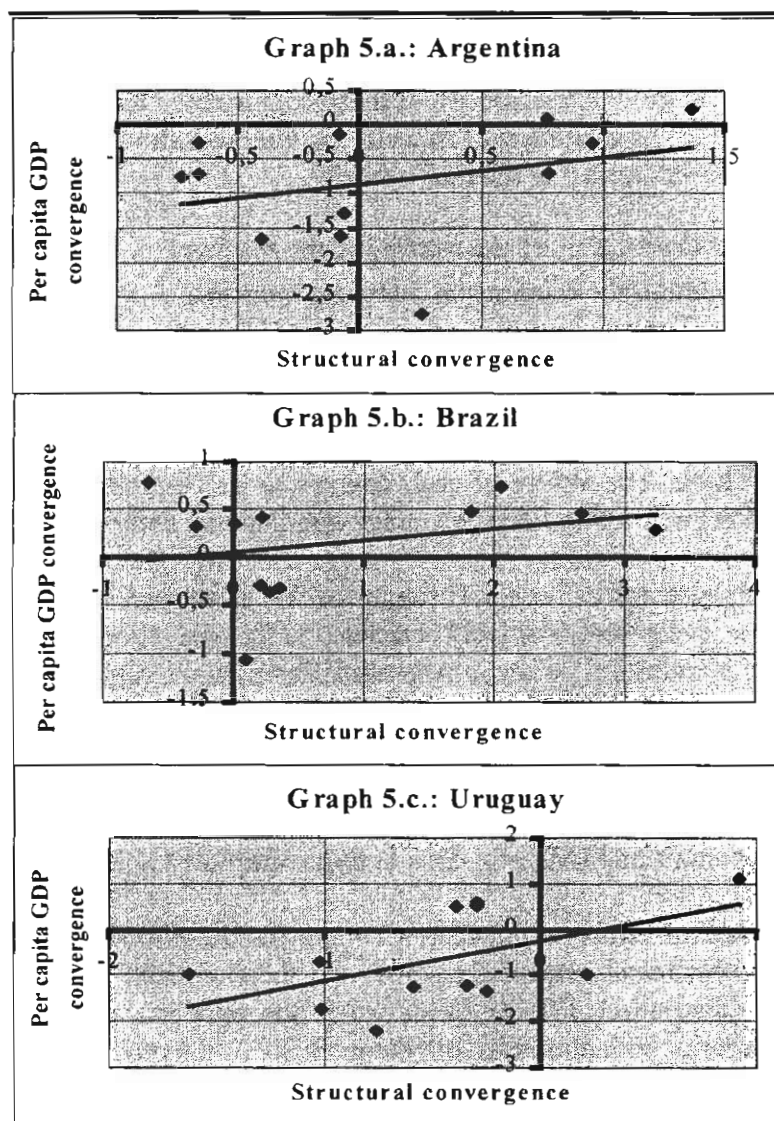
⁴² Bradford de Long & Summers, "Equipment Investment and Economic Growth" suggest that there is an especially strong case in favor of undertaking the analysis of the effects of investment on growth at a higher level of disaggregation. They point out that the quality of investment seems to play a role at least as important as the quantity on enhancing economic growth.

⁴³ Exceptions may exist due to good luck in the commodities lottery or to exceptional institutional conditions, giving rise to high growth of demand for certain primary goods.

productive structures, on the other, being the latter the independent variable.

Graph 5.a-c. shows the results obtained from plotting the CCSC indices, as a proxy for structural change, and GDP convergence, defined as the relative growth of GDP *per capita* between ABU and the four selected countries (six for Uruguay). We expect a linear positive correlation between the resulting pair of values obtained for three different periods for each ABU country (12 pairs of values). The results obtained are consistent with the hypothesis of a positive association between structural convergence and income convergence in 1963-1991. Both Argentina and Uruguay mostly exhibited structural divergence and a divergent trend aroused in terms of income *per capita*. On the other hand, Brazil showed a process of structural convergence accompanied by convergence in income *per capita*. In the three cases the expected upward slope was obtained.

Graph 5.a.-c. : Structural convergence and *per capita* GDP convergence, between a) Argentina, Brazil and Uruguay, and b) France, Germany, UK and USA. (1963-1991)



Cross-country Structural Change Index. Source ; UNIDO Industrial Statistics at three-digit level for 1963-1992. The annual rate of structural convergence/divergence was obtained for each pair of countries, as the semi-sum of the absolute values of the differences between the shares of each industrial sector's value added each year, divided the number of years of the period.

Per capita GDP convergence : is the average annual change of the share of an ABU country's per capita GDP in relation to an advanced country's, according to the data of the Statistical Appendix.

Clearly, these results are yet preliminary and they do not represent a rigorous statistical test. However, they suggest that the hypothesis deserves attention and should be more carefully

scrutinised. They are consistent with the idea that besides macroeconomic management, policies aimed at structural change in favour of sectors with higher rates of demand and productivity growth may have played a key role in post-war convergence. An upgrading of the industrial and export structures was necessary for convergence to occur. In particular, the literature on industrial policy in Latin America and in the more successful South East Asian countries suggests that it was the difference in the implementation of industrial policy, rather than sectoral neutrality, which can more plausibly explain the different growth trajectories of these countries.⁴⁴ Our results suggest that this tenet can be applied as well to the evolution of industry *within* the Latin American group -a point which will be more carefully addressed in the next section-.

VI. Convergence and divergence: do institutions matter?

We will analyse in this session the relationship between industrial policy and structural change in the post WWII experience. The previous discussion addressed how factors related to the economic structure of Argentina, Brazil and Uruguay (the degree of openness and the pattern of specialisation) affected the long term economic performance of these countries. Still, structural change is closely related to institutional change: the interaction between these two sets of variables shapes economic performance in the long term. The ability of each country to successfully promote institutional change in such a way that the new institutions encourage international competitiveness is crucial for convergence.

The empirical evidence presented in Section II suggested that convergence in industrial structures and convergence in income levels were positively correlated in the post- World War II period. In this section it will be argued that industrial policy in Argentina, Brazil and Uruguay played a key role in explaining differences among these countries in terms of structural change and convergence. A very broad definition of industrial policy will be used, including all governmental measures that can affect the allocation of resources among the different sectors of the economy. The main point to be developed is that industrial policy in Brazil was much more consistent, continuous and comprehensive than in Argentina and Uruguay. This in turn contributed to explain the higher rate of structural change in Brazil.

The late fifties witnessed the implantation of new capital-intensive industries in Argentina and Brazil, led by the metal-mechanical (especially autos) and the chemical industries (the so-called second phase of import-substitution, ISI-2). As shown in the previous section, the direction of structural change was similar in both countries, but the intensity of the process was rather different. This can in part be explained by the effectiveness of industrial policy. The design and implementation of industrial policy was carried out in very different political and institutional settings in the three countries and this had an impact on industrial development.⁴⁵

In Brazil, industrial deepening took place within the framework of Kubitschek's *Plano de Metas* (Targets Plan), that during five years provided consistent support for industrial development, including subsidies and closed markets for new industries.⁴⁶ The domestic political environment was

⁴⁴ Cf. Rodrik, D., "Taking Trade Policy Seriously".

⁴⁵ For a comparison of the institutional and political environment in Argentina and Brazil in this period, see Sikkink, K., *Ideas and Institutions*.

⁴⁶ The implementation of the Targets Plan was in charge of the so-called "Executive Groups", ad hoc bodies that managed policies for specific sectors, like autos, agricultural machinery, naval construction, heavy machinery, transport

always favorable to the "developmentalist" project, which was pushed forward even when mounting disequilibrium in the domestic and external front became evident. There existed a broad consensus in Brazil as regards the need of rapid industrial growth, which sustained the "developmentalist" coalition despite macroeconomic disequilibrium.⁴⁷ Moreover, the policies applied by the military governments that ruled Brazil since 1964 did not substantially changed the industrialist drive of the country.⁴⁸

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.⁴⁹ By mid-1959 the Frondizi administration had already been checked by domestic political opposition.⁵⁰ He then adopted a severe stabilisation plan that led to a sharp contraction of the economy and halted the "developmentalist" project.⁵¹ Two years later, Frondizi was ousted by a military coup amidst growing political conflict and economic downfall.⁵²

These differences in the institutional environment in which ISI-2 took place in Argentina and Brazil were not inconsequential. Their effects were clearly reflected in the average rate of investment in 1956-61, significantly higher in Brazil than in Argentina.⁵³

It should be observed that it is not being suggested that the industrial policy then adopted by Brazil was "ideal" in any sense. Other policy alternatives could have avoided so high levels of protection and macroeconomic instability. But given the policy strategy that both countries adopted, it is clear that Brazil pursuit this objective in a more consistent manner. And this had an impact on the relative success of the strategy in each country. In addition, Argentina and Brazil did not only seek to substitute imports but they also encouraged export diversification. Yet again, Brazilian

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 of 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 sector. Cf. Lessa, C., *Quinze Anos de Política Econômica*; Leopoldi, M., "Crescendo em Meio a Incerteza".

⁴⁷ On the political conditions of the Targets Plan see Benevides, M.B., *O Governo Kibitschek*.

⁴⁸ Cf. Malan, P.S., "Relações Econômicas Internacionais do Brasil".

⁴⁹ Cf. Szusterman, C., *Frondizi and the Politics of Developmentalism*.

⁵⁰ From one hand, the peronist unions looked suspiciously at Frondizi's policies, which heavily relied 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, liberal groups were alienated by the strong industrialist drive that Frondizi adopted. Cf. Potash, R.A., *The Army and Politics*.

⁵¹ Cf. Petrecolla, A., "Unbalanced Development, 1958-62".

⁵² The especially difficult conditions in which institutional change occurred in Argentina, and their impact on the Argentine capacity to promote structural change, are analyzed in Lewis, C., "The Argentine: From Economic Growth to Economic Retardation".

⁵³ A qualitative variable whose importance for industrial policy in subsequent years is difficult to assess had to do with the different collective perception held in both countries regarding the worth and significance of the policies of the late fifties. While in Brazil the Kubitschek's period is looked at proudly, as a phase of "heroic" industrialization and stable democracy, in Argentina the assessment of Frondizi's period has been largely dominated by controversy and criticism. See on this Sikkink, K., *Ideas and Institutions*.

policies were much more successful than those Applied in Argentina.⁵⁴

The case of Uruguay was different from that of her two bigger neighbours. Clearly, in this case, there was no place for industrial policies of the kind adopted in Brazil and Argentina. Uruguay's rather narrow domestic market did not allow for a strategy of deepening import-substituting industrialisation. The advance of ISI would have implied a much higher cost in terms of inefficiency than in Argentina and Brazil. Therefore, the only avenue opened for Uruguay was to diversify her exports in order to enter more dynamic international markets, in sectors with higher value added.

In the forties and fifties, the export structure of Uruguay 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. But 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 the Uruguayan exports of wool products.⁵⁵ Thus, Uruguay's competitive advantage remained in sectors facing increasing barriers in the international economy, which lessened the income elasticity of her exports. Moreover, domestic policies did not help. The overvaluation of the exchange rate and high industrial protection during the *Neo-Batllista* period compromised the growth of exports. Only in the mid-seventies would Uruguay implement a new and more successful drive towards export diversification, which positively effected growth rates.

Divergence in industrial policy between Argentina and Brazil became especially significant in the second half of the seventies. While in the fifties Argentina and Brazil moved in the same direction (albeit with a different degree of success, as mentioned), in the second half of the seventies they moved in completely opposite directions.

In 1974, Brazil adopted an especially ambitious programme of industrial development, the II PND (Plano Nacional de Desenvolvimento), aimed at implanting a new set of capital- and technology-intensive industries, mainly in the intermediate and capital goods sectors.⁵⁶ This move was prompted by the 1973 oil crisis and sought "complete" the industrial matrix through a new wave of import-substituting industrialisation. In addition, Brazil made an effort to further diversify her export structure by increasing manufactured exports, especially to other Third-World 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, which included 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 an active diplomacy towards developing countries in Africa, the Middle-East and Latin America.⁵⁷ The abundance of foreign capital was instrumental in

⁵⁴ See on this Rodrik, D., "Taking Trade Policy Seriously". Rodrik emphasises that the success of the Brazilian policy of export diversification had very little to do with neutrality respecting the price system.

⁵⁵ 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 of the difficulties to export to the closed US markets, see Batlle, *Pensamiento y Acción*.

⁵⁶ Cf. Barros de Castro & Souza, P.F., *A Economia Brasileira em Marcha Forçada*, and Suzigan, W. & Villela, A.V., *Industrial Policy in Brazil*.

⁵⁷ In addition, Brazil strengthened her diplomatic and economic links with Europe, especially with Germany, in order to set forward her nuclear projects. Cf. Hurrel, "The Quest for Autonomy".

broadening the degree of autonomy that Brazil needed to finance her new industrial projects. As already discussed, this new industrialisation effort of Brazil succeeded in promoting the convergence of her industrial structure with respect to that of the industrialised countries.

As Brazil, Argentina used the relative abundance of foreign loans to set forward an ambitious programme for industrial restructuring. But its direction was the opposite to that of Brazil. Argentina sought to regain competitiveness by dismounting her system of industrial protection and by increasing exports based on static comparative advantages.⁵⁸ In addition, the exchange rate was managed in accordance with the so-called "monetary approach to the balance of payments", with devaluation occurring at a pre-announced declining rate. This led to a combination of an overvaluation of the exchange rate with rapid trade openness that severely affected the competitive capacity of the Argentine industry.⁵⁹

The Argentine liberal experience ended in a 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 (which comprised industries which were energy- and natural resources-intensive) no industry received special support, as the policy was explicitly aimed at providing a neutral environment from the point of view of factors allocation.⁶⁰ Yet no new export-orientated sector came up to play the leading role in economic growth that the metal-mechanical industries had formerly played.

The contrasting experiences in industrial transformation of Argentina and Brazil ended with the 1982 debt crisis. Both countries had followed policies that compromised (for different reasons) 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. In the case of Argentina, the reversal of structural change towards agricultural and industrial commodities compromised 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 international interest rates in the early eighties and the Mexican default triggered the debt crisis which put an end to the policies of the seventies and opened up "the lost decade". Argentina and Brazil converged towards a turbulent period of economic decline. But it should still be observed that the impact of the lost decade was deeper in the Argentine case, where the previous learning path had been already disrupted in the late seventies.

VII. Concluding Remarks: in search for different convergence and divergence regimes

Convergence and divergence in Argentina, Brazil and Uruguay occurred in different historical scenarios resulting from different combinations of technological spill-overs and learning, openness, specialisation and institutional arrangements at the domestic and international levels. Each specific configuration of these variables defined a regime of convergence or divergence. In order to identify the key variables in action and analyse how they interacted, we drawn from the new evolutionary theories of technology, trade and growth. This allows us to suggest a typology of regimes of

⁵⁸ See Katz, J. & Kosacoff, B., *El proceso de Industrialización*; Kosacoff, B., "El Sector Industrial".

⁵⁹ Cf. Kosacoff, B. & Beszinchsky, G., "De la Substitución de Importaciones a la Globalización".

⁶⁰ See Aspiazú, D., "La Promoción de la Inversión Industrial".

convergence and divergence based on our empirical research on Argentina, Brazil and Uruguay and theoretically founded in the new theories.

Convergence regimes

1. The first convergence regime we identified corresponds to the case in which a country achieved a dynamic insertion in the golden era of classic liberalism. Income convergence with structural divergence with the leaders occurred on the basis of specialisation in goods facing high income elasticity of demand in a context characterised by a liberal international regime and fast growth of international trade. Competitive advantages were related to the relative abundance and relative prices of the production factors. This was the case of Argentina and Uruguay in 1870-1913. Not only did Argentina converge in this period but she also forged ahead in relation to the European countries, producing a trajectory which resembled (with less intensity) the successful experience of the United States.

2. The second convergence regime was characterised by structural convergence with the leaders, based on technological diffusion in sectors of mature, standardised technology. Industrial production in this regime was aimed principally at the domestic market as the international economy featured slow growth and fragmentation and/or the country faced a low WGDP elasticity of demand for her exports. This was the case of Brazil in 1930-1950 and Uruguay in 1943-1954. Structural transformation towards industrial production was in turn stimulated by significant changes in the institutional setting favouring the expansion of domestic demand, the management of external trade and the facilitation of credits for industrial investment.

3. A third convergence regime was defined by structural convergence with the leaders, based on a process of industrial learning and catching-up in the new metal-mechanical and chemical industries implanted in the late fifties. Structural transformation in the “developmentalist” period irreversible changed the growth trajectory of Argentina and Brazil and initiated a path of incremental, cumulative industrial learning. Although the domestic market remained the principal outlet for industrial production, a continuous process of export diversification occurred, especially with respect to South markets (South-South trade). This regime emerged in a period in which international trade grew at very high rates (1960-1973) or in which international financing expanded compensating for the loss of dynamism of international trade (1973-78). The only ABU country which displayed such a pattern of convergence was Brazil. At least in part the Brazilian relative success in achieving convergence in the post WWII period seems to have been related to industrial policies which enhanced structural change, allowing for structural convergence with the core countries.

Divergence regimes

1. A first pattern of divergence was defined by income and structural divergence with the leaders, associated to: low WGDP elasticity of demand for exports due to demand changes or to the limits to improve production (no more land to win or sharply decreasing returns); strong domestic heterogeneity (competitive export sector and a large low productivity domestic sector); institutional mismatch, in spite of the stimulus provided by high rates of growth of international trade (slavery and its abolition). This was the pattern exhibited by Brazil in the 1870-1900 period, when this country persistently fell behind the leaders and also behind Argentina and Uruguay.

2. A second pattern combined structural convergence and income divergence. There existed structural convergence but this was unable to prevent income divergence. This was the case of

Argentina in 1912-1955 and Uruguay in 1912-1944. Serious problems of international competitiveness (both in price and quality) remained in place, as reflected in the low income elasticity of the demand for exports.

3. The last divergence regime was defined by structural and income divergence. Structural change gave rise to industrial structures increasingly asymmetric with respect to the leaders. This was characterised by de-industrialisation, export reorientation towards industrial commodities, deteriorating quality competitiveness and a rising import coefficient sustained by an increasing dependence on financial capital inflows. This trend seems to have been present, with some discontinuities and varying intensity, in Argentina since 1985, Uruguay since 1978 and Brazil since 1990.

Statistical Appendix



STATISTICAL APPENDIX

	Real GDP Index (1913=100)		Real GDP per capita				Real World GDP(ABU) Index (1913=100) (9 countries weighted according to export shares in ABU)			Volume of Exports Index (1913=100)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay	4 advanced countries	3 advanced countries	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay
1870		38	19		443	1648	1708	1579			31		45	25
1871		39	20		442	1645	1781	1652			31		45	28
1872		41	25		456	1991	1847	1704			32		61	35
1873		40	25		442	1968	1828	1686			32		56	39
1874		42	23		448	1751	1883	1780			35		49	39
1875	9	43	20	1177	455	1465	1914	1813			36		59	25
1876	9	42	22	1179	438	1588	1899	1778			35		42	30
1877	10	42	23	1274	425	1605	1926	1783			35		52	36
1878	10	45	25	1183	446	1700	1940	1772			31		48	42
1879	10	46	23	1203	449	1468	1917	1713			33		51	38
1880	10	45	25	1155	428	1575	2005	1787			35		50	42
1881	10	46	24	1148	431	1460	2049	1831	50		36	12	46	39
1882	13	48	27	1404	440	1573	2093	1874	52		39	12	62	46
1883	15	48	32	1523	428	1811	2093	1872	53		39	12	64	60
1884	16	52	32	1575	458	1758	2077	1854	53		40	14	81	53
1885	18	49	37	1764	424	1938	2072	1851	53		41	17	74	54
1886	18	50	39	1703	425	1968	2111	1863	54		41	14	46	48
1887	20	49	36	1735	410	1710	2154	1902	55		43	17	67	46
1888	23	48	44	1905	394	2056	2186	1941	56		44	20	46	66
1889	25	50	41	1937	398	1823	2255	2000	58		47	25	47	69
1890	23	55	38	1740	436	1623	2311	2022	60		49	20	46	46
1891	22	60	42	1640	464	1728	2327	2021	60		49	21	62	51
1892	26	53	43	1920	404	1736	2387	2018	61		51	23	62	55
1893	28	47	47	1991	346	1861	2319	2006	62		52	19	58	55
1894	32	48	53	2244	347	2006	2361	2113	64		54	20	56	70

	Real GDP Index (1913=100)			Real GDP per capita								Real World GDP(ABU) Index (1913=100) (9 countries weighted according to export shares in ABU)			Volume of Exports Index (1913=100)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)			
	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay	4 advanced countries	3 advanced countries	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay			
1895	35	58	52	2432	414	1938	2453	2133	66	54	55	24	58	81			
1896	39	54	55	2582	377	1996	2466	2194	68	55	56	24	59	79			
1897	32	54	54	2032	372	1883	2523	2187	69	57	54	20	67	77			
1898	34	57	50	2141	384	1700	2592	2276	71	60	56	27	66	62			
1899	40	57	52	2444	378	1708	2716	2357	75	64	59	37	60	61			
1900	36	56	52	2070	368	1678	2730	2363	76	64	61	31	65	52			
1901	39	63	53	2170	403	1688	2776	2308	76	67	63	34	96	69			
1902	40	68	62	2154	421	1946	2782	2329	77	68	65	36	93	69			
1903	48	68	65	2476	415	1976	2828	2350	78	71	68	44	90	75			
1904	55	68	66	2783	408	1996	2829	2395	79	71	71	53	79	72			
1905	65	70	60	3136	409	1763	2893	2408	82	76	75	65	85	58			
1906	64	73	66	2990	419	1916	3030	2455	85	81	77	59	101	68			
1907	63	83	73	2814	466	2083	3056	2494	87	84	80	60	108	72			
1908	74	75	80	3187	411	2248	2895	2437	86	80	82	74	96	85			
1909	80	83	81	3304	445	2236	3034	2479	89	87	87	80	104	88			
1910	83	89	87	3310	468	2368	3046	2513	90	88	88	75	83	82			
1911	85	89	84	3293	460	2233	3118	2583	94	92	92	65	86	85			
1912	99	98	103	3675	498	2651	3234	2689	97	97	98	97	94	108			
1913	100	100	100	3575	495	2501	3298	2743	100	100	100	100	100	100			
1914	81	101	83	2799	491	2006	3078	2606	96	92	93	75	89	71			
1915	85	100	79	2892	475	1868	3104	2621	100	94	98	95	118	77			
1916	82	104	82	2726	486	1896	3238	2614	106	103	104	86	104	70			
1917	72	110	90	2362	503	2053	3195	2622	104	98	100	61	115	81			
1918	95	112	96	3047	501	2136	3282	2610	104	104	102	87	92	88			
1919	89	119	108	2812	520	2368	3131	2402	101	100	107	106	125	116			

	Real GDP Index (1913=100)			Real GDP per capita				Real World GDP(ABU) Index (9 countries weighted according to export shares in ABU)			Volume of Exports Index (1913=100)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay	4 advanced countries	3 advanced countries	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay
1920	91	131	94	2800	561	2021	3172	2497	103	103	110	119	112	65
1921	93	133	99	2800	559	2078	3046	2401	99	101	109	94	114	82
1922	104	148	113	3042	608	2326	3268	2629	106	110	117	118	121	90
1923	119	161	119	3353	648	2396	3396	2604	110	119	121	120	133	97
1924	134	161	131	3639	636	2566	3562	2804	116	127	131	150	121	100
1925	126	163	126	3327	631	2408	3659	2918	122	131	135	119	118	98
1926	129	166	137	3322	630	2568	3708	2884	122	137	136	134	118	109
1927	141	182	157	3530	676	2871	3804	3019	130	142	146	177	130	127
1928	141	208	165	3425	756	2951	3871	3111	135	146	151	161	130	113
1929	144	207	166	3397	739	2906	4039	3232	138	153	155	158	137	108
1930	132	198	189	3028	691	3248	3812		134	143	149	116	145	137
1931	129	192	156	2906	658	2643	3554		127	134	141	160	162	126
1932	123	197	145	2714	661	2416	3297		124	123	137	147	126	108
1933	125	222	127	2714	730	2078	3349		128	124	142	137	159	90
1934	138	242	151	2937	780	2433	3525		133	130	149	141	171	98
1935	152	254	160	3191	800	2536	3660		140	139	158	151	182	98
1936	153	284	168	3165	879	2613	3923		149	154	169	137	203	106
1937	165	295	171	3337	894	2616	4116		155	163	177	160	204	101
1938	165	310	183	3290	921	2758	4101		155	163	181	108	240	105
1939	171	323	184	3353	934	2791	4281		163	176	191	137	256	108
1940	174	326	185	3362	921	2763	4359		167	181	198	112	205	107
1941	183	352	188	3481	969	2781	4631		174	195	212	109	232	92
1942	185	333	172	3463	893	2521	4869		192	224	234	105	186	95
1943	184	360	174	3384	941	2516	5178		212	255	264	107	201	96
1944	205	377	195	3702	960	2798	5216		214	267	273	117	204	116

	Real GDP Index (1913=100)			Real GDP per capita								Real World GDP(ABU) Index (1913=100) (9 countries weighted according to export shares in ABU)			Volume of Exports Index (1913=100)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)			
	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay	4 advanced countries	3 advanced countries	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay			
1945	198	387	201	3523	964	2843	4900		207	255	264	109	204	117			
1946	216	435	221	3772	1055	3083	4438		203	230	266	124	246	113			
1947	240	454	236	4116	1074	3258	4644		208	238	274	126	237	104			
1948	253	496	244	4245	1143	3326	4913		219	252	289	105	244	99			
1949	250	539	253	4082	1211	3403	5076		231	260	299	78	218	109			
1950	253	577	262	4032	1265	3451	5408		246	289	320	101	190	106			
1951	263	613	283	4161	1275	4046	5655		262	319	344	72	202	105			
1952	249	660	287	3818	1368	3757	5737		273	331	358	57	167	106			
1953	263	681	301	3836	1355	3921	5940		285	350	375	39	186	118			
1954	273	757	321	3972	1465	4268	6050		298	357	395	64	160	118			
1955	293	798	323	4249	1517	4285	6456		314	384	419	69	186	116			
1956	301	824	329	4184	1501	4185	6609		324	397	435	64	199	99			
1957	316	892	332	4343	1606	4367	6721		337	409	450	68	186	99			
1958	336	959	320	4578	1673	3953	6706		345	413	457	72	179	80			
1959	314	1010	311	4197	1734	3828	7010		363	431	479	78	218	82			
1960	339	1108	322	4462	1784	3968	7278		386	450	509	79	218	86			
1961	363	1224	331	4777	1873	3915	7455		403	467	528	80	237	95			
1962	357	1280	324	4528	1924	3904	7690		423	495	553	72	218	81			
1963	349	1297	326	4293	1893	3799	7911		440	516	575	88	257	95			
1964	385	1349	332	4705	1892	3886	8313		465	553	608	100	232	84			
1965	420	1387	336	5018	1871	3698	8636		483	589	635	97	255	101			
1966	422	1440	347	4956	1903	3872	8900		502	620	660	107	290	122			
1967	434	1509	333	5018	1969	3705	9038		523	642	680	111	277	94			
1968	452	1678	338	5169	2154	3672	9398		558	680	717	104	315	109			
1969	491	1844	359	5501	2236	3904	9758		590	717	756	100	362	102			

	Real GDP Index (1913=100)			Real GDP per capita						Real World GDP(ABU) Index (1913=100) (9 countries weighted according to export shares in ABU)			Volume of Exports Index (1913=100)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay	4 advanced countries	3 advanced countries	Argentina	Brasil	Uruguay	Argentina	Brasil	Uruguay	
1970	517	1890	376	5637	2434	4121	10031		609	740	782	113	373	105	
1971	537	2105	372	5817	2659	4104	10253		633	768	818	121	395	77	
1972	548	2357	359	5810	2907	4026	10615		664	804	855	104	503	105	
1973	568	2685	362	5926	3228	4098	11154		711	854	910	98	578	119	
1974	599	2907	373	6168	3458	4142	11053		733	869	952	83	589	110	
1975	596	3056	395	6052	3505	4310	10846		730	860	958	99	615	126	
1976	596	3367	411	5852	3781	4358	11321		776	896	1013	93	656	152	
1977	634	3533	416	6132	3860	4355	11672		804	935	1054	75	660	163	
1978	613	3707	438	5849	3886	4542	12071		835	960	1091	105	746	170	
1979	656	3958	465	6306	4078	4816	12406		871	1003	1146	158	818	181	
1980	666	4324	493	6506	4303	5091	12285		897	1012	1184	178	978	188	
1981	622	4134	502	6068	3997	5162	12268		885	1014	1162	164	1176	199	
1982	591	4160	455	5487	3968	4655	12188			1003	1151	145	1073	178	
1983	608	4016	428	5608	3753	4056	12452			1029	1165	144	1231	206	
1984	624	4221	424	5724	3833	3952	12871			1076	1213	143	1470	207	
1985	596	4573	430	5324	4017	3969	13137			1113	1260	143	1518	218	
1986	628	4920	468	5624	4294	4316	13480			1139	1318	114	1388	232	
1987	645	5098	505	5720	4317	4767	13808			1174	1356	102	1477	208	
1988	628	5084	505	5349	4208	4687	14349			1218	1382	126	1830	228	

SOURCES AND COMMENTS:

(1)-(3). Real GDP

Argentina (1):

- 1875-1935, Cortés Conde, R. & Harriague, M, *Estimaciones del Producto Bruto Interno de Argentina 1875-1935*.

- 1935-1950, Banco Central de la República Argentina, Cuentas Nacionales (1935-50) as reproduced in Hofman, A.A., "Capital Accumulation in Latin America: a six country comparison for 1950-1989" (Database RIWDEC92).

- 1950-1988, *Penn World Table 56* (Summers and Heston Database), Real GDP per capita in constant dollars using Chain index (1985 international prices in PWTS) and Population.

- Brazil* (2):
- 1870-1899, Goldsmith, R. W., *Brasil 1850-1984: Desenvolvimento Financeiro sob um Século de Inflação*. Tables II-1, pp. 22-23 and III-1, pp. 82-83. It is an alternative estimate to 1870-1900, Contador, C. & Haddad, C., "Produto Real, Moeda e Preços: A Experiência Brasileira no Período 1861-1970" used in earlier works of ours.
 - 1900-1920, Haddad, C., "Crescimento do produto real brasileiro - 1900/1947".
 - 1920-1950, R. Zerkowsky y M.A. de Gusmano Veloso, "Seis décadas de economia a través do PIB".
 - 1950-1988, Penn World Table 56 (Summers and Heston improved Database), Real GDP per capita in constant dollars using Chain index (1985 international prices in PWT5) and Population.
- Uruguay* (3):
- 1870-1950, Bértola, L., Calicchio, L., Camou, M. & Rivero, L.: *Estimación, periodización y comparación regional del PBI uruguayo, 1870-1936*. Programa de Historia Económica y Social, Facultad de Ciencias Sociales, Universidad de la República. Junio 1997 (first draft).
 - 1950-1988, *Penn World Table 56* (Summers and Heston Database), Real GDP per capita in constant dollars using Chain index (1985 international prices in PWT5) and Population.
- (4)-(8). Real GDP per capita**
- Argentina* (4):
- 1875-1899, based on population figures according to Vázquez Presedo, V., *Estadística Históricas*, Table II.1, pp. 15-16.
 - 1900-1950, Banco Central de la República Argentina, *Cuentas Nacionales (1935-50)* as reproduced in Hoffman, A.A., "Capital Accumulation in Latin America: a six country comparison for 1950-1989" (Database RIWDEC92).
 - 1950-1988, *Penn World Table 56* (Summers and Heston Database), Real GDP per capita in constant dollars using Chain index (1985 international prices in PWT5).
- Brazil* (5):
- 1870-1900, based on population estimates interpolating census data according to IBGE, *Estadísticas Históricas do Brasil*, pp. 32-33.
 - 1900- 1950, based on population series taken from Hofman, A.A., "Capital Accumulation in Latin America: a six country comparison for 1950-1989" (Database RIWDEC92).
 - 1950-1988, *Penn World Table 56* (Summers and Heston Database), Real GDP per capita in constant dollars using Chain index (1985 international prices in PWT5).
- Uruguay* (6):
- 1870-1950, Bértola, L., Calicchio, L., Camou, M. & Rivero, L.: *Estimación, periodización y comparación regional del PBI uruguayo, 1870-1936*. Programa de Historia Económica y Social, Facultad de Ciencias Sociales, Universidad de la República. Junio 1997 (first draft).
 - 1950-1988, *Penn World Table 56* (Summers and Heston Database), Real GDP per capita in constant dollars using Chain index (1985 international prices in PWT5).
- 4 advanced countries** (France, Germany, U.K., U.S.A.) (7):
- Average of these four countries real *per capita* GDP. The series is weighted, as long as, at similar growth rates, a country with over average per capita GDP has higher impact on average per capita GDP growth than an under average country. The series is not weighted by population.
- 1870-1950: Real per capita GDP series for each country obtained by splicing per capita GDP series according to Maddison, A., *L'Économie Mondiale 1820-1992. Analyse et statistiques*: OCDE 1995, to the *PWT56*, for 1950-1988.
 - 1950-1988: *Penn World Table 56* (Summers and Heston Database), Real GDP per capita in constant dollars using Chain index (1985 international prices in PWT5).

3 *Advanced countries* (France, Germany, U.K.) (8):

Average of these three countries real per capita GDP. The series is weighted, as long as, at similar growth rates, a country with over average per capita GDP has higher impact on average *per capita* GDP growth than an under average country. The series is not weighted by population.

- 1870-1950: Real per capita GDP series for each country obtained by splicing per capita GDP series according to Maddison, A., *L'Économie Mondiale 1820-1992. Analyse et statistiques*. OCDE 1995, to the *PWT56*, for 1950-1988.

(9)-(11). Real World GDP(ABU):

Real World GDP(ABU) is an estimate of world GDP as it appears viewed from each ABU country's export window. Nine countries were selected (ten in the case of Uruguay), who played an outstanding role as export markets throughout the whole period. These countries are: Argentina (not for herself), Belgium, Brazil (not for itself), France, Germany, Holland, Italy, Spain, U.K, and U.S.A.. These countries' annual growth rates are weighted according to their annual shares in each ABU country's export. As a result, different WGDG series are obtained for each ABU country. World GDP may grow at different rates for each ABU country.

Real GDP series according to Maddison, A., *L'Économie Mondiale 1820-1992. Analyse et statistiques*. OCDE 1995.

Structure of Exports:

Argentina: Vázquez Presedo, V., *Estadística Históricas*.

Brazil: IBGE, *Estadísticas Históricas do Brasil*.

Uruguay: 1870-1955, *Anuarios Estadísticos*; 1955-1988, Banco Central del Uruguay.

(12)-(14). Volume of Exports:

Argentina (12):

1880-1900, Vázquez Presedo, V., *Estadística Históricas*.

1900-1988, in Hofman, A.A., "Capital Accumulation in Latin America: a six country comparison for 1950-1989" (Database RJWDEC92).

Brazil (13):

1900-1988, in Hofman, A.A., "Capital Accumulation in Latin America: a six country comparison for 1950-1989" (Database RJWDEC92).

Uruguay (14):

1870-1913, own estimates with the cooperation of Maria Inés Moraes, based on data of *Anuarios Estadísticos*.

1913-1961, Bértola, L., *La Industria Manufacturera Uruguaya 1913-1961*, Chapter IV.

1961-1988, Banco Central del Uruguay.

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