

Chapter 3. The manufacturing industry in Brazil, Chile and Uruguay in a comparative perspective during the state-led industrialization

A very preliminary draft, please do not quote

3.1. Introduction

Following the argument developed by ECLAC that Latin American economies have inserted and developed in the world economic system keeping structural heterogeneity, while the core countries achieved substantial changes in their productive structure; this chapter investigates the productive structures of 3 countries of the region (Brazil, Chile and Uruguay) and two rich countries (United States and Sweden) between the 30s and 80s.

The aim is to provide insight to understand the structural heterogeneity in Latin American countries during the stage of state-led industrialization, and in case it has changed in what direction and which magnitude. The greatest contribution of the work is the effort to present estimates for the whole period of the state-led industrialization, including the interwar period, and not since the 70s as is more usual. In addition, industries are expected to contribute to explain the changes and the differences by country. The inclusion of two rich countries, but at the same time with different trajectories (United States and Sweden), allows us to assess the structural change in a comparative perspective.

Specifically, the analysis focuses on the variables value added, employment and productivity within the manufacturing sector and with an opening of 19 industries for these 5 countries. To this purpose, I work with economic census data sources for all countries, with the exception of Chile in which I also include yearbooks and industrial surveys. Since each country presents the information in a different way, and also, its classification changes over time, there is a first work to homogenize the same categories of industries that will be maintained throughout the period in every country. Moreover, I followed the classification purposed by Katz and Stumpo (2001) which divides the manufacturing sector in three types of industries according to the production factor used more intensively: natural resources, labour and engineering (Katz and Stumpo 2001, ECLAC 2007, Lavopa and Szirmai 2011). The first group includes food, beverages, tobacco, paper, chemicals, petroleum, rubber and plastic. The second group is composed of textiles, apparel, leather, wood, furniture, printing, non-metallic minerals, and miscellaneous. And the third group includes metals, electrical and non-electrical machinery, vehicles and transport equipment.

It is expected to find an improvement in the structural heterogeneity when observing the countries individually, however, it is difficult to think about significant advantages in the relative position to the rich countries. It is expected that the Brazilian industry has reduced its structural heterogeneity over a longer period in relation to Chile and Uruguay, and that the gap between Brazil and the United States and Sweden has been shortened.

This chapter contains two parts after the introduction. The first one is dedicated to the historical context of the countries involved in the thesis. And the second one to analyze the five countries in a comparative perspective throughout the selected period. Both subsections are the basis for what will be shown in chapter 5.

3.2. Historical context

By the end of World War I, and more intensely after the Great Depression in 1929, Latin American countries were unable to keep sustainable economic growth based on primary goods exports. The world had changed; the international trade had decreased as well as external investment.

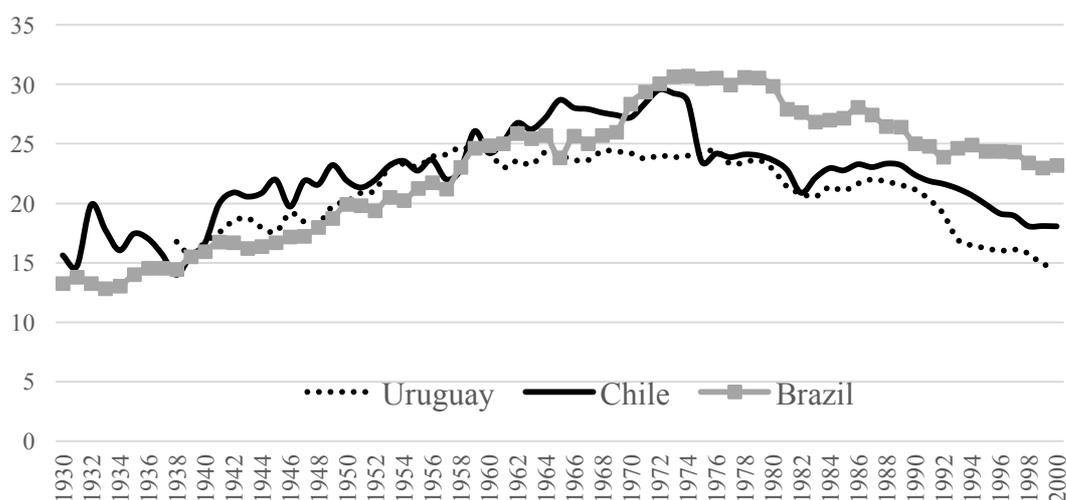
Furthermore, other political and economic ideas opposed to liberal policies had been strengthened, such as Keynesianism and its theory of state intervention. Due to this international situation and the current account deficits, Latin American governments encouraged industrialization for the domestic market using inward-looking economic policies, especially after the 1940s (Hofman 1998).

However, there is vast evidence supporting the idea that in countries such as Argentina, Uruguay, Chile, Mexico and Brazil there already existed an “early industry” before the 1930s, which was key to explain the growth of the manufacturing sector after the great depression in 1929 (Bulmer-Thomas et al 1997; Bértola and Ocampo 2012).

Industrialization and urbanization were two phenomena strongly related since the last decades of the XIX century. As more migrated to cities, the supply of workers for industry and services increased, as did the demand for consumer goods, thus providing a growing internal market for industrial production. Therefore, the three Latin American countries involved in this thesis shared similar patterns, such as developing an infant industry before 1930s, a period of industrialization from the 1930s with a great public support, and a continuous deindustrialization process after the 1980s. Notwithstanding there are also specific characteristics related to local institutions, the role of the state and policies, as well as different patterns of income distribution. This is why in the next subsections I decided to present a brief description of the historical context of each country during the period 1930-1980s.

To have an idea of how important was manufacturing in total economy for the Latin American countries, Figure 1 shows the ratio of both GDPs over the period. From the decade of the 1930s until the 1970s Latin American economies, and specially the Brazilian, were characterized by a greater role of the manufacturing sector. While in Brazil and Chile the ratio manufacturing GDP to total GDP¹ reached its highest point at the beginning of the 70s around 30%, in the first country it remained stable during ten years and started to decline in the 80s, and in Chile it dropped sharply from mid seventies. On the other side, the manufacturing industry in Uruguay reached its highest level at the end of the 50s (25% in 1959-1960) and since then it remained stable for two decades around 23%. At the end of 1970s the ratio fell down in Uruguay and showed lower levels than in Brazil and Chile.

Figure 3.1. Manufacturing GDP as a percentage of total GDP, in constant prices 1970.



Source: MOXLAD.

This dramatic change since the eighties happened in the context of the debt-crisis. A new institutional environment, and neoliberal policies were implemented in Latin American economies. The neoclassical perspective supported the idea that outward-oriented policies would improve competitiveness and productivity. However, some authors questioned these new recipes: following Thorp (1998) the limitations experienced by the state-led industrialization model could have solved with efforts in creating more capacity to generate technology, for example with national innovation systems and a

¹ This is a way of measuring industrialization.

stronger educational system. Even more important, the debt crises that ushered in the new policy era coincided with the end of economic convergence.

Some questions underlying in this thesis are: when these Latin American countries reached the highest levels of industrialization in the long run, did it happen together with a change in the productive structure? If the answer is yes, in which direction and magnitude? What happened in an international comparison? How determinant was a premature deindustrialization to impede a permanent reduction of structural heterogeneity? To which extent was reasonable to reduce structural heterogeneity in a context of such limited industrialization?

3.2.1. Brazil

In Brazil, the Great Depression of the early 1930s marks the end of the old era of reliance on coffee exports and the beginning of a new era, when great efforts were made to develop the domestic industry behind tariff walls. Even though the adverse effects of the volatile world market on prices of coffee had been felt for a long time, the catalyst of change was the great loss of world demand for Brazilian coffee in the wake of the Great Depression.

The early origins of industrialization in Brazil date from the late nineteenth and early twentieth century. Even though there are differences of interpretation and emphasis, the general judgment is that Brazilian pre-WWII industrialization was slow in coming and relied largely on foreign technology and incomes generated by exports of coffee. It seems likely that the coffee boom fueled the rise of domestic manufacturing plants when industrialization was still at its infancy (Dean 1969). Most authors point to the preponderance of consumer goods industries, above all textiles and food, and to the deficiency of capital goods industries, like the iron and steel industry and the mechanical engineering industry. The textile industry dwarfed most other industries, achieving a quarter of total output of the industrial sector in 1920. It was rivaled only by food industries, which accounted for 33% of output (Fishlow 1972: 322-323). The use of electricity also lagged behind in Brazil compared to other countries. In 1907, only 4.2% of the power used by industry was based on electricity. The role of the state to promote industrialization was focused mainly on tariffs and taxes: ad valorem tariffs applied to selected goods were around 400% in 1901. Taxes to improve harbor facilities and road, and also tariff exemptions, were very frequent in Brazil during this period (Abreu et al 1997).

Until the 1930s, when the domestic production of many capital goods began to substitute imports, Brazil was dependent on imports of a wide range of machines and

sophisticated equipment (Suzigan 1986). A corollary to the lack of experience in the production of capital goods was the decisive role played by foreign entrepreneurs in the development of more sophisticated manufacturing processes, as well as in the establishment of heavy industries like steel and cement. Whatever sign of sophistication one would come across, it almost certainly came abroad. Yet the foreign element would only exercise a significant impact on industrialization in the post-World War II decades, above all in São Paulo, once foreign entrepreneurs, this time *en masse*, were willing to make the required long-term commitments to develop manufacturing plants (Dean 1969; Colistete 2001).

Abreu et al (1997) distinguish two stages in Brazilian industrialization: between the 1930s and 1960s and from 1960s to 1980s. The first period can be considered a proper import substitution industrialization, while the second stage was characterized by a greater production of more technologically sophisticated goods.

Under the governments of Getúlio Vargas², and especially after 1937, interventionist economic policies became gradually more significant in order to speed up industrialization and structural transformations. The value added of manufacturing increased as a share of GDP from the beginning of the 20th Century, and was 16% by 1940. In addition to tariff discrimination, import controls constituted the most important industrial policy until the 1940s together with a devaluated foreign exchange rate in order to favour exports and discourage imports.

According to table 3.1 the share of value added in industries based on natural resources and labour, represented each one 44% of total manufacturing in 1939. Concerning their shares of labour in the total employment, they were 33% and 57% respectively, in 1939. Although over time these ratios dropped steadily, until the 1950s the growth of industrial production was due to the expansion of traditional goods based on some natural resources industries (food, beverages, and tobacco) and labour intensive industries (textiles, apparel, footwear and leather). Despite these industries were the most protected during the period³ (Arvin-Rad et al 1997), food, beverages and tobacco always registered relative labour productivity⁴ higher than textiles, apparel, footwear and leather. In general, the group of industries related to natural resources showed a better performance than those

² Vargas was the Brazil's President during four periods: 1930-34, 1934-37, 1937-45 and 1950-54.

³ During Vargas' government, the textile industry was highly protected with tariffs (Fishlow 1972).

⁴ Relative labour productivity is calculated dividing the labour productivity of the industry by the average labour productivity of the entire manufacturing sector.

labour intensive, explained to an extent by the inclusion of chemicals, petroleum, paper and rubber and plastic in the first group. While the labour productivity of the natural resources intensive industries was 134 and 151 in 1939 and 1949 respectively, in the labour intensive industries the ratio was 77 and 82 in each year.

On the other hand, engineering intensive industries such as metals, machinery, and transport equipment, had a share of value added and labour around 15% and 12%, respectively, until the 1940s, and a labour productivity higher than average of the total industrial sector (137 in 1939).

Between the 1940s and the early 1980s, Brazil carried out a massive state-promoted effort to modernize its economy (Baer and Kerstenetzky 1964; Suzigan and Villela 1997) and industrialize (Hofman 1998). Since the 1950s new industries related to durable-consumption goods (such as automobiles and household appliances) were supported by public subsidies and the state also participated in the generation of energy, construction and transport in order to provide infrastructure to the industrial sector (Thorp 1998). Financial intermediaries such as the National Economic Development Bank⁵ were key to financing infrastructure projects as well as the expansion of selected industrial sectors. Though protective industrial policies had moved towards multiple exchange rate, beginning in 1957 very high ad valorem import duties were established, reaching 150% in some cases.

The building of *Compañía Siderúrgica Nacional (CSN)*, a government-owned modern steel mill located in the city of Volta Redonda, was a result of the absence of private firms interested in the project, and thus the need for state intervention. Beginning in 1946 this state-owned company started to work, with its main purpose being to provide steel to the Allies of WWII. CSN impacted positively on the metal sector and on the whole economy through forward and backward linkages.

In the petrochemical sector, the state also intervened strongly supporting the petroleum and alcohol production. The government of Vargas in 1953 created Petrobras, a monopoly state company devoted to oil, natural gas and derivatives. But this sector had received special attention for two decades before. For example, in 1931 and 1933 laws were passed to promote the consumption of alcohol⁶.

⁵ This bank was founded in 1952.

⁶ The Institute of Sugar and Alcohol was created in 1933, and in 1931 a law obliged the use of alcohol in fuel production.

However, despite this strong state commitment towards industrialization from mid 1950s, the state also started to apply a policy of attracting foreign capital.

Considering this story we should expect changes in the industrial structure beginning in the late 1950s. Table 3.1 confirms this. According to the census of 1959, the share of value added in total manufacturing related to natural resources and labour dropped, whereas the engineering industries (metals, machinery and transport equipment) increased their share by 14pp (from 13 to 27%). Natural resources and engineering industries performed better than average of the industrial sector, though the first group reached a much higher relative productivity level.

Beginning in 1964, Brazil developed as a more open economy and many distortions were removed or reduced due to a policy reform. Given the international context, this new industrial strategy let Brazil go deeper into industrialization. Particularly, the period 1968-1973 was known as the “miracle years”; a great economic growth as a result of an aggressive program under a military government.

In this new stage, policies were more oriented towards the private sector. Export oriented firms, many of them multinational enterprises, were exempted from duties on the import of capital goods, which contributed to strengthening the alliance among the state, domestic capitalists and foreign capital (Alarcon and Meckinley 1992). Incentives for manufactured exports led to their expansion, especially in motor vehicles, transport equipment, metals, chemicals, shipbuilding and aircrafts.

In turn, Teitel and Thoumi (1986) found that the capital-intensive industries, such as metallurgy and metalworking, increased their volumes of exports and achieved higher efficiency and increased productivity rates. This achievement ran counter to the litany of complaints against import substitution industrialization. Instead it illustrates how the state-led policy fostered development of heavy industries, which played an important role in promoting exports. Contrary to other small Latin American countries, the large domestic market in Brazil allowed firms to reap the benefits of economies of scale, and made it profitable to produce capital goods, durable consumption goods and transport equipment.

Between the census of 1975 and 1980 the change towards engineering industries is more evident. The share of the group related to natural resources and labour represented 36 and 28% in terms of value added, respectively and 25 and 43% in terms of employment in 1975-80, whereas the engineering intensive industries had around three times their share of value added and labour of 1939, reaching approximately 36% and 33%,

respectively, in 1980. This change occurred steadily over the period 1939 and 1980. Also the labour productivity in this latter group was higher than the average.

To sum up, if we compare the distribution of value added and labour in 1939 and 1980, the share for those industries related to natural resources and labour dropped, while the share for engineering intensive industries increased dramatically (Table 3.1).

Viewed from the vantage point of the late 1970s, it would have been reasonable to argue that the achievements of the previous decades were largely the outcome of policies conducive to catching up, implemented by the Brazilian state, whether under democratic or military rule. Nonetheless, already in the late 1960s and early 1970s, some authors voiced their dissatisfaction with industrialization, arguing that protectionism and selected subsidies had brought into existence inefficient firms and high-cost industries (Hirschman 1968; Baer 1972; Bulmer-Thomas 1994). In addition, the labor markets were plagued by recurring conflicts and mounting inequalities as wages increased at a lower pace compared to labor productivity (Colistete 2007). These problems stand in contrast to such expressions as “the golden age of labor”, “compact for growth” and “wage moderation” coined to capture the prosperity and upheaval associated with the post-WWII decades in the US, Japan and Western European countries (Eichengreen 1996).

In Brazil, two camps offer conflicting views to explain the causes of the economic crisis in the 1980s and the later stagnation. The first one blames the accumulated failures of the model of state-led industrialization (Macario 1964) and the adjustment strategies adopted to deal with negative external shocks in 1973 and 1979 (Balassa 1980). Contrary to South Korea and Taiwan, Brazil did not adopt a permanent outward orientated model increasing the share of manufactured product exports in total GDP. The second camp focuses on debt growth during the 1960s and 1970s. Fishlow (1981) argues that Brazil implemented a debt-led growth model between 1967-1973: the external debt increased from 10% of total GDP to 17% in 1973 in order to support the II National Development Plan. Apart from this debate, what is evident is that the debt crisis implied a reorientation in economic policy, away from protectionism and state regulations towards pro-market policies (Baer 2008). However, in Brazil the shift in policy stance was not as abrupt and complete as we are often led to believe; although trade liberalization began in the late 1980s, it only gathered momentum in the mid-1990s⁷. The abrupt shift to divergence actually coincides with this shift to openness.

⁷ The first two tariffs reforms between 1987 and 1989 reduced the average effective tariff from 68 per cent to 39 per cent. In 1993, the tariff was down to 15 per cent (Kume, Piani and Sousa 2000).

	1939			1949			1959			1970			1975			1980		
	VA	L	LP															
Food & beverages	27.6	23.3	118.8	24.9	20.9	119.4	19.3	17.7	109.3	15.8	16.4	96.5	13.1	14.5	90.2	11.3	13.8	81.3
Tobacco	2.3	1.7	135.2	1.4	1.0	143.4	1.3	0.8	173.3	1.3	0.6	238.5	1.0	0.6	184.0	0.7	0.4	185.3
Textiles	21.8	28.6	76.3	19.6	25.8	75.9	12.0	18.7	63.9	9.3	13.0	71.8	6.1	8.7	70.2	6.4	7.7	83.4
Apparel																		
Footwear	6.5	7.8	82.6	5.6	7.5	74.7	4.6	7.0	66.4	4.0	7.2	55.1	4.3	8.9	48.6	5.3	10.2	52.0
Leather																		
Rubber & plastic	0.6	0.6	115.0	2.1	1.1	201.6	3.8	1.7	218.2	3.8	2.9	133.6	3.9	3.3	118.9	3.7	3.6	103.9
Wood	3.2	4.6	69.3	4.2	5.2	80.4	3.2	5.0	64.5	2.5	5.2	48.8	2.9	5.3	54.6	2.7	5.3	50.3
Furniture	2.1	3.5	60.3	2.2	3.0	72.7	2.2	3.6	60.6	2.1	4.0	52.4	2.0	3.6	54.7	1.8	3.6	50.3
Paper	1.5	1.5	96.2	2.2	1.9	117.8	3.0	2.3	126.9	2.6	2.5	100.7	2.5	2.2	112.4	3.0	2.2	138.6
Printing	3.5	3.9	91.5	4.0	3.8	105.4	3.0	3.5	86.6	3.7	3.7	99.7	3.7	3.3	110.2	2.6	2.9	89.9
Non metallic minerals	5.3	7.0	74.7	7.1	9.8	72.5	6.6	9.3	70.2	5.9	9.0	65.5	6.2	8.4	74.4	5.8	8.9	65.4
Chemicals	11.6	5.6	207.0	9.7	5.6	172.6	12.5	6.7	185.1	14.9	5.9	255.0	15.8	4.7	333.2	17.2	4.5	379.8
Petroleum																		
Metals & metal products	7.5	7.5	100.4	9.4	7.9	119.1	11.8	9.9	118.4	11.6	10.1	114.1	12.6	11.6	109.0	11.5	10.8	106.5
Non-electrical machinery																		
Mechanical engineering	5.4	3.1	173.5	1.6	1.2	132.6	4.0	3.3	120.7	5.4	4.4	122.8	5.8	4.6	124.4	6.4	5.0	128.4
Transport equipment																		
Miscellaneous	1.1	1.3	82.4	1.6	1.8	88.6	1.8	2.2	81.2	2.1	2.4	88.8	3.3	4.0	80.8	4.0	4.5	87.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.2.2. Chile

In Chile, the industrial activity appeared in the middle of the nineteenth century and strengthened in the 1880s due to the nitrate boom after the War of the Pacific⁸⁹. The economic prosperity driven by mining, transportation, and agriculture, together with demographic changes, increased the domestic possibilities of developing the manufacturing sector. Besides, higher national income and the expansion of an urban middle class generated a demand for a wide range of manufactured goods. Among the most important industries we identify concrete, sugar, flour-milling, brewery, textiles, paper, and wine. Protection tariffs, state production and export subsidies were instruments implemented by the State to protect the infant industries. Kirsch (1977) argues that the tariff system of 1897, despite being moderate, may be considered a milestone in the protectionism scheme. On the other hand, these domestic industries depended on foreign machinery, technology, and technicians. Europeans and Americans invested directly in manufacturing in Chile, and immigrants from these regions helped to cover the needs of employing qualified labour force.

During the first stage of globalization, world trade was the main engine of growth and Chile recorded growth rates well above the average of Latin American countries (Bértola and Ocampo 2012)¹⁰. However, the collapse of the nitrate after 1930, precipitated by the appearance of cheap synthetic nitrate, showed the fragility of an economy highly dependent on primary exports. Previous works claim that the Chilean economy was the most affected in the world during the crisis of 1929. While the index of world trade between 1929 and 1932 fell from 100 to 75, in Chile this trade index dropped from 100 to 24 in exports and to 25 in imports (Palma 1984). Besides this international context, after the 1930s the new stage of industrialization in Chile was encouraged by three domestic factors: economic groups interested in the manufacturing sector, the development of an ideology favourable to the active role of the state, and the balance among political forces (Muñoz 1986).

⁸Palma (1984) also supports the idea that the industrial sector was developed before the 1930s. His evidence shows that between 1914 and 1929 the domestic production increased whereas the imports were reduced. Besides, the industrial policies oriented the demand towards the local production.

⁹Ortega (2005) and Yáñez & Jofré (2011) argued that the industrial activity during the eighteenth Century was related to coal, which also enhanced sectoral linkages.

¹⁰Chile, together with Argentina and Uruguay, was part of the group of high-income countries in the region.

Muñoz (1971) distinguishes two different periods of industrial growth in Chile: before and after 1940. In the first period, industrial firms were led primarily by the private sector, produced non-durable goods and absorbed workers from other economic sectors. The urbanization involved the displacement of the workforce from rural workshops to the manufacturing establishments in the cities and increased the domestic consumer market (Mamalakis 1965). Geographically, specific zones in Santiago, Valparaiso, and Concepción were transformed into dynamic centers of manufacturing (Mamalakis 1976; Badía-Miró and Yáñez 2015).

After 1940, high rates of productivity growth in total manufacturing were obtained due to greater capital intensity and a reduction of labour input. During this second period, chemicals, paper, non-metallic minerals, and textiles played a key role in the industrialization process. Especially in chemicals and paper, high investment and technical progress increased productivity rates. The paper industry was one of the oldest industries in Chile, and its production capacity grew due to mechanical and chemical pulp production. Besides, the comparative advantages of the paper industry explained their performance in domestic and foreign markets in this period.

Under the government of President Pedro Aguirre Cerda (1938-41), member of the Radical Party, different mechanisms to protect manufacturing were developed. The most common instruments were tariff discrimination, import licenses, quotas, prohibitions, exchange controls, and multiple exchange rates (Pinto 1959). However, this protectionism was not homogeneous. Food, tobacco and textile were the most protected industries with a net effective protection of 100 percent. On the other hand, the rates of net effective protection in non-metallic minerals, furniture, and basic metals were between 50 and 100 percent, and chemicals and durable goods enjoyed low levels of protectionism (Muñoz 1971; Mamalakis 1976).

In 1939, the government created the Production Development Corporation (in Spanish: *Corporación de Fomento de la Producción de Chile*, henceforth CORFO). CORFO aimed at creating a strategy to promote economic growth and development in Chile, and it was financed by a tax on the copper industry. This organization encouraged private and public investment, stimulated technological research, and supported new industries in strategic fields, namely electricity, oil, and steel (Lagos 1966). Thus, CORFO intended to achieve a more diversified manufacturing structure and a faster industrial growth with less external dependence.

Regarding investment, between 1940-54 CORFO controlled more than 30 percent of total investment in machinery and equipment and 18 percent of total gross domestic investment (Mamalakis 1965). However, from a macroeconomic perspective total investment was significantly low in Chile and one of the bottlenecks of the economic development. While in the 1960s the rate of gross domestic fixed investment as a percentage of GDP was 17 percent in the Latin American countries, this ratio was 9 percent in Chile (ECLAC 1959).

A consistent policy of industrialization was followed until 1952, year in which the Radical Party was defeated. As a result of the policies implemented by the government of General Carlos Ibáñez, the economy grew but without being dynamic (Mamalakis, 1965). In the 1950s, this pattern of industrial development faced several difficulties. The literature suggests that domestic factors had a negative effect on manufacturing performance: excessive protectionism based on tariffs, weak private investment, lack of qualified workers, and inconsistency of industrial policies, insufficient foreign currency to import capital goods, inefficiency and complexity of the public administration without clear purposes (Pinto 1959; CORFO 1967; Lagos 1966; Sunkel 2011). However, other authors provide different explanations. French-Davis, Muñoz, Benavente, and Crespi (2003) explained that the major problem was not caused by the inefficiencies of protectionism, but by social inequalities, the high inflation and the orthodox plans to control it. In addition, Thorp (1998: 213) claimed that the industrialization in Chile failed mainly because of political problems.

Moreover, inflation worsened in the 1950s. One of the explanations supported by the policy makers of that moment laid on increasing fiscal and current account deficits, increased by the end of the Korean War, which led to the highest inflation in the economic history of the country (an annual inflation rate of 84 percent in 1955) (French-Davis et al, 2003). Due to this fact, the government hired the American consulting firm Klein-Saks to design and implement an anti-inflationary program. The main conclusions of the Klein-Saks mission were that Chile should reduce its fiscal deficit, eliminate the system of multiple exchange rates, the subsidies, the price controls and the automatic adjustment of salaries in the public and private sector. The government followed Klein-Saks stabilization policies and managed to control inflation in 1960¹¹; however, industrial production declined and the unemployment rate increased due to the recessive impact of

¹¹ The inflation rate dropped from 30 percent in 1959 to 7 percent in 1960 (Central Bank of Chile).

such policies. One year later, broad political and social opposition induced government to cancel these liberal reforms (Frank 1972).

Despite the progress and set backs in industrial production, towards the end of 1950s it is possible to observe some changes in the output and labour distribution. The structure of value added and employment in 1939 was 60% concentrated on natural resources, 34% in labour intensive industries, and only 8% in engineering industries (Table 3.2). However, this structure changed steadily over the period till 1989. In the census of 1957 the shares of value added were 43% in the first group, 36% in the second group, and 21% in the last group. If we take employment instead of value added, the ratios are higher for the first and second group (31% and 51%, respectively in 1957) and lower for the third group (19% of total employment). Related to labour productivity, tobacco and petroleum increased exorbitantly over the period, while between 1939 and 1957 food and beverages, paper, chemicals, metals and electrical machinery performed better than the average. On the other side, apparel, footwear, wood and furniture were the industries with the lowest relative labour productivity levels. This is reflected in relative labour productivity ratios above the average of total manufacturing in the natural resources and engineering industries and a ratio below the average for labour intensive industries.

Between 1958 and 1964, under the liberal government of Alessandri, economic development in Chile was led by a sustained industrial growth. The National Mining Company (Enami), the National Telecommunications Company (Entel) and the Port Company of Chile (Emporchi) were created in this period. Nevertheless, during the tenure of the Christian Democrats (1965-70), with Frei as president, industrial growth slowed down (Mamalakis 1976). The economic policies aimed to liberalize markets and encouraged the private sector; despite that, partial progress was made in the removal of large estates and in industrialization policies to stimulate telecommunications and petrochemical industry. Meanwhile, political and ideological conflicts arose, weakening the institutional environment, and during his government Frei was accused of being too reformist for the right and too conservative for the left.

In 1968, CORFO claimed that due to its small domestic market Chile should increase manufacturing exports, reduce protectionism and monopolies, and liberalize the economy. Contrary to these ideas, in 1970 the Popular Unity¹² (in Spanish: *Unidad Popular*) won the elections with its candidate Salvador Allende, and it reestablished and

¹² A left-wing political alliance.

deepened the reforms based on state intervention, agrarian reform, nationalization and industrialization, in a highly polarized political context (French-Davis et al 2003). As Figure 3.1 depicts, between 1970 and 1973, the average share of manufacturing in total value added reached its highest point (25 percent).

This accelerated industrial growth was together with changes in the structure. In 1979 the share of value added and employment of engineering industries reached 29% and 22%, respectively. Both ratios remained still below those related to natural resources intensive industries. Tobacco and petroleum showed an excessively high level of labour productivity related to the average, thus, affecting positively the result in this group.

The greatest drops in terms of shares of value added and employment are recorded in textiles and footwear, whereas food and beverages remains over the period as the industries with the highest shares. Related to labour productivity, textiles and footwear presented a level lower than the average and showed a decreasing trend over the period.

One of the most remarkable changes is the increase of paper in terms of value added (from 2% in 1957 to 4% in 1979) and its labour productivity much higher than the average, and the diminishing share of non-metallic minerals between 1957 and 1979. The favourable performance of paper contributed to explain, together with chemicals and petroleum, the high relative labour of its group. And related to engineering intensive industries, we see that in 1967 there was a particular increase in terms of value added and employment explained by metals, machinery and transport equipment. However, between 1967 and 1979 the shares dropped. Concerning labour productivity, metals and electrical machinery are those industries which pushed labour productivity up.

The pattern of development oriented to the domestic market and led by the manufacturing sector ended in 1973. The democracy was disrupted by a military dictatorship and Chile followed the neo-liberal recipes suggested by the international financial institutions, such as privatization of state enterprises, trade liberalization, and exchange rate deregulation. This economic policy dismantled the national manufacturing sector, and favoured the exporters of natural resources. Not before the late eighties did the new model implemented achieved to boost economic growth again (French Davis et al, 2003). Although the surviving firms were more productive than those which disappeared, the death rate of enterprises was even higher due to import liberalization and overvaluation. Both commercial and exchange-rate strategies drastically modified relative prices and led to a higher accumulation in the export sectors related to natural resources: mining and agriculture.

	1939			1947			1957			1967			1979			1989		
	VA	L	LP	VA	L	LP												
Food & beverages	27.5	24.7	111.3	23.5	20.3	115.9	22.6	19.9	113.6	21.3	20.5	104.3	23.2	25.8	90.1	21.2	29.3	72.3
Tobacco	7.0	1.6	438.4	5.6	0.9	619.9	5.4	0.6	934.0	2.6	0.4	719.0	3.7	0.3	1,181.8	2.9	0.2	1,498.7
Textiles	16.4	16.7	98.5	18.8	18.4	102.1	13.2	17.7	74.9	10.2	13.5	75.4	5.4	11.4	47.1	4.1	9.0	46.2
Apparel	1.8	3.7	48.7	3.0	4.1	72.4	4.3	7.4	58.5	2.9	5.0	58.7	2.8	6.3	45.0	2.0	6.2	32.2
Footwear	4.0	7.3	54.9	3.6	6.3	56.9	3.4	6.1	56.1	1.8	3.8	46.2	1.7	3.0	55.9	1.4	3.6	37.9
Leather Rubber & plastic	4.4	3.8	115.5	3.1	4.4	70.8	2.5	2.5	99.4	4.0	4.0	101.4	3.8	4.8	79.2	3.0	5.3	56.1
Wood	5.7	7.6	74.6	5.0	8.3	60.5	3.1	5.5	57.6	2.9	9.3	31.6	3.7	7.7	48.0	3.3	7.1	46.0
Furniture							1.6	2.3	69.1	1.0	2.3	44.9	0.8	2.1	38.8	0.7	1.9	36.2
Paper	8.0	8.6	92.9	6.2	6.3	98.1	1.9	1.6	116.5	2.1	1.4	150.0	4.4	2.2	205.0	6.3	2.7	235.6
Printing							3.7	3.8	97.0	2.7	3.2	86.1	4.0	3.9	103.8	2.5	3.2	77.8
Non metallic minerals	4.9	8.3	59.6	7.4	8.5	87.1	5.2	5.9	87.9	3.2	4.3	75.1	3.6	3.9	90.3	3.0	3.9	76.6
Chemicals	11.2	5.7	197.5	11.7	7.4	159.1	7.8	5.7	138.0	7.4	5.1	145.7	9.5	5.3	178.4	8.9	6.2	143.0
Petroleum							3.2	0.5	589.9	1.8	0.7	274.7	4.2	0.8	535.8	6.1	0.8	756.7
Metal & metal products							14.9	11.4	130.9	21.2	11.8	179.9	20.8	12.6	165.2	29.5	11.7	251.7
Non electrical machinery	8.0	11.5	70.2	11.7	14.9	78.5	1.7	2.4	71.0	4.4	4.7	91.9	2.2	3.2	68.1	2.0	4.4	44.3
Mechanical engineering							1.7	1.5	110.5	3.2	2.4	137.9	2.2	2.4	93.8	1.5	1.3	117.1
Transport equipment							2.3	3.3	70.6	6.4	6.7	95.3	3.4	3.4	99.8	1.5	2.5	59.4
Miscellaneous	1.0	0.5	193.0	0.4	0.2	197.4	1.2	1.7	72.1	0.6	1.1	58.6	0.5	0.9	55.7	0.2	0.7	33.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.2.3. Uruguay

Before the 1930s, the infant industry in Uruguay was based mainly on cheap inputs and simple technology, together with state protectionism through commercial tariffs. The changes in the structure of external demand and its impact on domestic production, as well as migration and urbanization, and advantages of localization for different industries contributed to favour the domestic market (Bértola 2000).

The first protectionist laws were approved in the last decades of the 19th century, although the general characteristics of the model oriented to the export of agrarian products remained unchanged. The first law which increased tariffs was passed in 1875, and in 1886 and 1888 tariffs were raised again (Jacob 1981). The law of 1888 included, for the first time, the participation of the industrialists on the commission in charge of determining tariffs, which constituted a recognition for the sector. In the 1890s several norms modified the law of 1888, to generate benefits to some sectors, for example, alcoholic beverages and cigars. These partial modifications created an extremely complex system of general and specific rights. The specific benefits to some manufacturing firms and the exceptions as a whole did not form a coherent industrial protection policy, but rather a very peculiar system. However, the new law on the imports of raw materials approved in 1912 in Battle's second presidency can be thought of as the first coherently protectionist law.

Between the 1930s and mid-fifties, this model strengthened domestic production oriented towards the local market, which was sustained by an increase in domestic demand, by the expansion of the State and the rise of worker's income. In addition, imports of consumer goods were replaced and imports of industrial inputs became cheaper.

The State had a greater presence in the economic sphere, in the provision of goods and services, in the creation of public jobs and in its role of regulating policies (multiple exchange rates, control of the foreign exchange market, tariff restrictions to certain imports) to favour the national industrial sector. This protection to industry through subsidies, preferential exchange rates, and tax exemptions, was characterized by non-selectivity and non-conditioning of certain levels of productivity (Bértola 1991, Bertino et al. 2001).

Through the regime of multiple exchange rates, the national industry was ensured raw materials and capital goods at low cost, and also protected itself from international competition via more expensive imports due to high exchange rates (Macadar 1988).

All these policies favoured non-durable consumer goods industries such as food, beverages and textiles. Given the high participation of these sectors in the overall industry (50% in terms of value added in 1936) they contributed significantly to explain total manufacturing growth. Particularly, the textile sector's growth was also attributed to both the incorporation of textile-wool production and access to international markets for its placement (Camou and Maubrigades 2006). However, the performance of this sector was conditioned to the restructuring of the agricultural sector to provide the necessary inputs for its production.

According to the census of 1936 the shares of value added and employment of those industries related to natural resources were 53% and 45%, respectively. Food and beverages recorded a relative productivity level 10% higher than the average of the entire manufacturing. On the other side, rubber and plastic had in 1936 a share of value added and employment of 1% and a low relative labour productivity, since then it performed better than the average over the period and increased their share of value added and employment up to 5% each one. In paper its participation in terms of value added and labour is also low (around 2-3%) with a relative labour productivity close to the average. A noteworthy change was observed in chemicals: its share of value added and employment doubled during the period (up to 9 and 6% respectively), and its relative labour productivity was 50% higher than the average. For the whole group of industries, relative labour productivity was always above the average and increased during the period explained mainly by tobacco, chemicals and petroleum.

The group of labour intensive industries showed a stable share of value added and employment between 1939 and 1968: around 35% in value added and 45% in employment. Moreover, their labour productivity declined steadily from 85 in 1939 onwards. By industries, wood and furniture contributed with a share of total value added and employment around 1-3% over the period. However, their labour productivity position was higher in 1939 (108 and 63%, respectively) and dropped since 1939 onwards. In printing its participation in terms of value added and labour was 3-4%, and non-metallic minerals recorded a share of value added and employment around 4-5% for the whole period.

Concerning those engineering intensive industries, their shares of value added and employment increased slightly between 1939 and 1968, and since 1978 remained stable. The share of metals fell from 1936 onwards and its performance remained always below the average. Non- electrical and electrical machinery more than doubled their share of

value added and employment, starting in 1936 with values less than 1%. However, they performed close and better than the average in 1936 with a declining trend since this date onwards. Transport equipment recorded a stable share of value added around 5% and a decreasing trend of its labour share from 6 to 4%, with a low relative labour productivity. Moreover, an important change was the introduction of oil refining in 1937 through a state company (ANCAP) whose production is included since the census of 1968.

All these changes described occurred in a context of a greater industrialization, it means that manufacturing GDP was higher related to total GDP (Figure 3.1). This is why it was considered the proper industrialization period in the country. This economic model was hand in hand with social and political changes such as the expansion of a welfare state based on rising wages and reducing income inequality, as well as a process of democratization and development of the educational system. In addition, the implementation of the Wage Councils in 1943 contributed to the improvement of the real wages and, with this, a sustained and growing demand for locally produced consumer goods (Bértola 2000).

Part of this period was framed in a favourable international context of high external demand for raw materials and food, with a consequent positive impact on the terms of trade which translated into more foreign currency. In the face of changes in the global context, once the Korean War ended in 1955, the terms of trade became unfavourable, and the income derived from exports fell. These short-term factors, together with others of an institutional and structural nature, are part of the explanations of economic and productive stagnation beginning in the mid-fifties (Bértola 1991, Bertino et al. 2001).

Between 1955 and 1961 the manufacturing industry stagnated, slowing the expansionary boom of previous years, and then during 1968-1973 it grew at a very slow pace. At the macro level, the economic situation experienced by the country since the mid-fifties was characterized by economic stagnation and high inflation, which continued in the following decade.

Despite this stagnation, the economic census of 1968 evidenced some movements of the industrial structure. The most remarkable change was a higher drop of share of value added and employment particularly from food and beverages (42% in 1939 to 24% in 1968). In the case of tobacco, while the share of value added remained stable the share of labour dropped during the period which led to a higher increase of labour productivity. The textile sector increased its participation, concentrating around 15% of total value added and employment together with an improvement in its productivity position in 1968,

but with the exception of this year, its level remained below the average. Since 1968 apparel, leather and footwear, represents around 5% of total value added each one; and in terms of labour the share varies from 10 to 6 and 4%, respectively. Related to labour productivity, for the first two industries, they dropped dramatically since 1968 and recorded one of the worst performance in the whole sector, although footwear improved in 1988. Whereas rubber and plastic had in 1939 a share of value added and employment of 1% and a low relative labour productivity, since then it performed better than the average over the period and increased their share of value added and employment up to 5%. Concerning those engineering intensive industries, their share of value added and employment was 15% and 19% respectively in 1968, with a higher participation of transport equipment and a relative labour productivity below the average.

The year 1973 was the beginning of a prolonged dictatorial period, in which the National Development Plan (1973-1977) was put into practice, which aimed to boost the economy; not so the living conditions of workers whose real wages were severely affected. As Notaro (1984) pointed out, the Plan sought to develop a model of "restructuring interventionism", increasing traditional and non-traditional exports with participation of foreign capital, higher exchange rates in real terms, lower wages and thus getting the country out of economic stagnation.

Among the instruments used by the de facto government to boost the economy were the law of investment promotion, reduction of restrictions on imports, promotion of new export items through the policies of subsidies and reimbursements, among others (Bértola and Bittencourt 2005).

For its part, the signing of trade agreements with Argentina in 1974 (Argentine Uruguayan Agreement on Economic Cooperation-*CAUCE* in Spanish) and with Brazil in 1975 (Protocol of Commercial Expansion-*PEC* in Spanish), gave privileged access to traditional Uruguayan exports and non-traditional to these markets (Finch 2005).

The implementation of these policies between 1974-1978 ended up having an exit from the economic stagnation, being the manufacturing industry one of the main responsible for it. However, Macadar (1982) noted that there was no directed industrial policy, and this sector grew according to the impulses in the external and internal demand. Particularly, in the case of non-traditional products (dairy products, rice, barley, citric fruit, oil, textile, chemicals) external demand played a key role to promote its production, and it led also to a favourable diversification of the basket of exportable products (Macadar 1982).

However, the industrial structure of 1978 did not differ significantly from 1968. In the case of food and beverage, and textiles, there was a greater drop of their share of value added, and petroleum increased its share from 2% in 1968 to 15% in 1978 (but not its share of employment). In terms of relative labour productivity, it improved in engineering intensive industries while it worsened more deeply in those industries related to labour.

Starting in 1978, there was a shift in economic policy towards an accelerated process of financial opening in the country, discouraging industrial production through the reduction of tariff protection and the elimination of export promotion; and this was combined with the redirection of foreign capital to the financial and construction sectors, which resulted, to a high degree, in speculation (Macadar 1992). This was accompanied by the establishment of an exchange rate regime of periodic mini-devaluations ("tablita") to control inflation, since the priority of the government became price stability over economic growth. However, this regime led to a currency overvaluation, a significant increase in imports, a loss of export competitiveness and an increase in the trade balance deficit. All of this, along with the increase in interest rates in the United States, generated capital outflows, high speculation and the economic crisis that would lead to the lost decade. The economic recession affected all economic sectors, especially construction and manufacturing industry.

After 1982, economic policy began to deepen trade liberalization and increase intervention to support financial capital (Notaro 1984). Between 1985 and 1987, the manufacturing industry showed a strong growth based on reducing installed idle capacity, serving a larger domestic market, taking advantage of the improvement in international prices and the increased demand of the neighbours. However, the industrial sectors that managed to grow in these years (mainly the export-oriented sectors which were not limited by installed capacity) retreated in the following biennium.

Beginning in the nineties, the influence of the Washington Consensus was evident in Uruguay. An important productive transformation was consolidated based on a greater participation of the service sector, largely explained by the deepening of financial and commercial openness. The latter was mainly regional, which was enshrined in the signing of the Treaty of Asunción in 1991 between Uruguay, Paraguay, Argentine and Brazil and the creation of the Common Market of the South (*MERCOSUR* in Spanish). This process was accompanied by stabilization of inflation based on the exchange rate anchor, which generated an appreciation of the Uruguayan currency against the dollar and loss of competitiveness via price.

	VA	L	LP	VA	L	LP	VA	L	LP	VA	L	LP
Food & beverages	42.2	37.0	114.0	27.35	23.35	117.13	23.4	27.7	84.4	28.10	31.13	90.25
Tobacco	3.8	1.7	225.7	5.45	0.53	1,030.73	4.0	0.4	1,060.5	3.72	0.36	1,035.59
Textiles	7.9	10.7	73.8	15.89	14.42	110.20	9.3	11.8	78.8	9.87	12.15	81.25
Apparel	7.2	6.6	109.0	4.99	10.74	46.43	4.5	9.7	46.1	3.91	9.18	42.62
Footwear	5.4	6.7	80.0	4.1	5.7	71.5	5.0	9.6	52.3	4.8	6.0	80.1
Leather												
Rubber & plastic	0.8	1.2	60.8	4.90	3.85	127.05	5.0	4.4	114.3	4.53	4.39	103.16
Wood	1.7	1.6	107.6	1.34	2.66	50.49	1.2	2.5	49.0	0.68	1.60	42.54
Furniture	2.1	3.4	62.6	0.94	2.56	36.59	0.7	1.6	41.0	0.65	1.77	36.67
Paper	1.4	1.4	96.6	1.47	1.45	101.59	1.6	1.9	84.2	2.65	2.24	118.52
Printing	4.0	4.4	90.4	2.50	3.41	73.47	2.6	3.0	85.4	2.62	4.30	60.98
Non metallic minerals	5.0	5.5	90.6	5.28	4.87	108.54	3.9	4.7	82.8	3.59	4.56	78.70
Chemicals	4.6	3.2	143.2	7.51	4.61	163.07	8.0	5.2	153.3	9.33	5.58	167.18
Petroleum				2.41	2.17	111.28	15.5	1.1	1,458.6	10.78	1.49	725.94
Metals & metal products	6.6	7.7	85.8	4.48	5.40	83.11	4.8	6.3	76.0	4.32	5.61	77.04
Non-electrical machinery	0.7	0.6	132.8	1.23	1.48	83.38	1.8	1.9	96.9	0.99	1.61	61.08
Mechanical engineering	0.9	0.9	97.7	3.44	3.82	89.98	3.3	3.4	98.9	2.92	3.12	93.55
Transport equipment	4.9	6.2	79.5	5.59	7.80	71.70	4.6	3.5	132.8	6.02	3.65	164.77
Miscellaneous	0.8	1.1	69.5	1.13	1.18	95.25	0.8	1.3	57.8	0.54	1.28	41.91
Total	100.0	100.0	100.0	100.00	100.00	100.00	100	100	100	100.00	100.00	100.00

3.2.5. Sweden

The early industrialization in Sweden grew swiftly thanks mostly to increased foreign demand for timber in the third quarter of the nineteenth century. In addition, the application of the steam engine made it possible to locate the saw mills closer to the coast as the generation of motive power no longer required running water. This early industrialisation also gained from expansions of textile production and steel and iron production. Though overall this early industrialisation was never sufficiently powerful to bring about productivity convergence in manufacturing with the UK and the US (Prado and Sato 2019). There was a large backlog of productivity to catch up on relative to these two forerunners: the US/Sweden productivity ratio was about 240 and the UK/Sweden ratio was 170. In GDP per capita terms the distance was equally wide (Edvinsson 2013). It would require an intensification of the industrialization process to make it the engine propelling economy-wide progress forward so fast the distance to the leader diminished.

In the fourth quarter of the nineteenth century, an era which economic historians often coin the Second Industrial Revolution (Landes 1969), industrialization in Sweden gathered speed. The composition of output and industries moved upwards along the value-added chain, exemplified by the output expansion and exports of pulp and paper, accompanying the exports of timber which continued apace. At the heart of this acceleration and reallocation of industrialisation lay the ironware and foundry industry and the mechanical engineering. The ironware and foundry industry delivered iron and steel products, either in the quite crude form of manufacturing plates, rails, tubes, wires and nails, or further processed into various machine-made products. The mechanical engineering developed in close proximity to the iron and steel production, and this development is a stellar example of how processing, and adding of, additional value to the raw materials and semi-finished goods, such as tack pig iron and bar iron, vitalized industrialization. Mechanical engineering had roots back in the 1830s, grew steadily in the latter half of the nineteenth century, and blossomed in the 1890s into being an industry highly competitive in the world market and yet able to supply the domestic market until World War I with an almost infinite variety of manufacturing machines, some of which were based on Swedish inventions.

Electricity is at the heart of swift transition. Schön argues that electricity was the new technology on which a new development block was created in the 1890s. Few countries could match the pace at which the Swedish manufacturing industry adopted electricity as a source of motive power in production processes. In 1912, about half of the installed

horsepower came from electric motors, whereas the US and Germany had a corresponding share of about 20 percent. This spurt in the use electricity stemmed from the country's abundant supply of suitable sites for harnessing energy from water.

Parallel to the rise of electricity and development of the mechanical engineering industry, the electromechanical industry grew vigorously in importance, accompanied by successive improvements in productivity and an unending flow of product innovations. It would become one of the most important export industries in the twentieth century. The movement of prices makes it easier to appreciate the attractiveness of this new prime mover. However, the prices of electric motors plummeted in the two decades preceding the First World War. It is most probable that dramatic price declines were commonplace because the Swedish company ASEA met stiff competition in the world market for electric motors, in particular from German firms.

The heyday of the Swedish manufacturing industry occurred in the 1950s and 1960s. The peak in manufacturing's share of employment occurred in the mid-1960s. Labour productivity in Swedish manufacturing outpaced that of the US in the 1960s, and the US to Sweden labour productivity ratio dropped from 200 to 150 (Prado and Sato 2018). The foundation for that boom was laid in the previous growth of manufacturing since the fourth quarter of the nineteenth century, and the growing demand for consumer goods and capital goods from the war ravage countries of Western Europe in the 1950s. We need to keep in mind that Sweden in the 1950s had a level of labour productivity in manufacturing equal that of the UK (Prado and Sato 2018). In a sense, the Swedish growth regime of this era conforms well to the expression "golden years" used to capture the experiences of Western Europe and North America. The demand for labour was so high that imports of labour from Finland above all but also from former Yugoslavia and Southern Europe was deemed necessary (Lundh and Ohlsson 1994). The mechanical engineering industry was again the foremost engine driving output and productivity levels forward. In particular, the part of mechanical engineering producing transport equipment put its mark on this development. Two car manufactures, Volvo and Saab, grew swiftly as the frequent use of private cars spread across Sweden. They were also early users of the assembly line, which spread across much of the mechanical engineering industry in post-World War II period. The assembly line would transform work places as much as the use of small electric motors reshaped the design of factories in the first quarter of the twentieth century.

International competition grew as technological improvements in shipping lowered transportation costs. At the same time, successive efforts to lower tariff levels made many industries subjected to international competition. Some of these tariffs dated back to the last quarter of the nineteenth century, whereas others had been erected, or reinforced, in the 1930s (Bohlin 2005). For consumer goods, like textile, shoes and clothing, this competitive environment was completely new. In Sweden, the clothing and shoes industries sprang up only after the introduction of tariffs in the 1890s. It is fair to say that these industries did not fare well without protection as consumer goods industries developed quickly in Southern Europe, and workers there earned a fraction of Swedish workers. These consumer goods industries became the first victims of the dawning globalisation. The next Swedish victims were the ship yards. They had grown vigorously in the 1950s and 1960s and had by the 1970s set their deep marks in the city ports of Gothenburg, Malmö and Uddevalla. The Swedish ship building industry was specialised in the building of large oil tankers. Stiff competition from ship yards in Japan lowered profitability, and the oil crises of the early 1970s inflicted heavy losses to these ship yards. Attempts were made to save them through a public holding company, Svenska Varv, but the fate of the ship yards was sealed, and they disappeared in the 1980s (Bohlin 2014).

Robert Gordon (2016) argued the technologies of the Second Industrial Revolution continued to push economic development also in the post-World War II era. No major new innovations can explain the rapid growth of productivity that most developed countries enjoyed in the 1950s and 1960s. Instead it was the spread and refinement of the macro innovations of the early twentieth centuries, in particular electricity and the combustion engine, that explain the golden years. When the potential of these innovations to serve as a lever of productivity became exhausted, many countries' productivity growth rates decelerated significantly. This appears to be an apt characterisation of the Swedish economy. From the vantage point of the present, the forces propelling the economy forward appear to have petered out in the 1970s, even though successive governments attempted to circumvent the problems through general and industry-specific subsidisations (Bohlin 2014). As in most of the countries pioneering industrializations in nineteenth century, economy-wide productivity growth rates decelerated in the 1970s and 1980s, as did growth rates of the manufacturing industry. Yet, the Swedish rate continued to outpace that of the US and the UK, two other countries that suffered structural crises during the 1970s. Convergence with the US was a *fait accompli* in the 1980s.

The historical context described above is consistent with the changes observed in the economic census of 1926, 1952, 1975 and 1985 for Sweden (table 3.4).

At the beginning of the analysed period in 1926, the manufacturing structure was divided in equal parts among the three big groups in terms of value added and employment. However, this picture changed in 1952: the industries related to natural resources and labour intensive industries shrank dramatically (around 26%) and engineering intensive industries increased their share up to 47% (mainly explained by metals, non-electrical machinery and transport equipment). After that, the trend is towards strengthening the role of engineering intensive industries in detriment of labour intensive industries: in 1975 the first one had almost doubled its share of value added in 1926 and the second one lost 15 pps.

As for the industries based on natural resources, food and beverages concentrated around 10% of total value added and labour with a relative productivity level above the average; and rubber and plastic increased their modest shares (from 1 to 2 and 3%) with a poorer relative position in terms of productivity (from 106 in 1926 to 81 in 1985). Paper was also important in this group, and although their participation was decreasing over time, its relative labour productivity was much higher than the average of total manufacturing (with higher levels in 1952 and 1975 of 151%, and 128% in 1985). In chemicals, the share of value added and employment more than doubled between 1952 and 1985, reaching 8 and 6% respectively at the end of the period. Natural resources intensive industries showed a performance better than the average of the entire manufacturing over the period, explained by all the industries included in the group (excepted from rubber and plastic) and mainly by tobacco, petroleum, paper and chemicals.

Concerning the labour intensive group, the greatest loss in terms of value added and labour was recorded in textiles, apparel, footwear and leather. And in terms of labour productivity their performance also worsened during the period, reaching one of the lowest relative levels (45 and 67% in 1985). Whereas furniture and non-metallic minerals recorded a drop in terms of value added and employment between 1952 and 1985; printing remained stable (with a share of 5%), and wood grew their shares around 50% for the same period. Relative labour productivity of this group is always around 20% below the average of total manufacturing, and with the exception of printing and non-metallic minerals in some years, all the industries performed worse than the average.

Finally, in the engineering intensive industries since 1952 we see that electrical machinery, transport equipment and chemicals increased strongly their share in total value added and employment. The shares of valued added and employment rose from 9 and 6% in 1952 to 15 and 9% in 1985 for transport equipment and electrical machinery, respectively. On the other side, metals remained stable and non-electrical machinery fell its contribution to the total of value added and employment. In turn, the performance of this group remained close to the average.

Despite the structural change evidenced in Sweden during 1926 and 1985, in the early 1990s, the country was struck by a severe economic downturn. Although the real state and bank sector was hardest hit, still the total loss of employment in manufacturing was manifest: from 1989 to 1993 employment declined by 20 percent (Krantz and Schön 2007).

The growth in labour productivity started already as the economic crises of the early 1990s unfolded. To some extent, the crises itself was the catalyst for acceleration in productivity. Hordes of unprofitable firms went out of business and those that remained raised the average level of productivity. A similar productivity boost occurred in the US during the great depression (Field 2003). However, the most important factor behind the surge in productivity was information and communication technologies (ICT) because a similar productivity spurt is identifiable also in countries that unlike Sweden did not plunge into a severe crisis in the early 1990s. Japan also had deep economic crisis in the early 1990s, but did not share in the productivity upswing centred on ICT.

The foundation on which the ICT-revolution rested did not appear out of nothing; instead the roots of those technologies begin in the late 1960s. In fact, the Swedish industrial statistics allow us to trace the beginning of the ICT revolution through the information by commodity they provide. From the late 1960s, one can trace the emergence of computers under the heading “office machines”. The technologies were not ripe to reap the benefits. It took a while for firms to figure out how to reap the benefits of this new technology. In addition, the use of networks required complementary investments in infrastructure. There are reasons to believe that Sweden were among the forerunners in the development and application of ICT technologies. Van Ark and Smits (2007) note that the penetration of ICT investments was as high in Sweden as in the US in 2004, putting Sweden at the very top of the usage of ICT in industry and services. Thus, the legacy of the structural change during the golden years led Swedish economy to recover and find new strategic sectors to continue improving productivity.

	1926			1952			1975			1985		
	VA	L	LP	VA	L	LP	VA	L	LP	VA	L	LP
	Food & beverages	14.8	10.8	136.8	8.6	8.0	108.5	9.6	7.6	125.6	9.6	8.7
Tobacco	3.0	0.7	406.7	0.4	0.2	163.4	0.3	0.2	189.2	0.4	0.2	242.5
Textiles	7.6	10.1	75.6	4.9	7.2	68.1	2.1	2.8	76.1	1.5	2.1	72.8
Apparel	3.1	3.6	85.3	3.8	5.9	64.8	1.5	2.6	56.1	0.6	1.4	45.4
Footwear	3.3	3.9	84.2	2.0	2.8	69.7	0.5	0.7	65.5	0.3	0.4	66.8
Leather												
Rubber & plastic	1.1	1.0	106.1	1.6	1.5	107.3	2.3	2.8	83.0	2.3	2.8	81.0
Wood	6.8	10.4	64.7	3.2	4.0	80.6	5.9	6.5	90.3	4.7	5.8	81.9
Furniture	3.0	4.0	74.3	3.1	4.4	69.7	1.4	1.8	79.3	1.2	1.5	75.4
Paper	13.8	10.0	137.9	10.4	6.9	151.6	9.9	6.5	152.0	9.1	7.1	127.7
Printing	5.2	3.4	152.4	4.8	4.6	103.4	5.0	4.7	106.0	6.2	5.5	111.9
Non metallic minerals	6.2	9.8	62.7	4.8	5.2	92.7	3.5	3.6	97.0	2.9	2.8	102.1
Chemicals	3.7	2.6	143.2	4.8	3.5	138.5	5.6	4.3	131.4	7.9	5.6	142.1
Petroleum	0.0	0.0	0.0	0.5	0.3	172.2	0.7	0.3	229.6	2.1	0.4	492.2
Metals and metal products	8.0	9.6	83.6	14.1	14.0	101.2	15.7	17.1	91.7	14.6	15.5	93.8
Non-electrical machinery	1.5	1.7	92.6	17.1	16.3	105.2	13.1	14.4	91.0	13.0	13.8	94.5
Mechanical engineering	16.4	15.5	106.1	6.7	6.2	107.9	8.5	8.8	96.4	8.7	9.4	93.0
Transport equipment	2.6	2.8	91.4	9.1	9.1	100.4	14.0	14.6	95.8	14.5	16.5	88.1
Miscellaneous							0.5	0.7	73.1	0.4	0.5	67.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.2.6. United States (incomplete)

In United States, the main changes evidenced between 1939 and 1987 are a higher participation of engineering industries together with a less important role of labour intensive industries and a stable participation of natural resources industries.

The share of value added and employment of those industries related to natural resources remained over the period around 30% and 22%. The labour productivity of this group always remained above the average of total manufacturing. Food, beverages and tobacco reduced slightly their participation in total value added (from 15 in 1939 to 12% in 1987) together with a stable share of labour around 10%, therefore their labour productivity increased also during the period and remained above the average. On the other side, rubber and plastic doubled their contribution in value added and employment from 2 to 4% with a stable performance close to the average over the period. And paper contributed to total value added and employment with a percentage around 4%, and a relative labour productivity slightly higher than the average. In the case of chemicals and petroleum, their shares of value added and employment remained stable (around 10% and 2.5% of total value added, and 5% and 1% of total employment), and both performed very well during the period.

In the group of industries classified as labour intensive, their share of value added and employment was 34% and 46% at the beginning of the period and both dropped steadily towards the 1980s. In 1987 the shares were 28% and 36%, respectively. And its labour productivity was always below the average: 80 in 1939, 75 in 1967 and 71 in 1987. Textiles, apparel, footwear and leather declined strongly their participation in value added and employment (from 15% and 26% to 5% in 1939 and 11% in 1987), and their labour productivity was half the average, which contributed to explain the low level of the group. On the other side, wood, furniture, and non-metallic minerals contributed to total value added and employment with a percentage around 2-4%, whereas printing did it with a higher value around 5 and 8%. Related to labour productivity, wood and furniture recorded one of the worst performance in the whole sector, around 60-70% of the average, while non-metallic minerals behaved similar to the average over the period. Moreover, printing's labour productivity was 40% above the average at the beginning, though it decreased from 1939 onwards and reached a level of 92% in 1987.

Concerning those engineering intensive industries, their share of value added and employment increases during the period: from 35 and 33% in 1939 to 41 and 42% in

1987. The relative labour productivity of this group was close to the average. The share of metals in terms of value added and employment fell between 1939 and 1987 from 15% to 10% and its performance remained close to the average. On the other hand, non-electrical machinery contributed with a stable 10% of total value added and employment, whereas electrical machinery and transport equipment started with shares around 4-7% at the end of the period they climbed up to 10%. In general, labour productivity in metals, electrical and non-electrical machinery and transport equipment remained very close to the average; however, metals worsened at the end of the period (85% in 1987) and transport equipment improved (115% since 1977).

	1939			1947			1957			1967			1977			1987		
	VA	L	LP															
Food & beverages	14.4	10.4	138.3	12.3	10.2	120.1	11.2	10.3	108.8	10.4	9.1	113.9	9.6	8.2	116.7	10.4	8.2	127.6
Tobacco	1.4	1.0	135.8	0.9	0.8	110.1	0.9	0.5	159.1	0.8	0.4	191.2	0.7	0.3	224.8	1.2	0.3	481.8
Textiles	7.4	12.9	57.1	7.2	8.6	83.1	3.5	6.0	59.0	3.2	5.1	61.9	2.8	4.7	58.2	2.2	3.8	58.0
Apparel	5.6	9.0	62.4	6.0	7.6	79.0	4.1	7.7	53.9	3.9	7.5	52.3	3.4	7.2	46.7	2.8	6.1	45.7
Footwear	2.4	4.0	59.8	2.1	2.7	77.0	1.3	2.2	58.7	1.0	1.8	56.3	0.6	1.3	48.4	0.4	0.7	51.6
Leather																		
Rubber & plastic	1.6	1.6	104.5	1.7	1.8	96.9	1.7	1.6	106.4	2.7	2.9	92.8	3.4	3.9	86.6	3.8	4.7	81.2
Wood	2.5	4.3	57.9	3.4	4.5	75.5	2.2	3.9	57.1	1.9	3.1	63.3	2.8	3.7	74.2	2.5	3.9	62.4
Furniture	2.5	3.6	70.2	1.8	2.2	82.0	1.7	2.3	75.3	1.6	2.3	69.2	1.5	2.5	60.8	1.7	2.9	60.4
Paper	3.5	3.3	106.3	3.9	3.2	123.5	3.9	3.4	114.2	3.8	3.5	107.7	3.8	3.4	111.5	4.3	3.4	125.6
Printing	7.2	5.1	140.3	5.7	5.0	114.3	5.4	5.3	102.6	5.6	5.7	98.3	5.5	5.9	92.7	7.7	8.4	91.7
Non metallic minerals	3.7	3.6	103.1	3.1	3.2	96.0	3.4	3.2	106.4	3.3	3.3	99.7	3.3	3.3	98.6	2.9	3.0	96.8
Chemicals	7.6	3.9	195.8	7.1	4.4	163.4	8.5	4.6	183.7	9.2	4.6	197.6	9.7	4.8	203.9	10.4	4.6	225.5
Petroleum	2.7	1.4	195.0	2.7	1.5	184.2	2.2	1.1	196.3	2.1	0.8	269.6	2.8	0.8	352.5	1.6	0.7	242.6
Metals & metal products	15.3	15.1	101.3	14.3	14.9	96.2	15.6	14.5	107.7	14.8	14.5	102.3	14.2	14.4	98.5	10.4	12.2	85.2
Non-electrical machinery	8.0	7.0	113.5	10.5	10.8	97.1	10.9	10.4	105.2	10.9	10.3	105.3	11.5	11.3	102.1	10.1	10.4	97.4
Mechanical engineering	4.1	3.5	114.5	5.2	5.6	93.3	6.6	6.6	99.7	9.6	10.4	92.2	8.6	9.3	92.5	8.2	8.8	93.1
Transport equipment	7.3	7.1	101.8	7.9	8.2	95.7	12.6	11.6	109.3	11.0	10.1	108.4	11.0	9.5	115.1	11.8	10.3	114.7
Miscellaneous	2.8	3.1	91.7	4.3	4.9	87.2	4.2	4.9	86.9	4.3	4.5	95.2	5.0	5.4	92.0	7.6	7.7	99.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.3. The structure of the manufacturing sector in a comparative perspective

The purpose of this section is to characterize the structure of the manufacturing sector and its relationship with heterogeneity in Brazil, Chile and Uruguay compared internationally during the state-led industrialization since its beginning in 1930s. Remember that chapter 5 will study in depth structural change using a shift-share analysis and structural convergence using time series of labour productivity at industry level.

Following the structuralist perspective, heterogeneity has characterised the Latin American economies and has been determinant to explain their peripheral condition (Prebisch 1948, Pinto 1970). Conversely to the neoclassical theory which predict convergence, the empirical evidence suggests that if economies are left to its own devices, the peripheral condition will prevail and the trend will be divergence. Empirical works that show it from heterodox theories are vastly documented for Latin America since the 1970s (Cimoli et al 2005). Following previous works, I focus on the manufacturing sector and employ the coefficient of variation¹³ of labour productivity in order to measure heterogeneity in the Latin American countries compared to US and Sweden for the period 1930-1980.

Despite no single pattern of industrial transformation can be taken as a universal reference, there are general trends in the evolution of certain sectors in the productive structure that give hints to how to achieve sustained development. Moreover, different theoretical perspectives may help to understand this change. The Schumpeterian view recognizes that technical progress is the main driver of growth, which is in turn, inherent to structural change. Technical progress implies the creation of new sectors and processes that redefine the productive structure, making it more diversified, dense and complex. Two indicators let us measure structural change associated with technical progress: the Krugman Index (KI) and the Index of Relative Participation (RP). The KI is calculated as the sum of the differences (in absolute terms) between the participation of each industry in the total industrial value added of a country and the participation of the same industry in the industrial value added of another country taken as reference (US in this case). If it is = 0, then they have the same structure, and on the contrary when the IK is increasing it implies structural divergence. RP is the relationship between the share of the engineering sectors (as a proxy of the share of technology-intensive industries) in the value added of total manufacturing of a certain country and that same participation in the reference

¹³ It is calculated dividing the standard deviation of labour productivity by the average of labour productivity.

country (US). It is assumed to be a proxy of the technological intensity of the industrial sector. Both indexes are complementary (Cimoli et al 2005, CEPAL 2007).

Table 3.6 shows that over the period Brazil was the country with the lowest heterogeneity compared to Chile and Uruguay and remained close to the reference country (US) though always with a higher CV. On the other side, in Chile and Uruguay the heterogeneity was lower at the beginning of the period (circa 1939) and then it increased more sharply reaching 4 and 3 more times the levels of the US. Contrary to the Latin American results, in Sweden heterogeneity went down and it was even lower than the US. These results are consistent with the historical context: Brazil achieved to reduce productivity differentials until the 1970s while Chile and Uruguay were unable to discourage structural heterogeneity.

Table 3.6. Coefficient of variation of labour productivity in the manufacturing sector, 1930s-1980s

CV	circa 1939	circa 1949	circa 1959	circa 1970	circa 1980	circa 1989
Brazil	0.4	0.3	0.4	0.5	0.7	
Chile	0.8	1.1	1.4	1.1	1.6	1.8
Uruguay	0.4			1.6	1.8	1.5
US	0.4	0.3	0.4	0.5	0.7	0.8
Sweden			0.3		0.4	0.8
Relative CV	circa 1939	circa 1949	circa 1959	circa 1970	circa 1980	circa 1989
Brazil/US	1.0	1.2	1.1	1.0	1.1	
Chile/US	2.2	3.9	3.6	2.2	2.4	2.2
Uruguay/US	1.0			3.1	2.8	1.9
Sweden/US			0.8		0.6	1.0

Source: Economic census for Brazil, Uruguay, United States and Sweden. Census, yearbooks and industrial surveys for Chile.

In order to explore more about heterogeneity, table 3.7 shows the labour productivity of each industry compared to the average of total manufacturing separately for each country and for selected three years. Regardless the country, tobacco, chemicals and petroleum are the industries with a higher relative labour productivity over the period. In turn, other industries such as rubber and plastic in Brazil and Uruguay, paper in Brazil, Chile, US and Sweden, and transport equipment in Brazil and US showed a better performance in selected years.

Relative labour productivity compared to the average of total manufacturing sector

	Brazil					Chile					Uruguay					United States					Sweden				
	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa	circa
	1940	1960	1980	1940	1980	1940	1960	1980	1940	1980	1960	1980	1940	1960	1980	1940	1960	1980	1940	1960	1980	1940	1960	1980	
Food & beverages	118.8	109.3	81.3	111.3	113.6	113.6	113.6	90.1	114.0	117.1	84.4	84.4	138.3	108.8	116.7	136.8	108.5	125.6	136.8	108.5	125.6	136.8	108.5	125.6	
Tobacco	135.2	173.3	185.3	438.4	934.0	934.0	1,181.8	225.7	1,030.7	1,060.5	1,060.5	1,060.5	135.8	159.1	224.8	406.7	163.4	189.2	406.7	163.4	189.2	406.7	163.4	189.2	
Textiles	76.3	63.9	83.4	98.5	74.9	74.9	47.1	73.8	110.2	78.8	78.8	78.8	57.1	59.0	58.2	75.6	68.1	76.1	75.6	68.1	76.1	75.6	68.1	76.1	
Apparel				48.7	58.5	58.5	45.0	109.0	46.4	46.1	46.1	46.1	62.4	53.9	46.7	85.3	64.8	56.1	85.3	64.8	56.1	85.3	64.8	56.1	
Footwear	82.6	66.4	52.0	54.9	56.1	56.1	55.9	80.0	71.5	52.3	52.3	52.3	59.8	58.7	48.4	84.2	69.7	65.5	84.2	69.7	65.5	84.2	69.7	65.5	
Leather																									
Rubber & plastic	115.0	218.2	103.9		115.5	99.4	79.2	60.8	127.1	114.3	114.3	114.3	104.5	106.4	86.6	106.1	107.3	83.0	106.1	107.3	83.0	106.1	107.3	83.0	
Wood	69.3	64.5	50.3	74.6	57.6	48.0	107.6	50.5	50.5	49.0	49.0	49.0	57.9	57.1	74.2	64.7	80.6	90.3	64.7	80.6	90.3	64.7	80.6	90.3	
Furniture	60.3	60.6	50.3		69.1	38.8	62.6	36.6	36.6	41.0	41.0	41.0	70.2	75.3	60.8	74.3	69.7	79.3	74.3	69.7	79.3	74.3	69.7	79.3	
Paper	96.2	126.9	138.6	92.9	116.5	205.0	96.6	101.6	101.6	84.2	84.2	84.2	106.3	114.2	111.5	137.9	151.6	152.0	137.9	151.6	152.0	137.9	151.6	152.0	
Printing	91.5	86.6	89.9		97.0	103.8	90.4	73.5	73.5	85.4	85.4	85.4	140.3	102.6	92.7	152.4	103.4	106.0	152.4	103.4	106.0	152.4	103.4	106.0	
Non metallic minerals	74.7	70.2	65.4	59.6	87.9	90.3	90.6	108.5	108.5	82.8	82.8	82.8	103.1	106.4	98.6	62.7	92.7	97.0	62.7	92.7	97.0	62.7	92.7	97.0	
Chemicals	207.0	185.1	379.8	197.5	138.0	178.4	143.2	163.1	163.1	153.3	153.3	153.3	195.8	183.7	203.9	143.2	138.5	131.4	143.2	138.5	131.4	143.2	138.5	131.4	
Petroleum					589.9	535.8	111.3	1,458.6	195.0	196.3	352.5	352.5				-	172.2	229.6	-	172.2	229.6	-	172.2	229.6	
Metals & metal products	100.4	118.4	106.5		130.9	165.2	85.8	83.1	76.0	101.3	107.7	98.5	83.6	101.2	91.7	83.6	101.2	91.7	83.6	101.2	91.7	83.6	101.2	91.7	
Non-electrical machinery				97.2	92.7	92.7	70.2	83.4	83.4	96.9	113.5	105.2	102.1	105.2	102.1	92.6	105.2	91.0	92.6	105.2	91.0	92.6	105.2	91.0	
Mechanical engineering	173.5	120.7	128.4		110.5	93.8	97.7	90.0	98.9	114.5	99.7	92.5	106.1	107.9	96.4	106.1	107.9	96.4	106.1	107.9	96.4	106.1	107.9	96.4	
Transport equipment				162.6	132.2	70.6	99.8	79.5	71.7	132.8	115.1	91.4	100.4	95.8	73.1	100.4	95.8	73.1	100.4	95.8	73.1	100.4	95.8	73.1	
Miscellaneous	82.4	81.2	87.6	193.0	72.1	55.7	69.5	95.2	57.8	91.7	86.9	92.0	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	73.1	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

On the other side, textiles, apparel, footwear and leather, and wood and furniture recorded the lowest relative labour productivity over the period and for almost every country. Therefore, at first glance, the relative level productivities by industries do not show great differences comparing the Latin American countries with the rich countries. However, in table 3.8 I calculate the labour productivity ratio between the most productive and the less productive industry of each country, and the sectors of higher productivity in US show levels three times the average until 1960 and seven times the average in 1980, a difference much lower than that registered in Chile and Uruguay. As it was mentioned, tobacco and petroleum are two industries with higher levels of productivity related to the average, and particularly in Chile and Uruguay, they are the main responsables of such large gap compared to the less productive industries. Both industries are very capital intensive and do not require a great number of workers.

Meanwhile, the ratio between the most productive and the less productive industry in Brazil is very similar to the American ratio, and both are higher than the ratio in Sweden from 1960 onwards. The Swedish transformation since the 1960s led to successful results in terms of reducing productivity differentials, even more than others industrialized countries.

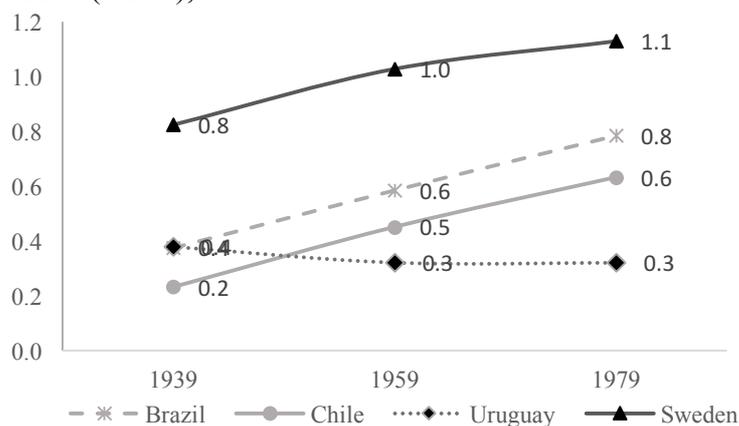
Table 3.8.
Ratio between the most productive and the less productive industry, by country

	c.1940	c.1960	c. 1980
Brazil	3.4	3.6	7.6
Chile	9.0	16.6	30.4
Uruguay	3.7	28.2	35.6
United States	3.4	3.4	7.6
Sweden	6.5	2.7	4.1

Source: Economic census for Brazil, Uruguay, United States and Sweden. Census, yearbooks and industrial surveys for Chile.

Figure 3.2 shows how evolved the participation of the engineering sectors in the total manufacturing value added related to the United States for three different years. Brazil, Chile and Sweden could reduce the gap with the US; whereas Uruguay lagged behind over the period. In 1979 Brazil achieved an index of 0.8, which is a result of the changes in the composition of the productive structure mentioned in the historical context, but since the 1980s it started to lose ground slightly compared to the US (CEPAL 2007). Concerning Chile, although it also introduced changes, there were less significant than in Brazil and the technological intensity related to US declined strongly since mid 1970s (CEPAL 2007). On the other side, Sweden showed an increasing trend and at the end of the period surpassed the American level.

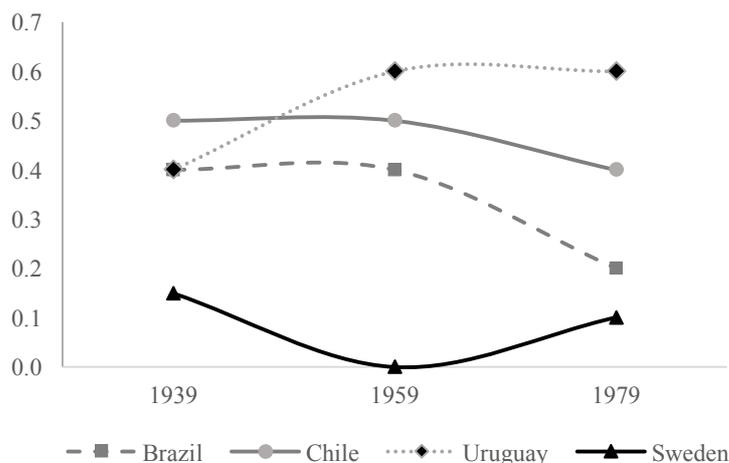
Figure 3.2
Relative participation index of the engineering sectors in the total manufacturing value added (US=1), c. 1940 1960 and 1980



Source: Economic census for Brazil, Uruguay, United States and Sweden. Census, yearbooks and industrial surveys for Chile.

During the state-led industrialization, the Uruguayan economy showed an increasing disparity from the American industrial structure. Conversely, in Brazil, and much more modestly in Chile, there was a convergence of industrial structures between the 1930s and 1980s (Figure 3.3). However, this trend for Brazil and Chile is strongly reversed since the 1980s. In both countries the structural divergence coincides with the deindustrialization stage. Meanwhile, in Sweden the share of the different sectors in total manufacturing value added tended to differentiate less that of the reference country during the selected period.

Figure 3.3
Krugman Index, circa 1940, 1960 and 1980.



Source: Economic census for Brazil, Uruguay, United States and Sweden. Census, yearbooks and industrial surveys for Chile.

3.4. Conclusions

In this chapter I presented estimates for the whole period of the state-led industrialization, including the interwar period, in order to understand the structural change and heterogeneity in Latin American countries in a comparative perspective.

The expansion of manufacturing industry from the nineteenth century, and specially from the 1930s until the late 1970s, was an exceptional stage in the Latin American countries, which is not repeated again in their economic history. However, the rate of industrialization was different in Brazil and Chile compared to Uruguay. While in Brazil and Chile the ratio of manufacturing GDP over total GDP grew steadily until the 1970s and 1980s reaching the level of 30%, in Uruguay since the 1950s it remained stable in a level close to 25%.

The more premature deindustrialization in Uruguay goes hand in hand with its inability to achieve a change in the productive structure. The historical context and the evidence showed in this chapter support the idea that this country could not change substantially the composition of value added and employment in the manufacturing sector over the period. Natural resources intensive industries and labour intensive industries always kept a privileged place, reinforced by state protectionism, which impeded to reduce structural heterogeneity.

Otherwise, primarily Brazil and moderately Chile, introduced profound changes, and despite distortions and inefficiencies, the results were a more diversified and technologically complex industrial structure. Towards the late 1960s, in both countries the share of value added and employment of engineering intensive industries were around 35 and 25%, respectively. However, in terms of structural heterogeneity measured by the coefficient of variation, the Brazilian industrial sector showed a better performance than the Chilean.

Since the debt crisis in the 1980s there was a reversal of industrial and sectoral performance in these Latin American countries; other economic sectors were privileged during the trade liberalization and privatization.

In a comparative perspective, during the state-led industrialization, following different indicators the Uruguayan industrial sector showed an increasing disparity. Conversely, in Brazil, and much more modestly in Chile, there was a convergence of industrial structures towards the American over the period. However, this trend for Brazil and Chile is strongly reversed since the 1980s. In both countries the structural divergence coincides with the deindustrialization stage. Liberalization policies implemented since the 1980s, but at different pace in Brazil and Chile, contribute to understand the relationship between this two phenomena.

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