Brazil as an export economy, 1880-1930*

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1. Introduction

Conventionally, the year of 1930 is taken as a watershed in Brazilian history. It marked the fall of the political regime of the Old Republic and the transition from an export-led economy to a long period of growth led by import substitution. A closer look at the evidence makes this transition far less clear-cut. Coffee's contribution to the generation of foreign exchange earnings remained crucial until the 1960s when import substitution had reached maturity. On the other hand, domestic industrial production had become relevant as a share of domestic supply already in the turn of the century. While attention here will be concentrated on the export economy in the 1880-1930 period, the links between the export economy and import substitution should be kept in mind. Table 1.1 shows the gradual replacement of agriculture by industry in the Brazilian GDP. While there is no information for the pre-1910 period, it is known that industrial activity was rather limited before the 1870s and the first important industrial investment boom was in the early 1890s.

Table 1.1
Brazil: GDP Shares (%)*, 1910-1993

Year	Agriculture	Industry	Services
1910	35.8	14.0	50.2
1920	31.9	17.1	50.9
1930	30.6	16.5	52.9
1940	25.0	20.8	54.2
1950	24.3	24.1	51.6
1960	17.8	32.2	50.0

* GDP at factor prices, including financial intermediation.
Services include government.
Sources: 1910-1947: Haddad (1978), sectoral data aggregated using 1947 weights; 1947-1980: Brazil (1990).

It is also important to keep in mind that after independence Brazil preserved its integrity as a country of continental size, with an area of about 3.3 million square miles.

The Brazilian economy has been often described as a number of islands, with its main regions having closer links with markets abroad than with those of other regions. Coffee culture has been mainly limited to the Southeast, migrating from the mid-19th century from the neighborhood of Rio de Janeiro along the Paraiba valley in the direction of São Paulo, then spreading in the Paulista plateau. Minas Gerais became an important producer from the turn of this century. Sugar cane agriculture and cotton production were concentrated in the Northeast until the 1930s. Rubber was produced in the Amazon region. The South, with weak links with the core coffee economy, traditionally exported hides, skins and jerked beef, and later on timber and matte.

To put the economic integration issue in perspective, it is important to take the geography of the country into account. The distance from Rio to Recife is 1,125 miles and to Belém, in the mouth of the Amazon River, is 2,280 miles. Manaus is a further 924 miles upriver from Belém. Rio Grande, the main harbor in Rio Grande do Sul, is 875 miles from Rio. Transportation costs other than by ship were extremely high before the introduction of railways, as rivers generally flow in the North-South direction and the Brazilian plateau rises abruptly to 3,000 feet roughly 50 miles from the coastline in most of the Southeast.

The country was very sparsely populated. In 1872 population was 10.1 million, barely 3 inhabitants per square mile (see Table 1.2). There are indications that the 1920 census data seriously overcounted Brazil’s actual population at the time. But there is a clear picture of high and accelerating population growth, especially after the 1940s, as a result of a rapid fall in mortality rates and the persistently high birth rates.

In this paper, attention will center mainly on coffee due to its dominant role in the Brazilian economy and to the persistent high share of Brazilian exports in the world market, which allowed Brazil to try to exploit its market power. The paper is divided into five sections besides this introduction. The next section focuses on the core export economy, from the 1880s to 1930, as well as on the commodity exports outside the core in the same period: rubber, sugar and cotton. The third section analyses the implications of the position of Brazil as the main world supplier of coffee, particularly the links between domestic policy and world coffee prices. Section 4 considers the linkages of coffee agriculture with other sectors, especially infrastructure and industry. Section 5, on the export economy between 1930 and 1960, is included as a coda. But this is an important coda, due to the role of coffee policy in the Brazilian recovery from the depression and the continued importance of commodity exports in foreign exchange earnings, even if the economy became increasingly closed. In spite of the erosion of its dominant past position, in 1960 Brazilian coffee exports still corresponded to almost 37% of world exports. The final section concludes the paper.

Table 1.2
Brazil: Population data, 1872-1960

	Population in million in census date	Population yearly growth rates between censuses	Share of population in cities of more than 50,000 inhabitants*
1872	10.1	--	5.9
1890	14.3	2.5	6.8
1900	17.3	2.2	9.4
1920	30.6	3.8	10.7
1940	41.2	1.7	12.6
1950	51.9	2.6	16.3
1960	70.1	3.7	22.9

*Data not strictly comparable as up to 1920 rural population in cities of more than 50,000 inhabitants was also included.
Source: Lopes (1968), pp. 13-16.

2. The export economy, 1880-1930

Coffee became the leading Brazilian export commodity very early in the 19th century. By the early 1830s, it already accounted for nearly 30% of total exports. From the 1850s it reached almost 50% of total exports, on average, and remained in the 50-65% range until the early 1960s. Its share fell slightly in the 1860s due to the United States

War of Secession and more significantly in the 1940s, as the Second World War closed most Brazilian coffee markets outside the United States (see Table 2.1).

The Brazilian share of world coffee production, which was already in excess of 50% in the 1850s, fell slightly in the 1870s, but then, as competitors in Asia were hit by plant disease and price support schemes were introduced, it increased to reach more than 60% in every year from 1896 to 1942 (more than 70% in almost half of these years and more than 80% in 1906). It fell from the early 1940s on, but it was still around 47% in the 1950s. The long-term evolution of coffee prices is shown in Figure 2.1. Figure 2.2 shows the terms of trade between coffee prices and import prices. As Brazilian series of import prices are not very reliable, export prices for the United States and the United Kingdom were used as proxies. Export quantities increased modestly until 1880 -- at 0.9% yearly -- then very rapidly until 1900 --at 5.5% yearly -- slowing down to 1.7% in 1900-1930. By the end of the 1920s capacity to import (due to coffee exports) had increased more than 4-fold in relation to 1851 at roughly 1.8% yearly.[1]

The share of Brazil in the world market was lower than the share in production as Brazilian coffees tended to command lower prices and 78 million bags, corresponding to three years of world consumption, were destroyed under coffee support programs, mainly in the 1930s. The share of Brazilian coffee exports in total world exports was nearly 40% in the 1850s, rose to more than 50% in the 1860s, receded to 40% in the 1870s, and then increased to reach almost 75% at the turn of the century and more than 80% in 1911. It then fell, but remained above 50% until 1929. With the depression it fell further to reach a through of under 30% in 1938-39 and then rose again to almost 50% until the early 1950s. In 1960 it was still above one third of the market.

Brazilian coffee exports increased with the dissemination of world coffee consumption. Growth was very rapid in the early 19th century: 4-fold by volume in the 1820s, 2-fold in the 1830s, and 1.7 times in the 1840s. Then there was stagnation in the 1850s, further increase in the 1860s (by 70%), and stagnation in the 1870s. Growth was resumed in the 1880s (30%) and spectacularly in the 1890s, as export quantum increased 170%. From 1821-25 to 1901-05 the volume of coffee exports increased at 5.2% a year. From 1851-55, when production was already well established, to 1901-05 it increased at an yearly rate of 3.2%. In the late 1860s the US market was already absorbing some 50% of the Brazilian coffee output. This share was the same in the early 1900s and in the late 1920s. The British share of Brazilian total exports fell sharply due to the insignificant British coffee imports. Before World War I Britain had been overtaken by Germany as a market for Brazilian exports and this share had been reduced to 13%.[2]

The domestic consumption of coffee was relatively unimportant if compared to production.[3] This makes the ratio between coffee exports and GDP a reasonable indication of the direct weight of coffee in economic activity. However, there are no reliable series on GDP and GDP deflators for the period before 1908. From the available data it seems that the coffee exports-GDP ratio was around 9% in 1850, reached more than 10% in 1900 and 1913. In the last "normal" pre-depression year of 1928 this ratio was slightly above 9%, but it fell with the collapse of coffee prices and the reduction of the importance of exports as a share of GDP, reaching 4.8% in 1939 and 4.3% in 1947. In 1960 it was 2%.[4]

While coffee production corresponded to the core of the Brazilian export economy for the first 140 years of its independence, other commodities such as sugar, cotton and rubber, were also important in specific periods of Brazilian history. The decline of sugar exports was steady from the 1820s, as the sugar economy in the Northeast became increasingly less efficient in spite of a spurt of modernization in the 1880s.[5] Sugar production in the Southeast became important only after 1914, but Brazilian exports never played an important role again.

The share of cotton exports in total exports also declined, but less smoothly as the trend was reversed in several periods. In the 1860s, cotton exports peaked to reach nearly 30% of exports in 1864-65 during the "cotton famine". More than 80% of the exports were from the Northeast and the Northern provinces.[6] In the second half of the 1930s, due to the side effects of US cotton price support programs and the rise of the German compensation trade, they peaked again at more than 20% of total exports in 1939. There was a sharp growth in cotton production in São Paulo: 97% of the cotton exports were embarked in Northeastern ports in 1928, 81% in Santos in 1939. Cotton exports also rose, but more modestly, in the second half of the 1940s, due to the postwar cotton demand boom and the export of British-controlled stocks accumulated during the war, only to fall again from the early 1950s.[7]

Exports of native rubber from the Amazon region became relevant in the 1890s, peaked in 1910 at nearly 40% of total Brazilian exports, and fell precipitously as exports of Southeast Asian plantation rubber started to rise.[8] By 1919, rubber exports were under 5% of total exports. As in the case of coffee, Brazilian output was a high proportion of world output: not less than 50-60% in the period between 1895 and 1911.[9] Figure 2.3 shows the evolution of rubber prices from 1887 to 1917.

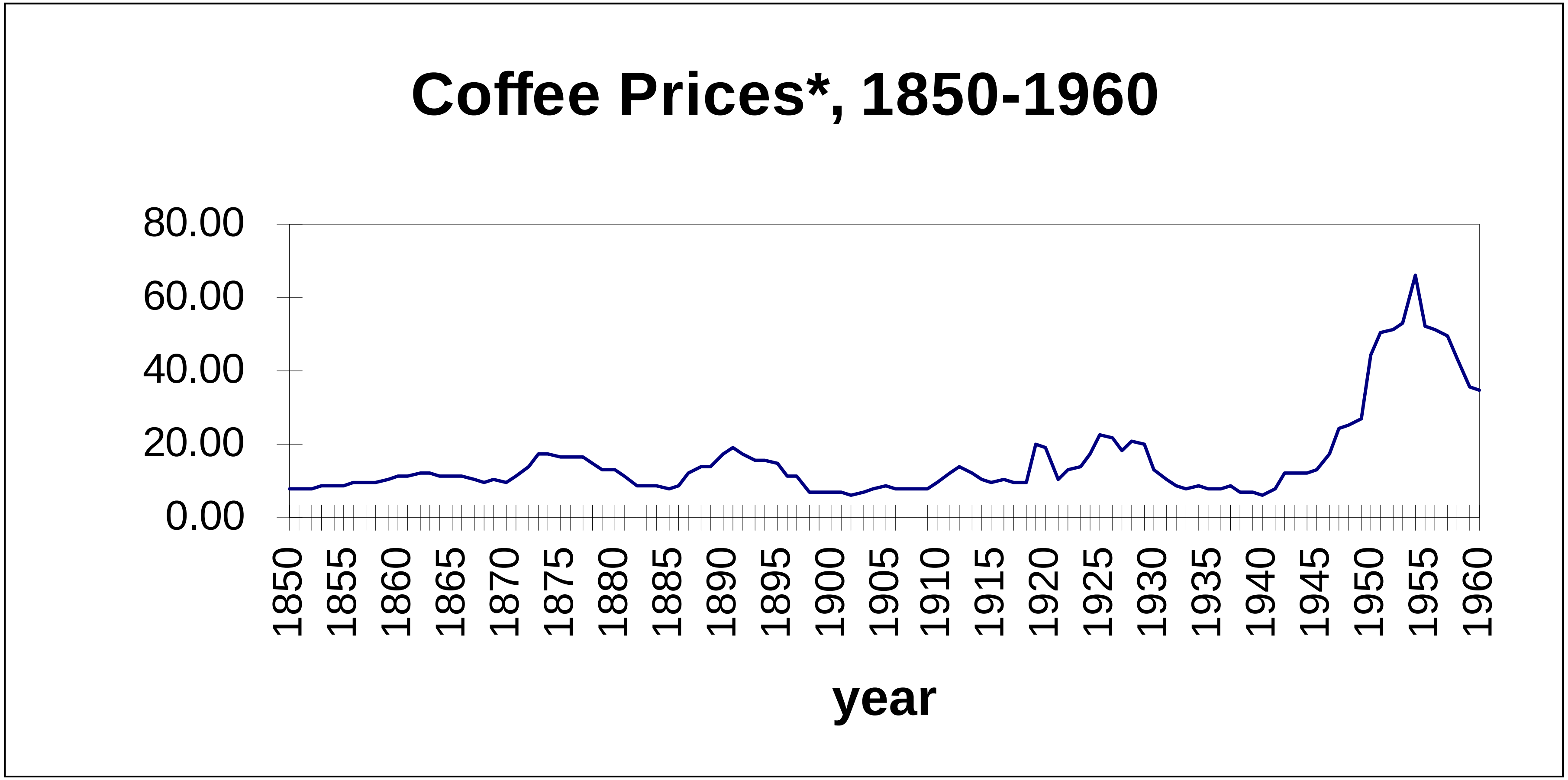
Rubber exports were an important source of foreign exchange earnings, especially in the golden decade before the First World War, and their expansion played an important role in the success of the 1898 stabilization program which led to exchange rate appreciation and the adoption of the gold standard. The rubber economy was based on the extraction of native rubber with extremely limited pre-export processing. The boom attracted surplus manpower from other parts of the country, especially from the declining Northeast.[10] Its abrupt end resulted in a sharp contraction of economic activity in the region as it returned to subsistence activities.

Table 2.1
Brazil: commodity export shares, 1850-59 to 1950-1959*

	Coffee	Sugar	Cotton	Rubber	Total
1850-59	48.7	21.3	6.3	2.2	78.6
1860-69	45.9	12.3	17.7	3.1	79.0
1870-79	56.3	11.8	9.7	5.5	83.3
1880-89	60.5	10.6	4.4	7.6	83.1
1890-99	65.4	6.1	2.5	14.2	88.2
1900-09	53.1	1.5	2.3	25.6	82.6
1910-19	52.1	2.4	1.7	16.4	72.6
1920-29	67.2	2.3	2.7	2.7	75.0
1930-39	56.3	0.5	11.1	1.0	68.9
1940-49	36.3	0.8	11.6	1.6	50.3
1950-59	57.9	2.4	7.0	0.2	67.4

*10 year-average of yearly shares. 1850-51 to 1887-88: fiscal years.
Source: Computed from Anuário Estatístico do Brasil, several years and Brasil em Números, several years.

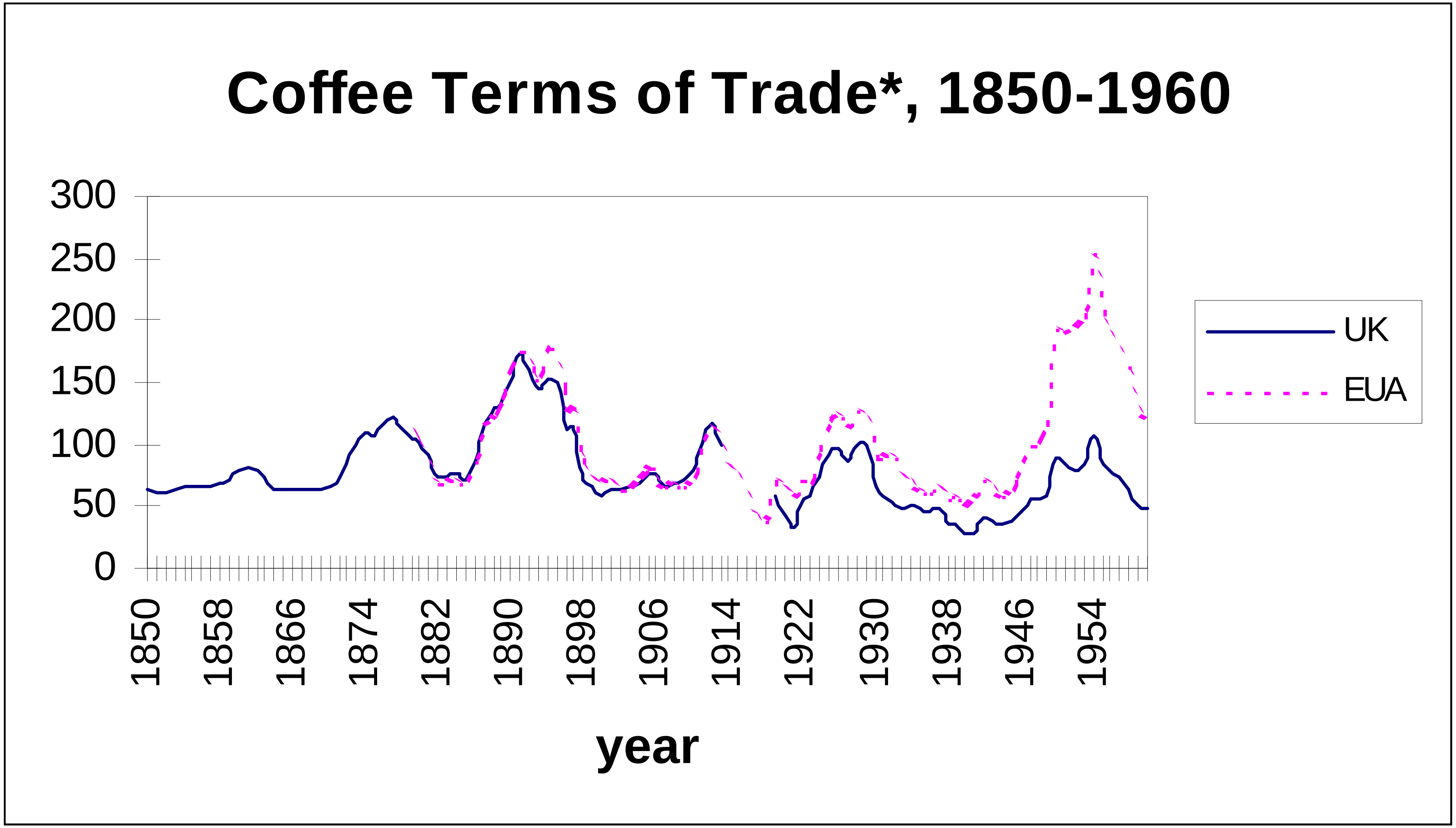
Figure 2.1



*** U.S. cents per pound, calendar years**

Source: USA (1975)

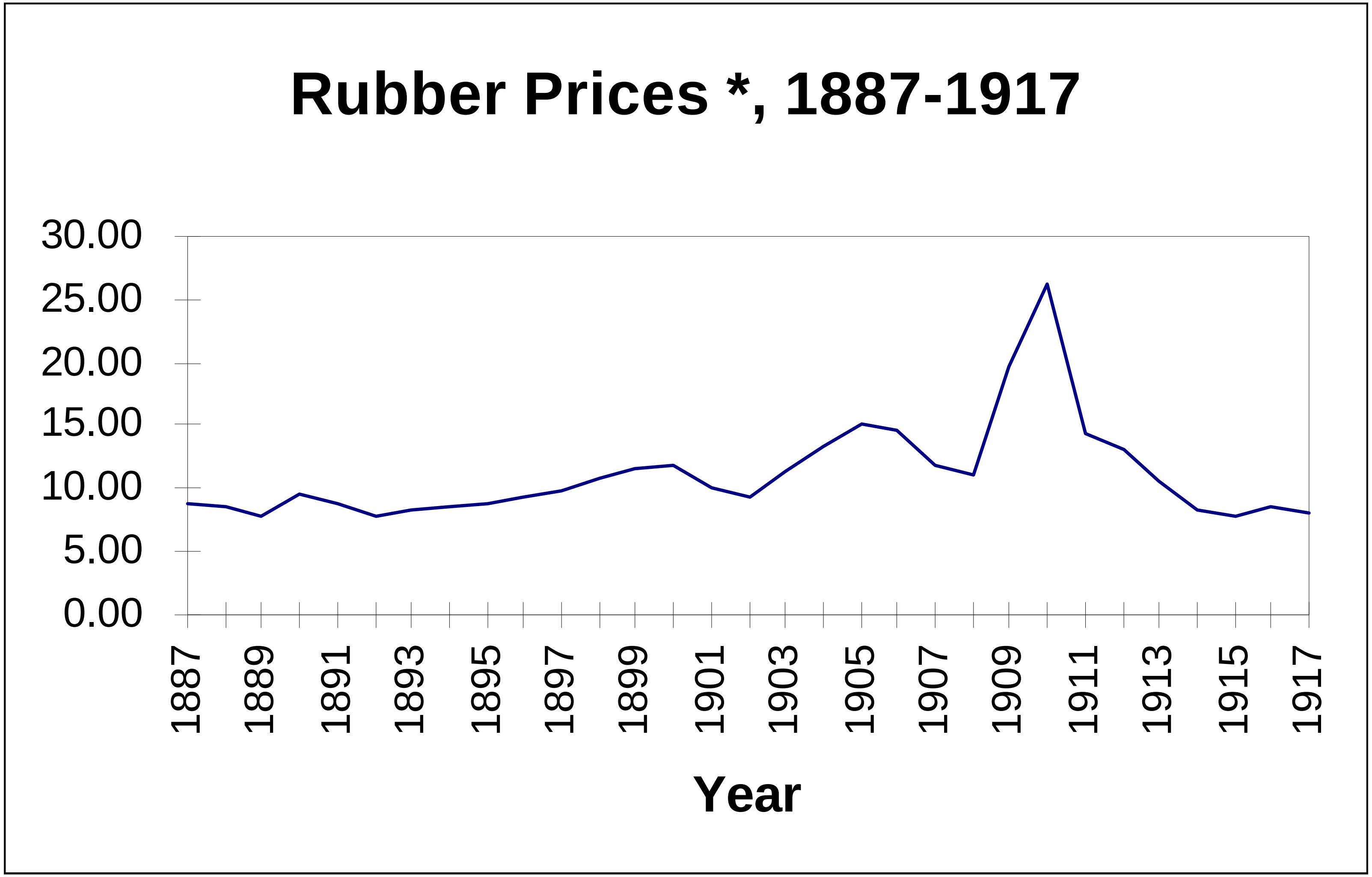
Figure 2.2



*Coffee prices over USA/UK export prices, (1913=100)

Sources: Mitchell and Deane (1971) and United States (1975).

Figure 2.3



*Fine Para , francs per kilogram, London

Source: Le Cointe (1922)

Coffee in Brazil was produced in plantations. Before the 1870s the region around Vassouras, relatively near Rio de Janeiro in the Paraíba Valley, had been the most important producing area. But the primitive planting methods and the characteristics of the dominant topography led to the continuous destruction of productive soils. As free land was available at low cost, the coffee frontier moved southwards in the direction of São Paulo leaving behind a trail of destruction.[11] In the Paulista plateau there were very good soils for coffee together with a good topography. For many decades, from the 1870s until the 1928-1933 depression, São Paulo was the most dynamic coffee region in the country. The Brazilian native population in expanding coffee culture areas had already been unfavorably affected by the economic expansion before the coffee boom, so the link between the expansion of the coffee culture and the declining standard of living of the Indian population does not seem direct. But the expansion of the coffee economy directly resulted in the destruction of most of the native Atlantic Forest, as burn and slash methods of clearance remained the rule for the whole period.[12]

While land policies nominally protected the interests of all those seeking to occupy free government land, actual policy prevented the establishment of small-scale subsistence agriculture by immigrants for a long period and thus the creation of an alternative to low-wage agriculture. The link between land policy and the elasticity of supply of labour to the plantation-based coffee agriculture was of crucial importance and well understood by coffee planters.[13] The average size of coffee farms in Brazil declined over time, but production in the 1920s was heavily concentrated in big farms. Even if it is accepted that farms up to 20,000 trees were mostly worked by "peasant owners" and their families with a minimum of hired labour, only 18.1% of total coffee trees in 1927 were not in "commercial" or big farms.[14] The average coffee farm in Brazil in 1927, even taking as representative the least productive group of farms, produced almost six times the output of the average Colombian coffee farm in 1932.[15]

Indeed, an essential long-term objective of economic policy in Brazil was to assure an elastic supply of labor, so as to guarantee that wages remained low. The government turned a blind eye to illegal slave trade until 1850. It also participated actively in the efforts to find alternative supplies of labor. Especially from the 1880s, as the abolition of slavery could be anticipated, a stable substitute to slavery was found in the *parceria* system, which depended on the attraction of European -- mainly Italian -- immigrants. By introducing a hybrid system of labor relations including elements of share cropping and wages it was possible to proceed expanding the coffee sector and to maintain low wages. There were some Federal subsidies to immigration, but the system was mainly financed by the State of São Paulo. Brazil was the fourth major destination of European immigration between 1815 and 1930, after the US, Canada and Argentina. Immigration peaked in the late 1880s, the 1890s, and immediately before the First World War. After the turn of the century it was unfavorably affected by restrictive legislation prohibiting subsidized emigration in Italy.[16]

The commercialization of coffee in the turn of the century was controlled by foreign exporting houses which had circumvented Brazilian factors which had traditionally acted as intermediaries between planters and coffee exporting houses.[17]

While coffee production was not directly capital intensive, requiring little machinery, the inflow of foreign capital was essential for the consolidation of the infrastructure related to the expansion of the coffee culture.[18] The expansion of the coffee industry fostered and was fostered by investment in infrastructure. Table 2.2 shows the concentration of foreign capital inflows in the golden decade before the First World.[19] Investment in railways was attracted by the widespread use of interest guarantees which were redeemed after the turn of the century. However, recent work on the economic impact of railways in Brazil has suggested that coffee freight as a proportion of total freight in most big railway networks in the Southeast declined steadily from 1869 to 1913.[20] It is also surprising, as shown by data on British capital (see Table 2.3), that investment was heavily concentrated in public services rather than in railways, especially in the golden decade. Urbanization proceeded rapidly in 19th century Brazil, especially in the 1890s and after the 1940s, when rates of growth were two or three times those for total population (see Table 1.2). It is as if most of the important infrastructure investments had been completed before the turn of the century and urbanization had become the focus of attraction of new investment.[21]

Table 2.2
Brazil: Foreign capital stock, 1840-1930, in £ million

	Public portfolio British	Public portfolio other*	Non-public investment British	Non-public investment other*	Total
1840	5.6	0	1.3	0	6.9
1865	13.0	0	7.3	0	20.3
1875	20.4	0	10.6	0	31.0
1885	23.2	0	24.4	...	47.6
1895	37.5	1.0	40.6	...	79.1
1905	83.2	5.0	41.1	34**	163.2
1913	129.1	36.9	135.2	120.7**	421.9
1930	163.0	91.4	118.6	123.8**	496.8

*US and French.
**These estimates are particularly fragile given the weight of French investment in 1913 and its sharp fall in the 1920s.
Sources: See sources in Abreu (1985), (1994) and (1995).

Table 2.3 Brazil: British Direct Investment and Holdings of Sterling-Denominated Corporate Securities by Sector, in £ million, 1865-1913

	1865	1875	1885	1895	1905	1913
Railways	5.4	6.4	17.1	33.1	24.0	59.1
Public utilities	0.8	2.7	3.0	3.4	6.6	55.0
Other	1.1	1.4	4.3	4.2	10.3	21.1
Total	7.3	10.5	24.4	40.6	41.1	135.2
Unallocated to particular Latin American countries						
Banks	2.0	3.2	2.4	5.0	9.4	24.3
Shipping	2.9	4.8	3.0	3.1	6.0	18.3

Source: Stone (1987)

The transition to a Republican regime in 1889 was intertwined with the institutional strengthening of the military, the abolition of slavery, and the erosion of the political coalition which supported monarchy and was heavily tilted in favor of the Northeast. The coup of 1889 resulted from an alliance between the military and the Paulista coffee growers. The transition to the stable political preeminence of the Southeast was achieved towards the end of the 1890s by a pact which assured the automatic election of the Presidential candidate of the party in power and the continuity of local political control by the ruling oligarchy. It was possible to speak of a decentralized system as, in contrast with the Empire, there was devolution of financial and administrative power to the provinces. But this was a rather special type of decentralization, being, as it was, under strict central political control.[22]

Such an arrangement provided one of the elements required by the implementation of policies which tended to favor coffee interests, particularly the accumulation of coffee stocks. The traditional interpretation, which underlined the very strong influence exerted by the coffee oligarchy on economic policy under the Old Republic, has been effectively qualified by the identification of important contrasts in the policy stance adopted by different segments of traditional agriculture.[23] But even with important qualifications, it is still true that to a large extent economic policy tended to reflect the interests of the rising coffee oligarchy and the long-established tradition of rent appropriation.

The historical precedent on policy formulation shows a tradition of rent-seeking arrangements since colonial times. Colonial rule was marked by the farming out of a large number of contracts regulating the extraction of monopoly profits by private entrepreneurs from a wide range of activities. Trading monopolies and detailed regulations constrained economic activity in the colony. Manpower and land policies during the Imperial regime underlined the ability of the rising coffee oligarchy to keep labor costs under control by maintaining the slave trade, even if illegally for twenty years, and then mobilizing subsidies partly paid by all taxpayers (mainly consumers of imports) and blocking the legalization of land occupation by agricultural producers other than those in large-scale plantations.[24]

What perhaps has not been sufficiently stressed in the literature is the whole range of implications of the fact that Brazil was a price maker in the coffee market. Some of these implications are examined in sections 4 and 5. This ability to influence world coffee prices contrasts with the case of most relatively large developing economies such as Argentina, Australia or Canada which faced competition as price takers in the markets for temperate agricultural products. Brazil had in principle more degrees of freedom than other primary commodity exporters.

Market power was used it in several occasions to support world coffee prices, sometimes by syndicates controlled by exporting houses, sometimes by the Federal government, and sometimes by the State of São Paulo, most notably in 1907-1913 and 1923-1930 in the Old Republic, but also after 1931. There was practically no international cooperation in such support activities before the end of the 1950s, with the exception of a short-lived agreement in 1936-37 with Colombia.[25] The result in the long-term, as could be expected, was the gradual reduction of the Brazilian share of world coffee output. The golden age of coffee "valorization" -- a word first used, as recorded in the Oxford English Dictionary, in 1907 -- was from 1907 to 1930. The first Brazilian valorization of 1907-1913 was decided in the wake of the considerable exchange rate appreciation which followed the Murtinho Plan of 1898 -- the domestic currency rose from 7 pence to 12 pence -- coupled with a large expansion of coffee output in the 1890s and again after 1905. Provincial authorities entered into a pact to restrain supply by purchasing stocks and to freeze production. They needed Federal backing to raise finance and added a clause to their pact which demanded exchange rate stabilization. Foreign debt service was to be paid by an export tax which was thought would be mainly born by consumers, given the price inelasticity of coffee demand. After many political difficulties[26], coffee valorization came into being, mainly controlled by foreign banks and coffee importing houses. It was a success until it was disorganized by compulsory sales of coffee stocks in the United States in 1913 due to legal action under the Sherman Act. In parallel with valorization, Brazil adopted the gold standard, an experiment which survived until the outbreak of the war in July 1914.

The valorization experiment relying in foreign finance -- half-hearted domestically financed attempts were undertaken during the First World War -- was repeated in the 1920s. But after the difficulties with United States legislation, stocks were held near producing regions and responsibility for coffee “defense” was transferred to the State of São Paulo so that the Federal government could retain a free hand in relation to initiatives to raise finance in New York without fearing the US government veto as it happened early in the 1920s. In the wake of the international trend to return to gold, Brazil adopted the gold exchange standard in 1926. So, there was a close parallel between economic policy developments before the First World War and before the depression, with an active role played by the government. The lack of a laissez faire tradition, which was already well established when the Republican regime was introduced in 1889, was only reinforced by developments under the Old Republic.

The vulnerabilities of coffee valorization have been examined in the literature. To the extent that it relied in foreign borrowing it was vulnerable to the cyclical behavior in international capital markets. The success of such schemes depended on the ability to establish barriers to entry, that is, on successfully limiting the planting of new coffee trees as this would make oversupply even more serious and turn valorization into a snowball. The costs of price valorization were paid only by Brazil as the dominant supplier, competitors were free riders as they simply reaped the benefits of higher prices at no cost. In the long run Brazil’s umbrella effect would naturally entail the erosion of its market share.

It is not easy to assess the impact of the coffee export economy on the standard of living of the Brazilian population as there is very limited reliable and comprehensive information on social conditions in Brazil before the 1940s. But what exists underlines the widespread poverty. Average life expectancy at birth in the 1930s was still 42.7 years (the extremes were 33.5 years in the state of Rio Grande do Norte and 52.0 in Rio Grande do Sul) and infant mortality of 158.3 per thousand live births (extremes of 201.1 and 119.4 in the same states). The coffee states, and, specifically, São Paulo, were very near the average (43.6 years and 154.7 per 1,000 live births in São Paulo). However, improvement until the end of the 1950s was considerable and concentrated in the South and Southeast. The illiteracy of the population of five years and more was 61.2% in 1940 (65.3% for women), the first year for which there is reliable data.[27]

There is much controversy on the direct effect of the expansion of coffee production on the standard of living of laborers and small owners but there is no hard evidence to make possible a rational election of the contrasting interpretations.[28] The main mechanism working in favor of an improvement of the standard of living was the reduction in the share of employment in agriculture and a correspondent increase in industrial employment as the productivity in industry was about 3.5-4-fold the productivity in agriculture both in 1920 and in 1940. The increase in industrial employment of almost 1.3 million between these two years corresponded to more than 8.5% of the working population in 1940.

3. The implications of being the main world coffee supplier

The links between world coffee prices and the Brazilian exchange rate, or for that matter world commodity prices and the exchange rate in any commodity exporter which holds a substantial share of the relevant market, were acknowledged early in the literature on the Brazilian economic history.[29] Brazilian supply had a important impact on world coffee prices. Due to the low price elasticity of coffee demand, supply shifts had significant consequences on the price level. Increased output meant a heavy fall in prices. Retention of stocks could hold or raise world prices without much impact on quantities demanded.

The fact that Brazil was the leading coffee producer and exporter implies that production costs in Brazil had a significant influence in the determination of world coffee prices.[30] Foreign exchange rate fluctuations affected the supply of coffee in Brazil and consequently world coffee supply due to the weight of production in Brazil. In the short run, devaluation tended to weaken world prices as there was a inducement to dump stocks in the market. In the long run, the net effect of a devaluation will depend on the relative importance of the impact on production costs and on revenues of coffee growers both instantaneous and expected in the long-term.

In order to test the empirical relevance of this hypothesis, a standard reduced form equation for the determination of world coffee prices was estimated in logarithmic form, using annual data for 1852 to 1930. The Brazilian share of world exports was substantial throughout the 1852-1930 period.[31] In the basic specification, real coffee prices (PRICE) are a function of their own lagged values and of the lag of a variable that tries to capture the supply-demand balance in the coffee market (MARKET). Here, this variable is constructed as the ratio of world coffee consumption to the sum of world coffee supply and world coffee stocks. Therefore, an increase in this variable should have a positive impact on real coffee prices. The inclusion of this explanatory variable is justified by the special characteristics of the coffee market. Since the product can be easily stored and production responds to prices with a lag of several years, a standard model where supply and demand are functions of current prices and determine the market price through a clearance condition is not appropriate for the case of coffee.[32] An additional explanatory variable, the real exchange rate (RER), is included to capture the increase in production costs associated with exchange rate fluctuations. The variable is defined so that an increase in the index corresponds to a depreciation of the domestic currency and enters the equation with lags of one and five years in order to capture both short term and long term effects. The reason for the five-year lag is that in the beginning of the century production started, in general, 5 years after coffee trees were planted, and some three fourths of total costs in the coffee sector were associated with fixed costs.[33]

Table 3.1 presents the main estimation results. Equation 1 displays the baseline coffee price equation for the entire 1852-1930 period. The short term real exchange rate effects are not significant, as well as the MARKET effects. Long term real exchange fluctuations are shown to have a significant effect on real coffee prices, with an estimated coefficient significantly different from zero at standard confidence levels. A real devaluation results in an increase in world coffee prices. In Equation 2 the short term RER variable is omitted and then the significance of the RER variable in the long term is unfavorably affected. Results for sub-periods, such as 1852-1913 and 1930-1960, proved to be disappointing. For the earlier period it is believed that measurements may have been affected by the shortcoming of the statistical series. Alternatively, the recession in the 1870s and early 1880s also may have affected the results. For the period after 1930 the main difficulty is that

Table 3.1
Brazil: Coffee Price Regressions*, 1852-1930

Variable	Equation 1 1852-1930	Equation 2 1852-1930	Equation 3 1880-1930	Equation 4 1880-1930
CONSTANT	-0.61 (-0.97)	-1.07 (-1.99)	-1.54 (-1.76)	-1.73 (-2.25)
PRICE (-1)	0.73 (5.98)	0.76 (5.66)	0.65 (4.80)	0.65 (4.66)
MARKET (-1)	0.14 (1.01)	0.16 (1.09)	0.54 (2.56)	0.56 (2.62)
RER (-1)	-0.18 (-1.18)	-	-0.09 (-0.41)	-
RER (-5)	0.25 (2.05)	0.18 (1.55)	0.39 (1.94)	0.34 (2.02)
Rho	0.29 (1.68)	0.36 (1.82)	0.26 (1.25)	0.29 (1.43)
Adjusted R^2	0.64	0.58	0.64	0.62
Number of observ.	75	75	50	50
Standard error	0.16	0.16	0.17	0.17

* Corrected for first-order serial correlation.
Sources: Data adjusted to calendar years. Coffee prices: imports into USA, United States (1975); world coffee production, consumption and stocks: Bacha and Greenhill (1992), Statistical Appendix; domestic prices USA: United States (1975); exchange rates: Brasil (1941); average tariffs: computed from Brasil (1941), Brasil (1990) and Fritsch (1988);

domestic prices Brazil: Goldsmith (1986), Catão (1992), Haddad (1978) and Brasil (1990).

the exchange rate ceases to be as relevant as before, since foreign exchange controls became the rule. However, for the golden age of coffee, the sub-period 1880-1930, which is the core of this study, the results are much better. In Equation 3 of Table 3.1 it is shown again that the RER variable with a lag of one period is not statistically significant. When it is omitted (in Equation 4) all estimated coefficients have their expected signs and are statistically different from zero at standard confidence levels.

Much emphasis has been placed on "socialization of losses" as an important mechanism to explain the political economy of the Brazilian export economy in the pre-1930 period.[34] But such an emphasis does not take into account Brazil's share in the world coffee market. The gist of the "socialization of losses" argument is that through exchange rate devaluation coffee growers were able to recoup significantly the losses entailed by the fall in the world prices of their commodity exports. This argument is likely to be much more relevant for a small commodity exporter than for a price maker such as Brazil. In the case of a price maker, the devaluation of the exchange rate increased the amount of domestic currency generated by each unit of foreign exchange received by exporters in the short-run; but it also weakened world prices denominated in foreign currency through the inducement to a release of stocks. Robust results for the short-run effects have proved to be elusive to capture. In the long run, however, it has been shown that foreign exchange devaluation resulted in a lagged increase in world coffee prices denominated in foreign currency. That this effect was strong has been empirically shown above.

4. The coffee economy: linkages and diversification

There was little scope for forward and conventional backward linkages in a coffee-based export economy. Soluble coffee became important only in the 1950s and there is no mass market for processed coffee products. Traditional backward linkages were also weak due to the rudimentary techniques used in agriculture.[35] Consumption linkages, however, were rather powerful and of special interest. From rather early days there was involvement of coffee growers in the building up of export infrastructure, especially railways from the early 1870s, and somewhat later, from the 1890s particularly, in the development of a broadly based import substitution industrialization process. This is a substantial qualification of traditional views which underline the more or less permanent opposition between the interests of coffee growers and industrialists as providing the economic rationale for the accumulation of tensions, which were eventually solved by a shift of policies in 1930 in favor of emerging domestic industry and against coffee interests.

It is true that industrial interests in Brazil had considerably more political weight in the Old Republic than in other developing economies. Industrial interests were able to obtain important concessions from the government, in particular a very protective tariff.[36] It has been shown that due to the weight of Brazilian coffee exports in world exports and to the price elasticity of world coffee demand a high tariff in Brazil was transferred with a lag to world coffee prices.[37] The basic mechanism at work is through the increased production costs in Brazil which, given Brazil's very high share of the world coffee market, affect world prices.

Tariffs also were, of course, very important as a share of government revenue as alternative forms of taxation, such as taxes on land and on income, were politically unpopular with the agricultural oligarchy, or of difficult implementation, as in the case of excise or consumption taxes. During the late years of the Empire the share of import duties in total central government revenue fluctuated around 60%. It fell slightly in the beginning of the century and more substantially during the First World War. In the 1920s it was still around 40% of total revenue.

What is argued here is not that high import tariffs were sought because it was perceived that increased production costs would be transmitted to world coffee prices. It is rather that, once the political economy of protection, as for instance lobbying by industrial interests, resulted in increased tariffs, there was no significant deterioration in the performance of exports to justify countering such tariff increases. Coffee growers were generally keen in maintaining low production costs, as exemplified by their stance on labour costs since very early in the 19th century. One cannot thus claim that a high tariff was adopted because it was perceived that the foreign consumer would bear the increased costs. It is simply that that the policy of high protection was not countered by an export lobby interested in maintaining low production costs as it was the case in most big primary commodity exporters.

The empirical relevance of this hypothesis for the period of this study is tested with an extension of the framework for the determination of world coffee prices used in the previous section. The analysis is based on annual data for the sub-periods 1880-1930 and 1880-1913.[38] Real coffee prices are explained by their own lagged values, the lag of the supply-demand balance variable, the real exchange rate lagged five years and the implicit tariff (TRF) also lagged for five years. The lag in the TRF variable is explained by the same reasons of the lag in RER variable. As the results in Table 4.1 indicate, all signs are as expected and all variables are significant at standard significance levels for both periods. This means that Brazil was able to pass increased import costs to higher world coffee prices.

Table 4.1
Brazil: Coffee Price Regressions with Tariff, 1880-1930

Variable	Equation 1 1880-1930	Equation 2 1880-1913
CONSTANT	-3.43 (-3.54)	-3.44 (-3.48)
PRICE (-1)	0.77 (9.98)	0.81 (8.96)
MARKET (-1)	0.48 (2.77)	0.43 (2.16)
RER (-5)	0.57 (3.50)	0.46 (2.11)
TRF (-5)	0.23 (2.26)	0.38 (3.58)

Adjusted R^2	0.78	0.88
Number of obs.	51	34
Standard error	0.17	0.13

Sources: see Table 3.1.

5. Coda: the export economy 1930-1960

The second internationally-financed Brazilian coffee valorization cum foreign exchange stabilization program started to break down in mid-1928 with the end of capital inflows. After the second half of 1929 coffee prices collapsed and by mid-1930 Brazil had de facto abandoned the gold exchange standard. The difficulties in the early 1930s were compounded by the important increase in coffee output following the failure of the efforts of Paulista authorities to freeze output capacity in the late 1920s.

Government policies in the wake of the depression relied on a package which included expenditure-switching policies, through devaluation and import controls, and coffee price support, which was taken over from the state of São Paulo. It involved the purchase of coffee by government, accumulation of stocks and destruction of coffee equivalent to three good crops, over 70 million bags mainly over the 1930s. Perhaps these policies were not so original in their instinctive Keynesiasm[39], since other big spenders can be found in Brazilian Republican history.[40] But it has been shown that transfers from Federal government had an important role in financing coffee price support and that the mildness of the depression in Brazil was partly due to expansionary fiscal policies adopted by the government from 1931.[41] Besides purchasing excessive coffee, the government reduced by 50% the debt of coffee growers and stimulated output and export diversification in the Southeast which was especially successful in the case of cotton, as there was rising world demand with high prices assured by United States support policies.

That 1930 was as a watershed in Brazilian economic history there is little doubt. The importance of foreign trade and foreign capital was significantly reduced as a proportion of output and investment. The share of domestic industrial output in total supply rose. But commodity export sectors, and especially coffee, remained important as a share of output and as an outlet for the much increased domestic industrial output. Export sectors remained vital as a source of foreign exchange, especially so as capital flows dried up almost entirely.

The increased role of the State, and specifically of the Federal government, is evident in coffee policy. But from another crucial point of view there was a radical qualitative change of the role of the State, a change that persisted until present times. This was intervention in the foreign exchange markets. Foreign exchange regimes were to play a vital role as an instrument of economic policy for the remainder of the relevant period for this paper. With the exception of a short period in 1946-1947, government exchange monopoly was exerted indirectly by the Federal government for the whole period. Policies varied considerably, but the common feature was that an overvalued exchange rate was maintained. This was either a single rate[42] or some (or all) of a set of multiple exchange rates.[43]

A single overvalued exchange rate required foreign exchange rationing to cope with excess demand for imports and the operation of the system of distribution of cheap imports to economic agents was to play a crucial role in import substitution industrialization. To absolute protection for domestically produced goods was added secure access to cheap imports of inputs and capital goods. The core of rent-seeking interest was thus moving away from the export economy in the direction of industry. The rationale for maintaining a single overvalued exchange rate ranges was complex. The traditional fiscal argument was, of course, that a sizeable share of government expenditure was indexed to the foreign exchange and thus increased automatically with devaluation, while government revenues relied importantly on imports which had been curtailed following the depression. The government through its monopoly power in the foreign exchange market had access to the relatively cheaper (official) foreign exchange rate. The other reason was the fear that further devaluation would weak even more coffee prices.

It reasonable to believe that after 1930 Brazil continued to be able to pass through increased production costs entailed by high tariffs to coffee prices, but empirical work is prevented by the lack of data on the tariff equivalents of non trade barriers, particularly import rationing. As a last resort, the foreign exchange reserves-imports ratio was used as a proxy for such non-tariff barriers, but the empirical results were not satisfactory.

Multiple foreign exchange regimes were introduced in recognition of the undesirable impact of a single official exchange rate regime on non-traditional exports and on the cost of essential imports. Since the 1930s the Brazilian government tried to stimulate non-traditional exports by assuring sales of foreign exchange at a more favorable exchange rate.

The Brazilian exchange rate remained nominally stable from 1939 to 1953 in spite of a differential inflation in relation to the United States which reached almost 140%. This was possible, in spite of the balance payments problems from 1947 on, by the sharp rise of coffee prices after 1945, but more especially after 1949. Coffee oversupply in the 1930s and early 1940s had become coffee scarcity by the late 1940s and the high coffee prices were to persist until 1954. After 1953 the multiple exchange rate regime also included multiple export and multiple import rates and the government also used the exchange regime as a rudimentary import tariff, since the Brazilian specific tariff had been eroded by inflation. The wedge between the average import and average export rates was very important for the government in the second half of the 1950s, especially so as it escaped congressional control.

In the second half of the 1950s, as exports declined continually, foreign direct investment was attracted by heavy subsidies and room to reap monopoly or oligopoly profits behind a wall of absolute protection. Coffee prices fell after 1954 and the coffee industry was to face again a period of oversupply. While there was no return to the policy of burning coffee stocks, there was a policy of fostering the eradication of coffee trees in an effort to control supply. At the turn of the decade coffee control was to become an international concern after many years of single-handed supply restraints by Brazil.

It is not easy to assess the impact of overvalued exchange rates on coffee interests. In the short run, it was likely that at the same time there was a reduction of income per unit of foreign exchange earned, world coffee prices were supported by an overvalued foreign exchange. This link was reversed in the long term. The net extraction of income from coffee growers in the 1950s was not that evident as while in the short-run the government skimmed away income from exporters, by making compulsory the tendering of a certain share of their export earnings at a grossly overvalued exchange rate, there was an important program of transfers to the coffee sector in an effort to reduce productive capacity.

6. Conclusions

Brazil was a price maker in the international coffee market for the whole period during which the economy can be reasonably described as being an export economy. This is a crucial element to understand how policies were designed and implemented. Even before coffee oversupply and the adoption of coffee valorization policies there was no laissez faire tradition in Brazilian economic history. Land and labor policies were designed and implemented to maintain the profitability of the plantation-produced coffee export economy. Valorization depended directly or indirectly on financial guarantees by the Federal government. There was also complementarity between coffee price support and Brazil’s adoption of the gold and gold exchange standards immediately before the First World War and in the 1928-1933 depression. There was, however, an in-built mechanism in valorization which made inevitable the steady decline of Brazil’s share of the international coffee market as the support of artificially high prices attracted high cost competitive suppliers which would not be able to compete otherwise.

Government intervention was already important before 1930 also in relation to protection of the domestic industry against the competition of imports. A commercial policy based on a very high tariff made import substitution already relevant from the turn of the century. The impact of such tariffs on coffee production costs had as a consequence higher world coffee prices due to Brazil's market power as the main producer and the price inelasticity of world coffee demand.

The diversification of economic activity was the main source of improvement of the standard of living. This was related to urbanization, the increased role of government and the rise of industry. It was thus not surprising that improvement in living standards affected regions very heterogeneously with the Northeast trailing badly the Southeast, especially in the 1940s and 1950s. Until 1930, however, disparities were surprisingly small, at a very low standard of living level. Coffee culture remained based on low-wage manpower and concentrated in plantations with very little change in the techniques used from the 19th century. This also applied to the use made of land resources as there were no limits to the advancing land frontier incorporated in the coffee economy within the relevant time span. Traditional techniques which involved fire and slash remained the rule.

The scope of state intervention became even wider after 1930. The Federal government took over coffee policies. Exchange regimes based on exchange rate overvaluation and multiple rates became the rule. The wedge between average export and import exchange rates became important for fiscal reasons. In some periods the government imposed additional levies on exporters of traditional commodities, especially coffee, sugar and cotton.

The protection to industry relied until 1930s on high tariffs, but then increasingly on access to low cost imported inputs and capital goods coupled with absolute protection assured by exchange controls. Brazil "made the consumer pay" for its commercial policy based on high tariffs before 1930 and it is likely that it continued to do so after 1930.

Exports remained concentrated in a few agricultural commodities, and especially coffee, until very late as industrial exports, except in very special conditions, as during the Second World War, for example, were unable to compete in the international markets. There was no introduction of new commodity exports until the soya boom in the late 1960s and early 1970s.

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NOTES

[1] See Bacha and Greenhill (1992), appendix.
[2] See Delfim Netto (1979), p. 9 and Brazil (1941a), pp. 299-304. The British share of Brazilian total imports fell less markedly, but in the 1900s it was down to 30% as compared to more than 50% before 1880.
[3] Brazil imported some foodstuffs especially before 1930, but only wheat was an important item of the import bill.
[4] Our own estimates. For pre-1913 GDP and deflator data see Goldsmith (1986), pp. 22, 23, 82 and 83.
[5] See Eisenberg (1974), chapter 1 for a general view of sugar production and exports in Brazil.
[6] See Canabrava (1984) on the short-lived cotton boom in São Paulo in the 1860s and 1870s.
[7] See Ellis (1971), pp. 246-255 and Abreu (1990).
[8] Weinstein (1983) and Schurtz et al (1925) are the standard sources on the rubber boom and collapse in the Amazon region.
[9] See LeCointe (1922), vol. I, p. 333.
[10] See Furtado (1965), chapter 23.
[11] See Stein (1957) for the boom and downfall of Vassouras as a coffee region in the 19th century.
[12] See Dean (1995), chapters 8 and 9 for the environmental consequences of coffee culture expansion.
[13] See Dean (1971) and Reis and Reis (1988) for land policies and labour policies in Brazil and the fragmentation of oligarchic interests.
[14] See Rowe (1963), p. 44 and Rowe (1932), p. 89. Rowe (1936), p. 29, suggests a much lower threshold of 4,000 trees as compatible with operation of a farm by a family without hiring labour. The importance of the small scale coffee production sector would be even smaller if this was the case.
[15] See Rowe (1932), pp. 88 and 89 and Palacio (1983), pp. 437 and 448.
[16] See Hatton and Williamson (1994), pp. 7 and 44. For immigration to São Paulo see Holloway (1980), especially ch.3.
[17] See Stein (1957), pp. 282 and ff., and Greenhill (1977).
[18] See Lalière (1909), third part, for a comprehensive explanation of machinery used in best practice farms for the preparation of coffee.
[19] Even if the suspiciously high stock of French capital is taken at face value.
[20] See Summerhill (1995), chapter 5.
[21] See Lewis (1978), chapter 7.
[22] See Cardoso (1975) for the classical treatment of this issue.
[23] See Fritsch (1988), passim.
[24] See Reis and Reis (1988) for a discussion of the sharply contrasting stance of different segments of the agricultural oligarchy on land policies, slavery and immigration in late 19th century Brazil.
[25] See Ocampo (1984), pp. 70-74.
[26] See Fritsch (1988), chapter 2.
[27] See Brasil (1990), p. 52. To put these numbers in historical comparative perspective infant mortality in England and Wales was 154/1,000 live births in 1900 and life expectancy at birth 48 years. See United Kingdom (1987).
[28] See Stolcke (1986), pp. 78 and ff.
[29] Granger causality tests show that for the 1850-1930 period as well as for all the relevant subperiods one cannot reject the hypothesis that there is no causal link between changes in real coffee prices and changes in the Brazilian real foreign exchange rate. For early perceptions of the importance of the exchange rate in the determination of coffee prices see Gudin (1933) and Williams (1934). As noted by Furtado (1965), Wileman (1896) detected the link between coffee prices and exchange rate. Such a link was investigated empirically by Cardoso (1983).
[30] For conditions of coffee planting and costs in the 1880s see Laerne (1883), ch. X. For current costs in the 1900s see Lalière (1909) , part 4. On the importance of fixed over current costs see Rowe (1936), p.37. For detailed costs for plantations at different stage of maturity of coffee trees in the 1920s see Rowe (1932), pp. 88-89.
[31] During 1852-1930 the average Brazilian share of the world coffee exports was about 51 percent. It was about 55% in 1880-1930.

[32] See De Vries (1975).
[33] See Rowe (1936), p. 37.
[34] See Furtado (1965), ch. 28.
[35] See Hirschman (1958), chapter 6, and Hirschman (1981) for linkage taxonomies.
[36] For the history of protection under the First Republic (1889-1930), see Villela (1993).
[37] See Abreu, Bevilaqua and Pinho (1997) for a treatment of import substitution in Brazil from the 1890s to the 1960s.
[38] After the balance of payments crisis following 1930, tariffs are a poor measure of protection since exchange controls became the rule.
[39] See Furtado (1965), chapter 31.
[40] There no scarcity of big spenders, but Epitácio Pessoa and the building of dams in the Northeast in the early 1920s can be singled out.
[41] See Fishlow (1972), pp. 327-331.
[42] And it was in 1931-1934, 1937-1939 and 1947-1953.
[43] And this was so in 1934-1937, 1939-1946 and 1953-1964.