HOW LATIN AMERICA FELL BEHIND

Essays on the Economic Histories of Brazil and Mexico, 1800–1914

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CHAPTER 2

Economic Development in Brazil, 1822-1913

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This chapter focuses on two features of Brazil's economic history: the virtual stagnation of real per capita income in the country as a whole from independence in 1822 through most of the nineteenth century; and the shift, circa 1900, to several decades of sustained, rapid economic development.[1] Few observers would expect a simple explanation for such large economic phenomena. In fact, the story is complex and involves many causes.

An Aggregate View and the Special Experience of the Northeast

In the United States, real per capita income grew at a long-term rate of approximately 1.5 percent per year in the nineteenth century. Long-term growth at that annual rate for a period of 91 years (the time interval between 1822 and 1913) implies a cumulative increase of per capita income from an initial level of 100 to an index of 388 at the end of the period. By contrast, the data available for Brazil suggest a very different economic experience in the nineteenth century. Although real output was able to keep pace with Brazil's rapid population growth (1.8 percent per year), real per capita income seems to have grown very little between 1822 and 1913.[2] Further, most of the per capita income growth that took place in Brazil between 1822 and 1913 seems to have occurred in the period 1900–13. Those years were indeed a period of rapid economic progress. By the same token, the years 1822–99 seem to have been a long period of disappointing economic achievement in Brazil.

Disaggregation of these figures in terms of geographic regions is also helpful in understanding Brazil's economic experience during the nineteenth century. The country's overall performance masks a significant differential in the pace of development between regions. In part, the poor aggregate experience of the Brazilian economy during the nineteenth century reflects the especially dismal performance of the country's large northeast region, where almost half of Brazil's population resided.[3] A rough estimate suggests that real per capita income in the northeast *fell*, by approximately 30 percent between 1822 and 1913. Our first task, then, is to try to understand why the large northeast region did so poorly. We then proceed to a more general analysis, encompassing the rest of the country as well.

Exports were the main source of productivity growth in nineteenth-century Brazil. International trade was important both for permitting higher income from available resources and for stimulating capital formation, including public-sector and foreign investment, in economic infrastructure. The northeast's negative economic experience during the nineteenth century stemmed largely from the poor export performance of the two products in which the region had an international comparative advantage: sugar and cotton. In 1822, sugar and cotton accounted for 49 percent of Brazil's aggregate export revenues, while coffee (produced in the southeast) accounted for 19 percent. In the course of the nineteenth century, Brazil's export receipts from sugar and cotton showed little long-term growth and actually declined in terms of receipts per capita. In 1913, sugar and cotton provided only 3 percent of Brazil's total export revenues. By contrast, real income from coffee exports increased at a long-term annual rate of approximately 5 percent. By 1913, coffee accounted for 60 percent of Brazil's aggregate export revenues.

The decline of the northeast's sugar and cotton exports reflected the fact that nineteenth-century Brazil had a stronger comparative advantage in coffee than in sugar or cotton. That is, a unit of foreign exchange could be earned with fewer domestic resources in coffee than in sugar or cotton. Because the domestic-resource cost of foreign exchange was much lower in coffee than in sugar or cotton, the northeast experienced a nasty case of the "Dutch disease." As the foreign currency provided by coffee exports grew as a source of supply in Brazil's foreign-exchange market, the country's overall exchange rate increasingly reflected the importance of coffee and its pressures for real-currency appreciation. Revenues of the producers of Brazil's various export commodities and the volume of output that they supplied varied in function of changes in the mil-réis (the Brazilian currency) price that producers received. Mil-réis prices for individual commodities, in turn, varied both with changes in the specific commodity's

international price and with changes in Brazil's overall exchange rate. In fact, much of the variance in the mil-réis prices for Brazilian cotton and sugar resulted from changes in the mil-réis sterling exchange rate. Therefore, the coffee-dominated exchange rate squeezed factor returns and priced ever-larger quantities of the northeast's sugar and cotton out of the world market.

In introductory economics textbooks, when a new export activity emerges with a stronger comparative advantage than that of the country's traditional export activity, factors are reallocated to earn the higher returns available in the new activity, and income rises. By contrast, in the Brazilian historical context, the northeast's adjustment was constrained by some rigidities imposed by geography. The northeast's specific types of land (and climate) were not well-suited to coffee production and were therefore not reallocated to coffee. Consequently, transfer of other productive factors from sugar and cotton to coffee required interregional migration. The large distances between Brazil's regions, however, meant high transportation costs, such that migration involved an investment. Brazil's slave market financed the transfer of slaves, and most of the northeast's stock of slaves was indeed bid away to the southeast. But much of the northeast's labor force was free, and large-scale transfer of free labor was precluded by the absence of a capital-market institution to finance free workers' investment in interregional migration.

Economic theory points to a key condition that must be satisfied if the integration of multiple geographical regions in a single political unit is to constitute an economically optimal currency area. That condition is intersectoral factor mobility.[4] As we have seen, nineteenth-century Brazil did not satisfy that condition. Under these circumstances, one may wonder whether the northeast might not have been better off economically as a separate political entity, with its own exchange rate. The northeast's trade and development would then have been governed by its own (rather than by Brazilian) comparative advantage. In fact, the northeast's political elite did attempt to secede from Brazil during the nineteenth century, but maintenance of the country's territorial integrity was a key priority for Brazil's political leadership, which used military force to repress secession. The northeast therefore remained within Brazil, and the region's monetary and trade conditions were greatly aggravated by its being part of a political entity that did not meet the conditions for an optimum currency area. The northeast's dismal economic experience was an important part of Brazil's overall poor record in the nineteenth century.

The Elastic Supply of Labor

In the southeast, coffee exports grew rapidly, with major linkage effects on the regional economy. But long-term increase in real wages, and hence in income for much of the population, was constrained by two labor-market institutions that provided an elastic supply of labor to Brazil's "advanced" sector throughout the nineteenth century.[5] Accordingly, output and the demand for workers in the Southeast coffee region could increase rapidly without generating an increase in real wages.

First, importation of slaves from Africa enabled Brazil's plantation owners to satisfy their growing demand for labor with relatively little utilization of workers from the country's domestic agricultural sector. Consequently, the export activities could expand their output substantially without bidding up wages within the Brazilian economy. In the first half of the nineteenth century, the British government attempted to stop the importation of slaves from Africa. The economic advantages that importation afforded Brazil's planter class were so great that the Brazilian state resisted British interventionism for half a century. Between 1800 and 1852 (when the British navy finally forced suspension of slave imports), approximately 1.3 million slaves were imported to Brazil. This amounted to more than one-fifth of the growth of the country's total population and an ever larger share of the increase in the Southeast's labor force.

The increase in the supply of slave labor to the coffee sector seems to have been sufficiently great that the real cost of labor did not rise over the century. Pedro Carvalho de Mello has collected data on nominal slave purchase prices and rental rates between 1835 and 1888 (the year of abolition) in Rio de Janeiro.[6] Regression equations estimated with Mello's undeflated data show an annual trend rate of increase of 2 percent for the slave-purchase time series and an annual rate of increase of 1.8 percent for the slave-rental series between 1835 and 1888. Deflated with observations for the price of coffee, Mello's time series can be regressed against a time trend to ascertain the rate of change of real labor costs in nineteenth-century Brazil's "advanced" sector. Over the years 1835–88, the regressions show an annual trend rate of change of −0.1 percent (with a t-ratio of 0.39) for the deflated purchase-price series, and an annual trend rate of change of −0.3 percent (with a t-ratio of 1.43) for the deflated rental-rate series.

These regressions, in which coffee prices are used as the deflator, indicate that real labor costs for Brazil's coffee producers did not increase in the half century between 1835 and 1888. We lack an annual index of con-

sumer prices that could be used to deflate the nominal slave price and rental series in order to assess rigorously the time trend in real consumption wages for coffee workers. As discussed elsewhere, however, data on the medium-term rate of increase of consumer prices in Rio de Janeiro suggest that consumer prices rose at least as rapidly as the current-price series for coffee labor.[7] Thus despite the great growth of coffee production and the rapid expansion of the southeast's economy, the supply of labor apparently kept pace with the demand for labor, obviating upward pressure on labor costs or worker incomes.

The second labor-market institution involved immigration. As noted, in 1852 the British government stopped Brazil's importation of slaves from Africa. Following a long-term interaction between domestic economics and politics, slavery was abolished within Brazil in 1888. From the viewpoint of maximizing coffee-planter returns, the mounting pressures for abolition posed a potential problem. Unless accompanied by other changes in the labor market, abolition would bring a sharp rise in labor costs. Accordingly, some of the coffee sector's political leadership sought a monopsonistic, class solution to protect planter interests. Their approach to the impending problem was, in effect, to shift downward the supply schedule of labor in anticipation of the planters' growing demand for workers. To achieve this objective, they developed a new labor-market institution that would maintain an elastic supply of low-cost labor from overseas.

To endogenize the supply of labor, the coffee planters pressed Brazil's central government and the government of São Paulo province to pay the transportation costs of immigrants from southern Europe. Such subsidies had two important consequences for potential European immigrants. First, without raising Brazilian wages, transportation subsidies increased the net private returns from immigrating to Brazil. In addition, the subsidies overcame the capital-market imperfection that might otherwise have prevented destitute Europeans from immigrating at all. By paying transportation costs, Brazil could attract immigrants who, if they could have financed their own immigration, might have gone to the United States or to Argentina, where wages were higher.

The Brazilian policy intervention to attract European immigration achieved its objective. Immigration, mostly from Southern Europe, accelerated sharply. The increase was most dramatic in the case of the province where coffee production was expanding most rapidly, São Paulo. Between 1880 and 1885, an average of 4,300 immigrants entered São Paulo annually. In 1886, the figure was 9,500, and in 1887, the year before abolition, the figure was 33,000. Overall, between 1885 and 1909 some 2.8 million European immigrants entered Brazil. Almost all of these people went to the southeast. Between 1890 and 1913, the stock of coffee trees in São Paulo province (a proxy for the demand for labor) increased at a rate of approximately 6.5 percent per year. In addition, the demand for workers also rose in manufacturing as well as in other activities in the booming southeast. Despite these pressures on the demand side of the labor market, however, real wages apparently did not increase.[8]

One may wonder why the supply of labor to the advanced sector in the southeast came from overseas rather than from within Brazil. In principle, workers from within Brazil might have come either from the domestic agricultural sector (see below) in the southeast or from the declining northeast. The inability to attract many workers from the domestic agricultural sector in the southeast is not surprising. Incomes earned in that sector made for an opportunity cost that was apparently well above the labor costs offered by subsidized immigration.

The failure to draw on labor supply from the northeast is more puzzling. It seems unlikely that transportation costs for would-be immigrants from the northeast to the southeast exceeded the cost of transporting workers from Southern Europe to Brazil. Another possibility is that supply constraints (perhaps reflecting sociocultural rigidities or political restrictions) limited labor mobility in the northeast. In fact, supply constraints do not seem to have been a problem. There is evidence of considerable labor mobility in the northeast.[9] And as regards extraregional labor mobility, between 1872 and 1910 hundreds of thousands of northeasterners emigrated to the booming Amazon region. Migration to the southeast, however, involved greater distances, higher costs, and a larger investment. As noted earlier, the absence of a capital-market institution to finance those investments seems to have been important in limiting migration from the northeast to the southeast during the nineteenth century. Hence, our question reduces to, Why were the coffee planters in the southeast more willing to finance immigration from Europe than from the northeast? Part of the answer may have been then-prevalent racial attitudes on the part of the coffee planters, which led them to prefer European to mulatto workers.[10]

The consequences of large-scale subsidized immigration from overseas are clear. The program continued through the beginning of the twentieth century the economic structure that importation of slaves from Africa had provided earlier. The highly elastic supply of labor from overseas meant that output could expand at a rapid pace in Brazil's advanced sector without raising the wages of workers in the rest of the economy. The similarities between Brazil's historical experience in the nineteenth century and W. A.

Lewis's celebrated model, "Economic Development with Unlimited Supplies of Labour," are evident.[11] There were, however, two important differences between Brazil's historical experience and the Lewis model. In the Brazilian case, the elastic supply of labor came from overseas. Also, in Brazil the elastic supply of labor continued "forever"—with ensuing long-term consequences for capital-labor ratios, wages, and technical progress. Continuing importation of labor from abroad enabled Brazil's planters to maintain their returns but had adverse effects on the rest of the population. This experience suggests that conclusions concerning the welfare effects of population growth in nineteenth-century Brazil may be a function of the observer's class perspective. Explicitly or implicitly, historians often discuss welfare effects over time, and their unit of study is usually "the nation." In the Brazilian case, class interests were so obviously disparate that it raises questions concerning the validity of using the nation as the unit of analysis.

The Domestic Agricultural Sector

Like most studies of Brazil's economic history before the twentieth century, we have focused thus far on conditions in the country's export activities. The greater availability of data for those activities should not lead us to exaggerate their quantitative importance. In fact, most of Brazil's labor force was engaged in the domestic agricultural sector: the production of food for local consumption and the internal market.[12] Brazil's domestic agricultural sector in the nineteenth century has been little studied. In the words of two scholars, the sector usually appears only "between the lines" of the country's historiography.[13] Consequently, detailed information on this sector is scanty. Nevertheless, the domestic agricultural sector was too important a feature of Brazil's economy during the nineteenth century to be ignored. As a first approximation, the following statements can be advanced concerning the sector's size and composition.

Socially, this sector comprised many of the people in Brazil's population who, in the words of one historian, "were not slaves, but could not afford to be masters."[14] This observation suggests one way of forming an impression of the quantitative importance of the domestic agricultural sector in the Brazilian economy: an examination of the proportions of free people and of slaves in Brazil's total population. This procedure obviously provides only a very approximate picture. All of Brazil's slaves were not engaged in exports or in urban-based activities; many free people did work in those activities and in roles other than plantation owners. Bearing this caveat in mind, let us see what analysis of the population in terms of its slave and free portions suggests.

Brazil's social structure has often been conceptualized in terms of a master/slave dichotomy. That approach ignores the presence of a very large intermediate stratum of squatters, sharecroppers, and small farmers. At the very beginning of the nineteenth century, at least one-half and perhaps as much as two-thirds of Brazil's population was free.[15] Relatively few of these people—poor whites, mulattoes, freedmen, and *caboclos* (peasants of mixed Indian and white ancestry)—were large slaveowners engaged in production for the export market. Lacking alternative opportunities in a predominantly agrarian economy, many people in this intermediate social stratum were engaged in production of food for domestic consumption.

In 1820, some 70 percent of Brazil's population was free.[16] Until 1852 (when importation of slaves from Africa was stopped), only a small percentage of these people was employed in export activities, which relied heavily on slaves for most occupations. With the decline of slavery, free people were increasingly employed in export activities, but by that time the free population had grown rapidly as a result of high rates of natural increase.[17] Consequently, the number of people in the domestic agricultural sector remained large relative the country's total labor force.

The impression that much of Brazil's labor force was not engaged in export production is corroborated if we consider disaggregated population surveys for specific locales during the nineteenth century.[18] Further, the limited information available on the sectoral composition of Brazilian output also suggests that a large fraction of the labor force was engaged in the domestic agricultural sector. In 1911–13, exports accounted for approximately 16 percent of gross domestic product (GDP) in Brazil. During the nineteenth century, exports had grown at a higher rate than output in the rest of the economy. Consequently, earlier in the century, the share of exports in aggregate economic activity had been even lower than 16 percent. Further, labor productivity was generally higher in exports than in other activities of the Brazilian economy. Hence, the export sector's share in the total labor force was even smaller than its share in GDP. There were of course other activities in this economy besides exports and the domestic agricultural sector. In absolute terms, many people were employed in transportation, commerce, crafts, manufacturing, and government. Those activities were located to a great extent in the cities, however, and as late as 1890 only 11 percent of Brazil's population resided in urban centers of 10,000 or more inhabitants. These considerations suggest that a large frac-

tion of Brazil's labor force was engaged in the domestic agricultural sector during the nineteenth century.

This sector seems to have consisted of two parts. First, there were people who lived as sharecroppers, smallholders, or squatters in or near the areas of export production. Because of factor-market imperfections, these people rarely engaged in production of the principal export crops. Their main products were such foodstuffs as manioc, beans, and maize. In addition, the observations of contemporaries suggest that these people took much of their total income in the form of leisure. Second, part of the labor force in the domestic agricultural sector was engaged in farming on the abundant lands in Brazil's interior, relatively far from the areas of export production. Output consisted mainly of cattle ranching and of semisubsistence agricultural cultivation. In the latter case, production was mainly in the form of small-scale family farming under the overlordship of a large local landowner. With labor scarce relative to land, cultivation was land-extensive. Population in this sector was increasing rapidly, while abundant lands existed further in the interior. Consequently, the production frontier shifted ever farther from the markets and centers of consumption. As marginal physical productivity fell with soil depletion on the intensive margin, incremental production shifted, with rising transport costs, to the extensive margin. Until the end of the nineteenth century, it is hard to believe that the value of output per worker in the domestic agricultural sector was more than, at best, constant over time.

Transportation Costs and the Slow Pace of Economic Development

Because a large portion of Brazil's labor force was employed in the domestic agricultural sector, the modest rate of per capita output growth in that sector weighed heavily on the pace of aggregate development. We noted earlier that exports were the main avenue to economic development in nineteenth-century Brazil. The central importance of the export activities reflects a default, the poor performance of the rest of the economy.

High transportation costs affected both the level and the growth of productivity in Brazil's domestic agricultural sector, limiting the access of many agricultural producers to markets beyond their immediate locale. As a result, the volume of intraregional, interregional, and international trade was curtailed. Because of the high ratio of land to labor, cultivation was land-extensive, and distances to the markets were large. Low-cost transportation facilities were therefore crucial for developing a high-productivity agriculture. Unfortunately, the country's geographical and topographical conditions made for relatively high transport costs from the production areas to the market centers.

Rivers and coastal shipping were used for transportation, but some of the country's rivers (the Amazon, for example) were poorly located from the viewpoint of promoting economic development. Other rivers flowed in a direction that was not advantageous from the perspective of production for markets. Geographical conditions also imposed another problem that hampered low-cost shipments of bulky commodities from deep in the interior. Unlike the United States with its Mississippi and Great Lake systems, Brazil did not have an extensive *network* of navigable, interconnecting waterways. Further, road conditions were also poor, to the extent that at the beginning of the period wheeled vehicles could seldom be used in the interior. Transport costs were so high that they absorbed a third of the value of coffee shipments during the prerailroad era. Similar conditions prevailed in the northeast. Thus the cost of shipping cotton from the São Francisco Valley to Bahia in the 1850's amounted to some 50 percent of the prices received. Under these conditions of high-cost transportation and poor access to markets, abundant land was not associated with a high value of output per worker in agriculture.

The combination of high transportation costs and a large domestic agricultural sector also had other consequences for the Brazilian economy. Because of Brazil's poor internal transportation facilities, food produced on more distant land involved higher supply prices. Inelasticity in the supply of foodstuffs meant that when income and demand in the economy's advanced sector increased, prices rose. Unlike many other countries, Brazil experienced a long-term inflation during the nineteenth century. Price inflation was a feature of the Brazilian economy that had its own welfare costs, both direct (higher uncertainty) and indirect (presumably, lower cash balances and lower investment). In addition, conditions in the domestic agricultural sector constrained Brazil's industrial development. Low income levels and high costs for transporting goods to the hinterland limited the size of the market for manufactured goods in Brazil. The Brazilian government imposed protective tariffs on many industrial products during the nineteenth century, but protection against imports could not assure would-be Brazilian industrialists access to a market that did not yet exist. Industrialization based on the internal market clearly required the prior emergence of a domestic market.

More generally, high transport costs diminished the net receipts that producers obtained from shipment of bulky, low-value foodstuffs to the market. As a result, income in the domestic agricultural sector was reduced—both because of the low value received for output and because of the disincentive effect that unfavorable relative prices had on the quantities produced. Low prices in the domestic agricultural sector were reflected in a small marginal value product for labor and, as a consequence, in widespread substitution of leisure for monetary income. Finally, high transport costs for foodstuffs also had an important intersectoral effect. The country's steep price-distance gradients in regional markets meant rising incremental costs for food, the economy's wage good, in the face of buoyant demand conditions. Expanding aggregate demand therefore reduced the returns to capital and the rate of expansion in the advanced sector, with little impact on higher real output levels in the economy's backward sector.

Efforts at modifying geographical conditions and lowering costs by construction of transportation infrastructure were slow to materialize in nineteenth-century Brazil. In contrast with the United States, there was virtually no canal construction. The country's rivers also remained largely without improvements.[19] Consequently, the boats used for internal transportation were small and entailed high unit costs. The country's first railroad legislation was promulgated in 1835, but actual railway construction was late in coming to Brazil. The country's earliest railway, extending some 15 kilometers, was built in 1854. Ten years later, approximately 424 kilometers of track were in operation. As late as 1890, however, the country had only 9,973 kilometers of operating trackage. This did not amount to much in terms of Brazil's overall expanse of some 8.1 million square kilometers.[20] Furthermore, the country's road network was extremely limited. As late as 1923, São Paulo state, one of the largest and most developed in the country, had only 1,025 kilometers of highways (of which 55 kilometers were macadamized) suitable for automobile use.

Railroads might have helped this situation by lowering transportation costs. This would have provided a necessary condition for linking part of the domestic agricultural sector with the rest of the economy and permitting it to shift from subsistence to market-oriented production (for the domestic market or for exports), whether in the family farms or in large-scale agriculture. Lower transportation costs would also have provided producers with the stimulus of market demand and might thereby have induced higher output levels. On the supply side, producers would have been able to reap the gains from specialization and local comparative advantage. Hence even with unchanged physical productivity, lower transport costs

TABLE 2.1

Length of Railway Track in Brazil, 1854–1914

Year	Kilometers	Year	Kilometers
1854	14	1894	11,260
1864	470	1900	15,320
1874	1,280	1904	16,320
1876	2,080	1914	26,060
1884	6,240		

SOURCE: IBGE 1939:218.

might have raised the value of production in the domestic agricultural sector, both by increasing the quantities produced and, with new relative prices, by altering the composition of output.[21]

Notwithstanding these potential benefits, nineteenth-century Brazil was late in initiating large-scale railroad construction. Table 2.1 presents data on the late start and the slow pace of railroad construction. Thus despite Brazil's vast territorial expanse, as late as 1884 the country had only 6,240 kilometers of track. This amounted to approximately 0.7 kilometers of track per 1,000 square kilometers of territory. Further, in terms of timing, the great increase in railway construction toward the interior began only in the 1890's. Indeed, the largest absolute rise in railway track occurred only in the twenty years before 1914. To gain some comparative perspective, note that in 1900, railway trackage in the United States was almost 20 times as great as in Brazil. Even after the large post-1900 increase in Brazil's railway construction, in 1914 the country had only 26,060 kilometers of track. This was a figure that the United States had surpassed by the 1850's.

Why were the railways built so late in Brazil? The difficult terrain often led to high construction costs, but these would have been no obstacle if the railroads had also generated substantial benefits. Capital immobilities were also a problem. Although some of the first railroads in the coffee region were built with local capital participation, construction of Brazil's railways in general depended heavily on foreign investment. In the nineteenth century, this was largely British, and British investment was directed away from Brazil by such non-market considerations as imperial policy. In addition, private rates of return on Brazilian railway investments were apparently not high enough to attract substantial British capital from its alternative opportunities during most of the nineteenth century.

Brazil's limited attractiveness to foreign investors, however, is not a sufficient explanation of the long delay before large-scale railway construc-

tion began. If private returns were low but investment in low-cost transportation facilities were justified in terms of external economies and high social returns, another approach might have been followed. In principle, the task of providing Brazil with an adequate transportation system might have been undertaken by government—central, provincial, or local. That was the course followed with many of the "public improvements" that were supplied in the nineteenth-century United States. In fact, Brazil did not follow that approach until the end of the period. For reasons discussed below, during most of the century Brazilian governments failed to provide on a sufficient scale the infrastructure investment needed for the country's economic development.

Railroads and the Acceleration of Economic Development

Once the railways were extended, economic development seems to have proceeded along the lines outlined above. Even with unchanged output levels, the higher ex-farm prices made possible by low-cost transportation would have raised producer incomes.[22] In addition, producers in the domestic agricultural sector responded to the new market opportunities opened by lower transport costs. Producers increased the volume of their output for the market, while the fall in transportation costs also led to new patterns of intraregional specialization. Another feature was a rise in the price elasticity of the food supply.[23]

Some numerical information on these developments is available for Minas Gerais. This large state had approximately 21 percent of Brazil's population in 1900. Despite its geographical proximity to São Paulo and that province's large regional market, Minas Gerais was not economically well-developed. In the 1890's, however, the province "caught railroad fever": half of Minas Gerais's pre-1899 trackage was laid in that decade.[24] Table 2.2 presents data on the subsequent increase in food shipments from Minas Gerais. As the high growth rates for the decade 1900–10 indicate, a domestic market existed for the products of the domestic agricultural sector, and supply responded effectively once low-cost transportation was made available. Import substitution in food was an important part of this development pattern.[25]

The process through which railroads promoted economic growth in the domestic agricultural sector had some special features. The railways helped domestic agricultural producers not only by reaching the distant interior, but also by existing in the zones of export production. Part of the country's food supply was produced in and around the plantation areas.

TABLE 2.2

Growth of Food Shipments from Minas Gerais, 1900–10

Product	Annual geometric growth rate (%)
Corn	10.5
Beans	17.4
Rice	40.0
Livestock[a]	10.4

SOURCE: Computed from data presented in Wirth 1977: 44, 46.
[a] 1895–1905

Food producers in those areas benefited directly from the new availability of low-cost transportation to the regional market. In addition, the lines opened in the export zones lowered the cost of shipments that originated in the far interior and proceeded, via the railroad, to the markets. Under these conditions, even railways that had been built primarily to carry export commodities came to transport large volumes of products from the domestic agricultural sector.

Table 2.3 presents data on this phenomenon in the province of São Paulo. The data relate to three major railroads that were built mainly to transport coffee. As the table indicates, even on those railways, products other than coffee came to account for a sizable share of total shipments.

TABLE 2.3

Total Freight and Non-Coffee Freight on Three of Brazil's "Coffee" Railways, 1876–1915

(annual averages)

	Paulista Railway		Mogiana Railway		Sorocabana Railway	
Period	Share of non-coffee shipments (%)	All freight shipped (tons)	Share of non-coffee shipments (%)	All freight shipped (tons)	Share of non-coffee shipments (%)	All freight shipped (tons)
1876–80	n.a.	n.a.	50	29,200	98	16,200
1881–85	37	132,000	36	57,300	n.a.	n.a.
1886–90	50	209,400	57	111,100	85	61,100
1891–95	63	520,100	63	215,900	85	139,700
1896–1900	57	728,400	58	395,700	82	248,100
1901–05	48	785,600	51	531,300	73	269,500
1906–10	48	1,018,800	56	720,600	76	412,600
1911–15	63	1,356,000	70	1,097,300	86	588,000

SOURCE: Computed from data in Saes 1976: 79.
NOTE: n.a. indicates data are not available.

Much of the tonnage consisted of foodstuffs and industrial raw materials transported from the hinterland to the expanding regional market.

Table 2.3 shows that, on the Sorocabana Railway, the proportion of goods other than coffee was very high at the outset. On the other two railways, the share of noncoffee products rose steadily to dominate total shipments. Overall, the volume of domestic agricultural products shipped on these lines increased at a pace similar to that of coffee shipments—and this in the heyday of the São Paulo coffee boom! Between 1886–90 and 1911–15, the amount of noncoffee products in Table 2.3 rose at an annual geometric rate of 9.5 percent. This compares with a long-term growth at an annual rate of 7.2 percent for coffee shipments on these lines.

The growth in shipments of domestic agricultural products was facilitated by the Brazilian government's tariff and rate-setting policies.[26] Brazil experienced considerable price inflation in the decades before 1913. As a consequence both of normal regulatory lag and of hostility to the foreign railway companies, however, the government's rate-setting authorities resisted efforts to raise transportation charges to keep pace with the country's inflation. Thus, not only did shipping costs fall when the railways were opened but, in addition, the price of railway transportation declined thereafter relative to the general price level. This rate-setting policy led to government subsidies for the railways and, eventually, to nationalization. What is important in the present context is that government regulation further lowered real freight charges for producers in the domestic agricultural sector.

The structure of railway rates also discriminated in favor of the domestic agricultural sector. Between 1874 and 1900, the rates charged for shipments of foodstuffs on the railways listed in Table 2.3 ranged between 26 and 49 percent of the rates charged for coffee. For livestock and timber the rates were even lower. Moreover, in 1899 the government implemented a general policy that obliged the railway companies to lower their charges on domestically produced foodstuffs. As a consequence, the domestic agricultural sector drew special and disproportionate advantage from the fall in transport costs that the railroads made possible. For this reason, it is difficult to make meaningful comparisons with shipping costs in the prerailroad era, which might serve as a basis for comparative welfare analysis. In the earlier period, freight charges for the domestic agricultural sector's high-weight/low-value commodities had often been so high in many areas that these products had not been shipped at all.

The government's policy with respect to import duties also promoted economic growth in the domestic agricultural sector. At the turn of the century, the government imposed protective tariffs on many foodstuffs produced in Brazil.[27] The fact that politicians from Minas Gerais took a prominent role in this policy initiative suggests that the new measures should not be viewed as determined randomly or by a process that was completely exogenous. The advent of low-cost transportation had greatly increased the potential economic returns that protective tariffs offered to domestic food producers. Political returns rose correspondingly for the political entrepreneurs who would implement the necessary policy measures. From this perspective, provision of the import tariffs can be regarded almost as endogenous to the process.

The economic consequences of the new import duties were clear-cut: reduced uncertainty and a larger market for the domestic agricultural sector. Moreover, the fact that part of the sector's market growth came at the expense of imports helped avoid a potential pitfall. That would have been a situation in which large increases in domestic food supply pressed on stationary, price-inelastic demand and thus reduced aggregate revenues for producers. The policy initiative also had broader economic effects. As noted, the new tariffs were implemented in conjunction with the heightened domestic supply response that low-cost transportation made possible. Under those conditions, the import tariffs led to import substitution in many food products and intensified intersectoral linkages within the Brazilian economy.

The northeast also benefited to some extent from a decline in transport costs. In areas where railways were built, internal freight charges for sugar and cotton appear to have fallen some 50 percent from their level in the prerailroad era. Railways could promote economic development only when they were built, however, and because of the poor economic prospects of the northeast's export activities, little railway construction took place in the region. In the southeast, however, extension of the railways seems to have opened a new period of generalized economic development.

Prior to the extension of the railways, a rising value of output per capita in Brazil had been limited mainly to the export sector. By lowering transport costs in a vast, land-rich country, railways permitted more rapid growth of income in the large domestic agriculture sector. The downward shift in internal freight charges also led to other structural shifts and new intersectoral linkages within the Brazilian economy. Thus the internal market for manufactured products also expanded. Supported by ample tariff protection, Brazil's cotton textile industry increased its output at an annual geometric rate of 11 percent between 1885 and 1915.[28] As noted earlier, Brazil's economic development proceeded much more rapidly after 1900

than in the preceding century. For the reasons discussed, the extension of the railways seems to have played a key role in the shift to the new development trajectory. This experience is also consistent with interpreting Brazil's slow economic development during the earlier period as stemming largely from an absence of the external economies that railways would have provided. Because of the country's factor endowment and geographical features, the availability of low-cost transportation was of special importance for economic development in nineteenth-century Brazil.

The Brazilian State and the Public-Finance Constraint on Public Investment

The preceding discussion raises an obvious question. We can well understand the failure of private entrepreneurs to invest in railways in the Brazilian interior. Much of the economic benefits of that investment came in the form of external economies, such that the railroads' social returns exceeded their private returns. But why did the Brazilian state not provide the resources—either through direct investment or through subsidies—to equip the country with railways earlier, so that Brazil could have been launched on its path of long-term economic development much sooner in the nineteenth century?

One possibility is that the vision of implementing a rational public-investment policy was distorted by the lens of Brazilian politics. The large landowners had considerable influence in Brazilian politics during the nineteenth century, and they are generally not considered to have been a very "progressive" or "development-oriented" group. In fact, what was needed in this context was not an interest in development but an interest in wealth maximization. Brazil's landowners displayed ample evidence of such an interest.[29] Thus, responding to the prospect of favorable returns, Brazilian planters allocated sufficient resources—even to products with a long gestation period, for example, cocoa in Bahia and coffee in São Paulo—to make possible sharp increases in output. Further, far from explaining the failure of Brazil's governments to provide large infrastructure investments, an interpretation that emphasizes the role of the large landowners in Brazilian politics only sharpens the question. For, following Joseph Schumpeter's insight concerning the convergence of monopoly and socialism, one would expect large landowners to be especially energetic in pressing for public investment.[30] This is because landowners with extensive holdings and market power can internalize and appropriate most of the

social benefits of infrastructure investment. Therefore Brazil's internal political conditions should have led to *large* government investment in economic infrastructure.

Another possibility is that ideology inhibited a rational public-investment policy. In principle, Brazil's political leadership may have been constrained by nineteenth-century doctrines of laissez-faire. Voices of economic liberalism were heard in nineteenth-century Brazil, but, in practice, Brazilian governments did intervene in the economy, imposing protective tariffs as well as providing subsidies—for example, for European immigration and for technological modernization of the northeast's sugar industry—when these did not require a large financial input. Likewise, the Brazilian state was so little bound by the canons of nineteenth-century economic orthodoxy that it ran frequent fiscal deficits and maintained economic policies that led to chronic inflation and long-term exchange-rate depreciation.

Another possible explanation for the government's lack of support for new railroads suggests that it would be naive to expect the Brazilian state in the nineteenth century to demonstrate an interest in promoting economic development. The country's political and administrative elites are generally considered to have been more interested in self-aggrandizement and bureaucratic expansion than in economic development. Such concerns, however, are perfectly consistent with a large promotional role for the public sector. Expanded state investment and subsidy programs would have meant more government jobs and greater control over society's economic resources. Thus the existence of self-seeking motives is hardly an adequate explanation of the Brazilian state's failure to pursue a more active public-investment policy.

One set of conditions does seem to have constrained the Brazilian state's developmental activity: public finance. Through most of the nineteenth century, the fiscal resources the Brazilian state had at its disposal to pay for infrastructure investment and subsidy programs were small relative to the country's development needs. Table 2.4 presents data on the Brazilian central government's expenditure in successive decades of the nineteenth century. Because of Brazil's long-term price inflation, figures in nominal mil-réis would not tell much about the state's fiscal capacity in real terms. Accordingly, using Brazil's exchange rate as a rough proxy for a price deflator, we express the fiscal data in terms of foreign currency, the pound sterling. Further, the relative price of exports in Great Britain (Brazil's principal foreign supplier) changed during the nineteenth century. Consequently, to get an idea of the import capacity of the central government's

TABLE 2.4

Sterling Value of Central Government Expenditure in Nineteenth-Century Brazil

(current and constant Sterling prices)

Period	Average annual expenditure in current Sterling prices (000£)	Expenditure per capita in current prices (£)	Average annual expenditure in constant (1880) prices (000£)	Expenditure per capita in constant (1880) prices (£)
1823–31	1,747	0.344	999	0.196
1832–41	2,377	0.401	1,703	0.286
1842–51	3,170	0.460	2,918	0.423
1852–61	4,919	0.614	4,534	0.566
1862–71	10,051	1.075	7,923	0.846
1872–81	13,769	1.252	12,483	1.128
1882–91	14,873	1.113	18,146	1.097
1891–1901	14,679	0.887	18,146	1.097
1902–11	29,609	1.409	33,519	1.598

SOURCES: Computed from data on the mil-réis value of central government expenditure presented in Onody 1960: 195–98 and from data on the sterling/mil-réis exchange rate. The series in constant sterling prices was computed using the index of export prices of the United Kingdom, Brazil's major foreign supplier, which is available in Imlah 1958: 94–98.

fiscal resources in real terms, we also present the data in constant sterling prices.

During most of the century, Brazil's fiscal system was highly centralized. Table 2.4 therefore tells much about the total spending of Brazil's public sector (including the provincial and local governments). Thus, until the 1880's, the tax revenues of the central government were approximately 4.5 times larger than those of the provincial governments. The central government's share in total public-sector *expenditure* was even larger, for the central government had much greater access to foreign and domestic borrowing. Likewise, the tax revenues collected by local governments in nineteenth-century Brazil were a small fraction of total public-sector revenues. Table 2.4 thus provides important information concerning the level and growth of total public-sector expenditure.[31]

As the data indicate, for the first four decades after independence, the central government's expenditures per capita were well below £1. It was only with the Paraguayan War (1864–70) that per capita expenditure exceeded £1. And it was not until the first decade of the twentieth century that central-government expenditure in current prices approached £1.5 per capita. Different measuring rods may be used to assess these expenditure levels. In the present context, the most pertinent comparison is with the magnitude of the development task that Brazil faced in the nineteenth century. As noted earlier, the country's initial conditions with respect to social overhead capital were poor. In addition, difficult geographical conditions meant that the costs of providing the country with a low-cost transportation system were high. Viewed in terms of providing infrastructure investment adequate for the country's development needs, the fiscal resources available to the Brazilian state until the end of the nineteenth century seem to have been relatively small.

The central government's low expenditure levels reflected basic features of the fiscal situation that confronted the Brazilian state in its efforts to raise tax revenues. Public finance was constrained by the paucity of tax bases that would yield revenues commensurate with the costs of tax collection. Consequently, government expenditure levels did not reach the scale that would have been socially optimal if such transaction costs did not have to be considered. As noted earlier, the Brazilian state had major incentives (if only for its own self-aggrandizement) to enlarge the volume of economic resources at its disposal. The country's landowners, who would have appropriated most of the benefits of expanded public investment, also stood to gain. But a large increase in fiscal penetration (increase in the size of the tax base) within the broader society also involved significant economic costs. The net marginal social benefits of public-finance expansion were thus low. As a result, such fiscal expansion understandably (and rationally) encountered resistance on the part of Brazil's socioeconomic elites.

Because of the great distances, poor communications, and low literacy rates present in nineteenth-century Brazil, the costs involved in tapping most potential tax bases were high. By contrast, the administrative costs of collecting taxes on imports and exports were relatively low. Accordingly, the Brazilian state's revenues and expenditures depended heavily on foreign-trade duties. Between 1830 and 1885, some 70 percent of the government's revenues came from taxes on imports and exports. As this number indicates, generalized taxes on agricultural land were not an important source of government revenue in nineteenth-century Brazil. In this respect, Brazil contrasted notably with countries otherwise as diverse as India and Japan in the nineteenth century.[32] Not only would the administrative costs (including a cadastral survey) of generalized land taxation have been high, but the revenue prospects of such an effort were meager. An important difference with India and Japan was Brazil's abundance of land and the ensuing low ratios of labor to land in the domestic agricultural sector. With little pressure of population on land, Ricardian rent, the basis for land taxation, was small. These conditions, which made for high transactions costs and a low economic surplus in the domestic agricultural sec-

tor, meant that the net fiscal yield of generalized land taxation would have been small.

Fiscal prospects in Brazil's foreign-trade sector were more attractive. There, transactions costs were not so large relative to the size of the economic surplus as to lower sharply the net social gains of taxation. Because of these differences between the foreign-trade sector and the domestic agricultural sector, government revenues and expenditures depended heavily on the value of Brazil's foreign-trade receipts. The tax rates imposed on this base, however, could not be set at arbitrarily high levels lest exports and imports diminish to the point where tax revenues would fall. Unfortunately, through most of the nineteenth century, Brazil's foreign trade volume was too small to provide the fiscal resources needed to finance infrastructure development.[33] A comparative perspective from the United States is useful in this context. The central government in the United States also relied heavily on foreign-trade duties as a source of tax revenue in the nineteenth century, but foreign trade provided a much larger tax base in the United States. From the 1820's through the 1850's, U.S. export receipts were approximately five times larger than those of Brazil. In the subsequent four decades, the ratio was even higher, 6.8 to 1. As these numbers indicate, the central government in the United States could draw on a much larger tax base to support its expenditure programs.

The Brazilian state attempted to supplement its revenues by borrowing, both at home and abroad. In 1864, before the sharp rise in government expenditure that came with the Paraguayan War, government debt (including money issued by the government) amounted to £5.5 per capita. Moreover, the Brazilian state's borrowing was not limited to foreign sources. Between 1841 and 1889, the share of domestically held obligations in the government's total debt-service payments ranged from 42 to 62 percent. Although borrowing afforded the Brazilian state a welcome short-term addition to its fiscal resources, it did not solve the country's public-finance problem. The scope for borrowing was set ultimately by debt-service capacity and hence by tax revenues. Until the end of the nineteenth century, the volume and growth of Brazil's foreign trade were too small to permit a high level of government expenditure.

Constitutional Structure and the Public-Finance Constraint

As noted earlier, nineteenth-century Brazil was a country of large distances and poor communications. Brazil's political elite wanted, neverthe-

less, to hold the country together as a single political entity. The constitutional structure implemented in the face of these tensions further limited the state's capacity to mobilize tax revenues.

Between 1834 and 1840, Brazil experimented with a decentralized ("federal") fiscal system. Serious centrifugal pressures emerged, however, and a tightly centralized constitutional structure was reinstituted. Throughout most of the nineteenth century, then, control over economic policy and public finance in Brazil was concentrated in the central government. The centralized constitutional structure affected public finance (and thus the pace of infrastructure investment and economic development) in two ways. First, Brazil's provincial governments and municipalities were not able to play the large public-investment role that the state and local governments filled in the United States. Brazil's provincial and local governments were legally empowered to make promotional investments, but under the prevailing constitutional structure they lacked the fiscal resources to fulfill developmental responsibilities that required large expenditures.

Second, the centralized constitutional structure may also have limited the volume of public-finance resources that Brazil's socioeconomic elites were willing to accord to the *central* government. Public-finance theory has emphasized that even under relatively favorable conditions, the supply of public goods is likely to be socially suboptimal; individual political participants are unlikely to reveal their true preferences concerning the supply of public goods. That standard problem was exacerbated in nineteenth-century Brazil by the centralized political structure. Because of their geographical dispersion, political participants in Brazil had very different preferences concerning the net benefits of potential public-investment projects that would be located in diverse provinces. Such location-specific preferences can be accommodated within a political system having decentralized fiscal functions, but with a unitary political structure and multiple regional participants—the situation that prevailed in Brazil during most of the century—the supply of public goods is likely to be especially suboptimal.[34]

Brazil's experience in the Paraguayan War supports the interpretation that the public-choice conditions we have discussed limited the size of government revenue and expenditure during the nineteenth century. The war confronted Brazil's elites with the need for a classic public good—national defense—which appeared to benefit all political participants. In response, central-government expenditures and tax revenues increased sharply. Thus the war offered a generalized public good, which, for a while, relaxed the constraint on the supply of public finance.

The absence of representative democracy—another feature of nine-

teenth-century Brazil's political constitution—also limited the system's capacity to implement social preferences in a rational manner. In a representative democracy, the ruling party is likely to be more responsive to the wishes of other political participants.[35] By contrast, in a hereditary monarchy such as existed in nineteenth-century Brazil, where the chief executive is not chosen by or responsible to broader socioeconomic elites, the state can achieve greater autonomy vis-à-vis other political actors. But since participants in a less-representative system can exert less control over the allocation of fiscal resources, they have less assurance that they (rather than other participants) will benefit from the way in which their taxes are used. Because of this uncertainty, political actors in a less democratic political system will rationally accede to a lower level of taxation than will participants in a more representative system. In the latter case, taxpayers have more control over allocational decisions and, consequently, greater assurance that their taxes will be spent in accordance with their own preferences.

Some of Brazil's political leaders recognized how the government's constitutional structure limited its public-finance ability and the country's economic development. In 1889, they introduced a new constitution, which transformed Brazil from a centralized imperial regime (the system that we have discussed) to a federal republic. This shift involved more than a superficial change, for it included some changes that were significant in the present context. The new constitutional structure decentralized power and functions and gave Brazil's states far more autonomy in fiscal affairs and overseas borrowing. Some state (and local) governments responded energetically to the opportunities that the new arrangements offered. A number of states raised their taxes and their spending on economic infrastructure. Also, recognizing that their credit rating was better than that of the country as a whole, some states and municipalities took advantage of the new structure to borrow aggressively overseas, largely for infrastructure investment. Between 1888 and 1915, the external debt of Brazil's overall public sector rose from £33 million to £172 million. State and local borrowing accounted for fully 42 percent of this large increment. Similarly, the 1906 program for coffee valorization was largely the effort of the major coffee-producing states and might not have been feasible under the earlier, centralized structure.

Also important were the new constitution's "republican" aspects. These, too, facilitated greater responsiveness on the part of the central government to private-sector economic interests. The new structure featured election of the chief of state by Brazil's socioeconomic elites—a change from the previous system of hereditary succession. In addition, the chief executive no longer had lifetime incumbency. Private-sector elites gained on both grounds. Not only could they exert more power in the initial selection of the chief executive, but they also had the enhanced influence on the central government's decision making that came with recurring elections.

The Onset of Long-Term Economic Development

Between 1898 and 1913, the Brazilian central government's spending, valued at constant pound sterling prices, rose at a trend rate of 10 percent per year. This rate of growth contrasts with the much slower expansion, at a trend rate of 2.1 percent per year, during the previous period, 1878–97. To some extent, the extraordinary fiscal expansion that began in 1898 reflects recovery from a cyclical trough. More important, the acceleration of government spending was driven by an export boom that increased tax receipts. Thus the decade 1902–11 saw a 52 percent rise in the constant pound sterling value of Brazil's exports as compared with the previous decade. Government spending, however, rose by much more than would be expected, in light of the historic relation between Brazil's exports and its public finance (a long-term elasticity of unity). The additional growth in government spending is consistent with the constitutional changes that we have noted.

The sharp, sustained increase in government spending was important for its effects both on the economy's supply side and on demand conditions. Some of the increased public-sector expenditure added to Brazil's infrastructure. Also, coming in conjunction with the sharp rise in export demand, higher government spending constituted an upward demand shock on the economy. Brazil had experienced export booms before. The country had also had periods—for example, the Paraguayan War—when government spending had risen rapidly. This time, however, the spurt in demand encountered the more elastic food-supply conditions and the intensified intersectoral linkages that came with extension of the railways. As a result, the growth in demand now generated a sharp rise in real output. Not only did output growth accelerate in the first decade of the twentieth century, but that decade was also a period in which price inflation was below Brazil's long-term trend.[36]

Decadal growth rates show real agricultural output growing at an annual rate of 3.5 percent between 1900 and 1909, industrial output growing at an annual rate of 5.6 percent, and aggregate real output (an index whose movements approximate those of real GDP), at an annual rate of

4.2 percent.[37] Brazil was now launched on a path of long-term economic growth. Between 1900 and 1947, aggregate real output rose at a trend rate of 4.4 percent per year, and per capita real output at 2.3 percent per year. That pace of economic progress exceeds the rate at which per capita GDP increased in the United States and in the countries of Western Europe at the onset of their modern economic development.

We can now recapitulate the main lines of Brazil's economic experience in the nineteenth century. Declining per capita income in Brazil's large northeast region, the result of poor performance of the region's exports, is one feature of the story. The elastic supply of labor to the economy's advanced sector is another. Finally, one key reason for Brazil's limited economic progress during the nineteenth century is a feature to which historians have traditionally given little attention: conditions in the domestic agricultural sector. As Brazil's subsequent experience was to demonstrate, the availability of low-cost transportation was crucial for productivity growth in that sector. Unfortunately, nature did not endow Brazil's interior with low-cost transport facilities. Until the end of the century, neither did the market or the political process.

Because the nineteenth century was a long period of meager economic progress for Brazil—and one of falling behind other countries in the world economy—it would be easy to end this chapter with a sense of missed opportunities. But an opportunity cannot be missed unless it was in fact available. We are therefore led to a basic question: *could* Brazil's long-term economic course have been very different from the path it actually followed? One can easily imagine alternative scenarios that would have led to higher rates of economic development in nineteenth-century Brazil. One alternative would have involved expansion based on rising productivity within the domestic sector rather than the orientation toward exports and the international economy. We can also imagine ways in which Brazil's development might have been happier even within the framework of export-led growth. For example, if Brazilian governments had invested earlier and on a larger scale in social overhead capital (as happened in the United States), or if Brazil had restricted the flow of labor from overseas (as occurred in Australia), Brazil's economic development would have been very different.

To be meaningful for historical analysis, counterfactuals should be empirically relevant and truly conceivable for the historical period under consideration.[38] In fact, those alternative scenarios were not historically available for nineteenth-century Brazil. In a country where a central thrust of governmental policy was to increase the supply of labor from overseas, it is

idle fantasy to speculate on a development pattern based on restricting the importation of workers. Furthermore, in view of the relatively low return on investment available in nineteenth-century Brazil (not least to the state itself, in terms of tax revenues), it is not surprising that the economy's expansion path inclined toward export growth. Finally, given the economic and political conditions that we have discussed, it would not be realistic to expect public-investment programs very different from what in fact occurred. Likewise, with Brazil's low level of social overhead capital, an alternative development scenario based on the economy's domestic sector was not possible.

Historical research can elucidate the limits of what was possible. Such analysis can clarify the extent to which events followed the course they did not because of accidents or random shocks but rather because of initial conditions and their intrinsic logic over time. As such, the study of history can spare later observers depressing reflections that have no basis in the realm of the possible. Brazil's economic history in the nineteenth century seems to have been a relatively extreme case in this genre. The pattern of economic change there appears to have been very much governed by existing structural parameters, with little scope for an alternative course.

This chapter also sheds light on some basic questions that have long intrigued students of Brazil's economic history. For example, one may wonder whether Brazil's economic development was driven primarily by political or by market forces. As our discussion of railroads, import tariffs, and subsidized immigration suggests, posing the question in such "either/or" terms is not helpful. Entrepreneurs—both economic and political—responded to the opportunity set that Brazil offered. In turn, political intervention shifted the country's economic constraints and incentives; economic change altered the results of diverse political initiatives. Brazil's economic experience—both the initial period of slow long-term growth and the country's subsequent breakthrough to sustained development—clearly reflects the interplay of economic and political forces.

This chapter also has some general lessons for understanding long-term economic development. I mention four obvious points. First, economic theory works in the real world. For example, economists have elaborated theoretical conditions necessary for an optimum currency area. The northeast's miserable experience in the nineteenth century can be read as a morality tale that illustrates what happens when people violate these conditions. Second, geography matters. We saw examples when we considered the importance of low-cost transportation for the domestic agricultural sector and when we discussed the rigidities that constrained factor reallo-

cation from sugar and cotton to coffee. A third lesson is that public finance matters. As we have seen, the supply of fiscal resources can be crucial for economic development. Finally, political institutions can play a relatively autonomous role in the development process. Constitutional structure had independent effects in transmitting (and in some ways distorting) the policy preferences of Brazil's socioeconomic elites. Brazil's experience, first with a centralized and subsequently with a decentralized political structure, suggests that institutions can be more than an epiphenomenon of sociopolitical conditions.

I also note some implications for the research agenda in Brazilian historiography. A refocusing on topics whose importance is now evident, and about which we know far too little, would be helpful. Thus I suggest a shift in research attention from the colonial period to the nineteenth century. In terms of economic subject matter, I suggest a shift from study of the export and urban-based activities to study of the large and as yet little known domestic agricultural sector. In terms of social history, researchers might give less attention to the masters and the slaves and more attention to the people who comprised the intermediate social strata, the free poor. Recognizing the importance of geography, we might give less emphasis to research on the cities and the coastal provinces and more to the interior, particularly Minas Gerais. Regarding specific topics, it would be enlightening to know more about Brazil's demographic history and especially about the conditions associated with the high rate of natural increase of Brazil's free population; about the revenue and spending patterns of Brazil's provincial and *municipio* governments during the nineteenth century; and about the social and cultural conditions related to the relative absence in nineteenth-century Brazil of the "spirit of association" that Alexis de Tocqueville found so prominent a feature in the supply of public goods in the United States during the nineteenth century.

Notes

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1. I draw on earlier research in Leff 1982a; Leff 1982b. Those studies provide the sources for data not otherwise cited in this paper.
2. Leff 1982a: chap. 2, appen. 2.
3. This section draws on material presented in Leff 1982b: chap. 2.
4. Mundell 1961.

5. This section draws on data and analysis presented in Leff 1982a: chap. 4.
6. Carvalho de Mello 1977: 50, 66.
7. During this period, consumer prices in Rio de Janeiro seem to have risen at an annual rate of at least 2 percent. See Leff 1982a: chap. 6.
8. Leff 1982a: chap. 4 appen.
9. Cowell 1977.
10. Levine 1971.
11. Lewis 1954.
12. The domestic agricultural sector is sometimes referred to as the "subsistence" sector. That term is misleading inasmuch as it also connotes minimal income levels, a condition that may not have applied to people in the interior of nineteenth-century Brazil. I therefore prefer the term *domestic agricultural sector*, which more clearly indicates the nature of the goods produced and their economic destination.
13. The phrase is from Reigelhaupt and Forman 1970: 103.
14. Prado 1963: 419. This work provides numerous observations on the people and activities of the domestic agricultural sector. See, e.g., pp. 183–86, 214–19, 302, 328–39, 400–2. But those observations are presented in a conceptual framework that ignores their importance.
15. See the population estimates presented in Simonsen 1962: 271; Prado 1963: 117.
16. This statement is based on population estimates that are presented in Simonsen 1962: 271; Stein 1957: 294; Manchester 1933: 183.
17. Leff and Klein 1974.
18. Leff 1982a: 21.
19. On the importance of canals and improved internal waterways in the economic development of the United States during the nineteenth century, see Goodrich 1961.
20. The ratio of Brazil's railway trackage to its territorial size in 1890 would remain very small even if large, relatively uninhabited areas like the Amazon region were excluded from the calculation. Note, moreover, that the extent to which an area is inhabited or not also depends on the availability of low-cost transportation facilities.
21. A formal model analyzing the impact of lower transportation costs on agricultural development is presented in Katzman 1974, esp. pp. 683–86. In addition to raising the ex-farm prices of all agricultural products, lower-cost transportation changes the relative prices that producers face at different locations. This differential price impact of freight charges on diverse products provides a basis for intraregional specialization even under homogenous production conditions. Producers who are more distant from the major consumption center will find that their comparative advantage lies in crops that are cheaper to transport, while producers closer to the market will specialize in products on which transportation costs weigh more heavily. The gains due to relative-price effects and compositional change are additional to those that stem from increase in market production per se.
22. On the magnitude of this output-valuation effect in less-developed economies, see Usher 1968, esp. part 2.
23. Leff 1982a: 117–20, 146–61.

24. Wirth 1977: 58. A map showing the timing of railway construction in the Minas region is presented on p. 417 of Webb 1959.

25. The data of Table 2.2 show exceptionally high growth for shipments of rice. This occurred in the context of import substitution in rice. Information on that process is presented in Mandell 1971: 167–68, 201–4, 217–19.

26. On what follows here, see Saes 1976: 80–81; Wirth 1977: 44, 50, 180; 1978: 40–41.

27. Luz 1961; Levine 1978: 119, 126, 130; Wirth 1977: 47, 180; Mandell 1971: 167–68, 201–4, 217–19.

28. Computed from data in Stein 1957: 191. The data there also show similar rates of growth for employment and looms installed in the cotton textile industry.

29. Concerning the general question of sociocultural conditions as a constraint on economic development in nineteenth-century Brazil, see Leff 1982b: chap. 3.

30. Schumpeter 1942.

31. Brazil's fiscal heterodoxy often led to budget deficits; hence, government expenditures were not constrained to equal revenues. Nevertheless, expenditures could not be totally unrelated to revenues because of the inflationary and balance-of-payments consequences of complete decoupling.

32. Bird 1974: chap. 5.

33. Information on the size and growth of Brazil's international trade in the nineteenth century is provided in Leff 1982a: chap. 5.

34. Public-finance behavior in contemporary less-developed countries supports these analytical perspectives. With other conditions held constant, the share of total government taxation in GDP is higher in less-developed countries that have a decentralized fiscal system. See Lotz and Morss 1970: 334–38.

35. Breton 1974: 44–48, 113–16, 156.

36. Leff 1982a: 101–2.

37. Haddad 1974: table 1.

38. See the thoughtful discussion on the use of counterfactuals in economic history in Engerman 1980. Engerman also quotes with approval Jon Elster's statement concerning "the need for a dynamic criterion of legitimacy, the requirement that the alternative state be capable of insertion into the real past."

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