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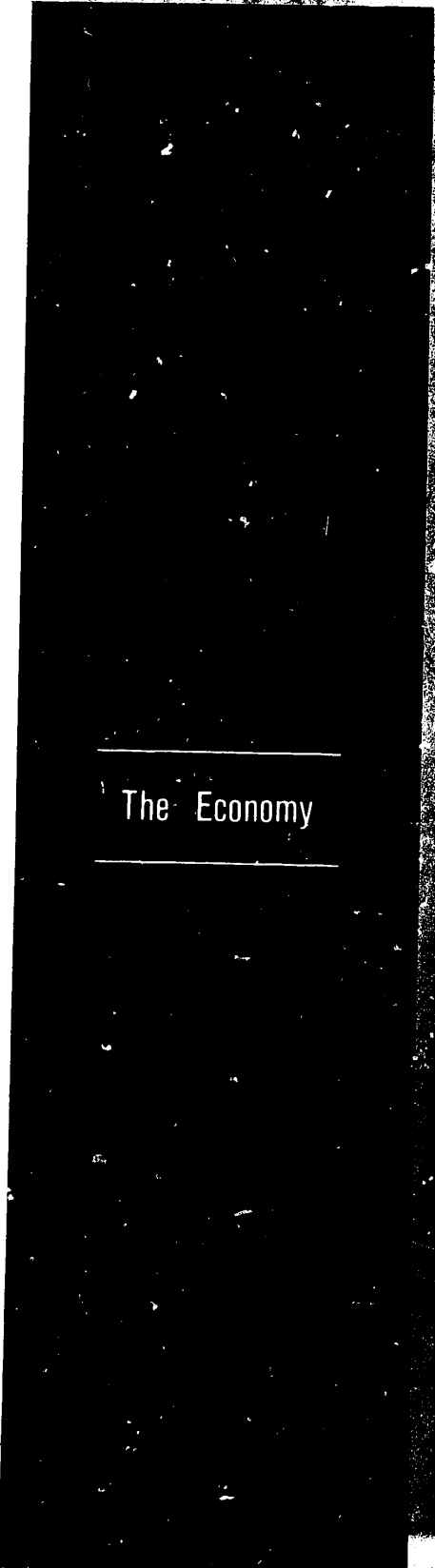
Brazil

September 1973

NATIONAL INTELLIGENCE SURVEY

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4-5



The Economy

NATIONAL INTELLIGENCE SURVEY PUBLICATIONS

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This chapter was prepared for the NIS by the Central Intelligence Agency. Research was substantially completed by March 1973.

BRAZIL

CONTENTS

*This chapter supersedes the economic coverage
in the General Survey dated January 1970*

A. Economic appraisal	1
B. Sectors of the economy	7
1. Agriculture, fisheries and forestry	7
a. Land use and tenure	7
b. Agrarian reform	9
c. Agricultural inputs	11
d. Principal crops	11
(1) Export crops	11
(2) Domestic crops	14
e. Livestock	15
f. Fisheries	16
g. Forestry	17

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	<i>Page</i>		<i>Page</i>
2. Fuels and power	17	C. Economic policy and development	27
a. Solid fuels	17	1. Economic policy	27
b. Petroleum and natural gas	18	2. Public finance	29
c. Electric power	18	a. Revenues	29
3. Metals and minerals	20	b. Expenditures	30
a. Ferrous metals	20	3. Money and banking	31
b. Nonferrous metals	22	a. Monetary policy	31
c. Cement	23	b. The money market	31
4. Manufacturing	23	4. Development	32
a. Food products	23	a. Planning	32
b. Textiles	24	b. Approaches to development	33
c. Chemical and pharmaceuticals	24	c. Development prospects	34
d. Pulp and paper	25	5. Manpower	34
e. Motor vehicles and agricultural equipment	25	a. Size and structure of the labor force	34
f. Machinery and equipment	26	b. Productivity	35
g. Electric and communications equipment	26	c. Wages and social benefits	35
h. Shipbuilding	26	d. Labor organization	36
i. Aircraft and missiles	26	D. International economic relations	36
5. Construction	27	1. Commodity composition of trade	37
		2. Direction of trade	37
		3. Trade regulations	39
		4. Balance of payments	39
		5. Foreign aid	40

FIGURES

	<i>Page</i>		<i>Page</i>
Fig. 1 Gross domestic product (<i>chart</i>)	2	Fig. 16 Livestock and fishery products	16
Fig. 2 Economic activity (<i>map</i>)	3	(<i>table</i>)	16
Fig. 3 Growth of output in major sectors	4	Fig. 17 Production of ores and metals (<i>table</i>)	20
(<i>chart</i>)	4	Fig. 18 Indexes of manufacturing (<i>table</i>)	23
Fig. 4 Origin of GDP (<i>chart</i>)	4	Fig. 19 Value added and employment in	24
Fig. 5 General price index (<i>chart</i>)	5	manufacturing (<i>table</i>)	24
Fig. 6 Economic regions, states and territories, and population density	6	Fig. 20 Motor vehicle production (<i>table</i>)	25
(<i>map</i>)	6	Fig. 21 Auto assembly plant (<i>photo</i>)	26
Fig. 7 Drought in the Northeast (<i>photos</i>)	7	Fig. 22 Sao Paulo (<i>photo</i>)	28
Fig. 8 Land use (<i>chart</i>)	8	Fig. 23 Federal government budget (<i>chart</i>)	29
Fig. 9 Natural vegetation (<i>map</i>)	9	Fig. 24 Federal revenue (<i>table</i>)	30
Fig. 10 Land tenure (<i>table</i>)	9	Fig. 25 Banking assets and liabilities (<i>table</i>)	32
Fig. 11 Farm village in Amazon area (<i>photo</i>)	10	Fig. 26 Balance of trade (<i>chart</i>)	36
Fig. 12 Area of principal crops (<i>table</i>)	12	Fig. 27 Composition of exports (<i>table</i>)	37
Fig. 13 Crop production (<i>table</i>)	12	Fig. 28 Shifts in export composition (<i>chart</i>)	38
Fig. 14 Coffee exports (<i>chart</i>)	13	Fig. 29 Composition of imports (<i>table</i>)	38
Fig. 15 Livestock numbers (<i>table</i>)	15	Fig. 30 Geographic distribution of trade	38
		(<i>chart</i>)	38
		Fig. 31 Balance of payments (<i>table</i>)	40

The Economy

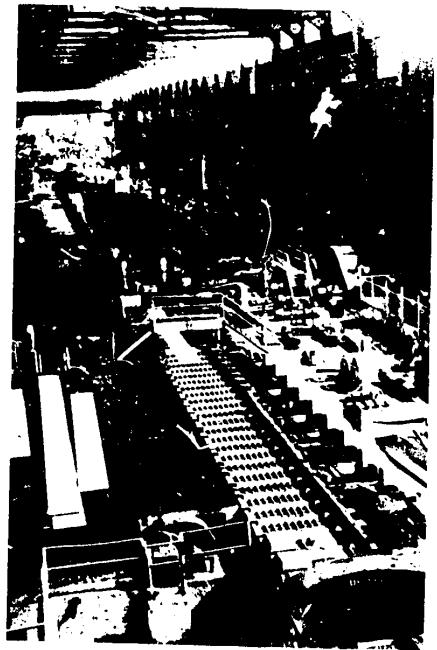
A. Economic appraisal

The Brazilian economy, one of the world's most dynamic, maintained a real growth rate averaging more than 6% annually throughout the 1950's and 1960's, and during 1968-72 growth averaged nearly 10% per year (Figure 1). Development has been well diversified and has produced a highly integrated modern sector. Although rapidly rising exports have become an important impetus to economic growth, production still is directed primarily toward the domestic market. The large industrial sector and broad resource base are adequate to meet the country's requirements for all but a few goods. Brazil still depends heavily upon imports, however, for petroleum, many intermediate goods, and some minerals, such as copper, aluminum, and sulfur, as well as for advanced capital technology.

Despite overall rapid economic growth, regional disparities and substantial remnants of underdevelopment remain. In per capita terms, Brazil is still

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Steel mill at Volta Redonda. Rapid growth of production, reflecting an expanding economy, has characterized Brazil's steel industry, the largest in South America.



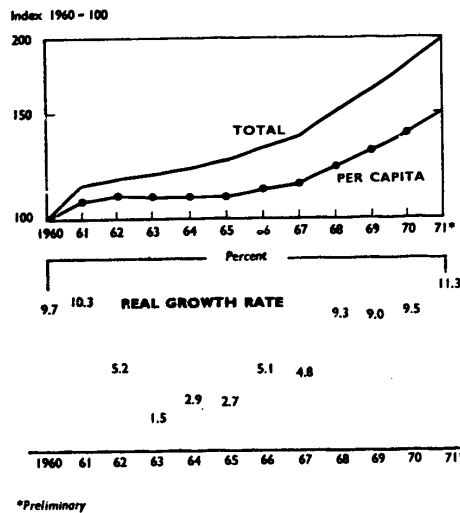


FIGURE 1. Gross domestic product (at constant prices)

a poor country. Per capita income (less than US\$500¹ in 1971) is significantly below the Latin American average and is less than half those of more prosperous countries such as Argentina, Venezuela, and Uruguay. Low per capita income reflects the fact that Brazil's modern economy is still far from able to absorb all of the excess labor from subsistence agriculture and other primitive sectors. Outright unemployment apparently is not unusually high, but underemployment afflicts about one-fifth of the labor force. The task of absorbing new additions to the labor force is complicated significantly by Brazil's high population growth rate. Although economic development and rapid urbanization are gradually reducing this rate, during the 1950's and 1960's population growth averaged 3% annually.

Brazil has maintained rapid economic growth despite the fact that its capital formation rate is not particularly high. During the 1960's, gross investment averaged about 18% of GNP, almost average for a Latin American country. Brazil's capital productivity has been very high, however, in large part because of a rich endowment of natural resources, conducive to a wide range of economic activity (Figure 2). A large amount of excellent farmland has permitted the expansion of agricultural production by extensive

¹The par value of the cruzeiro changes often; to obtain U.S. dollar equivalents, the average exchange rate for the year in question has been used throughout this chapter. The U.S. dollar equivalents are therefore not exact but are reasonably close approximations.

rather than intensive methods. Mineral wealth is abundant, particularly in the case of ferrous metals and ferroalloys. The inadequacy of mineral fuel resources is offset in good part by Brazil's hydroelectric potential, which is one of the world's largest. Industrial development also has been aided by a sufficiently large domestic market to permit fairly efficient scales of operation. Brazil's population of about 100 million—over one-third the people in Latin America—provides a broad domestic market in spite of low per capita income. Finally, Brazil is fortunate in having a large and skilled entrepreneurial class that vigorously responds to market incentives.

If the private entrepreneur is an important factor in Brazil's economic development, he shares this honor with the government's technicians and political leaders. Brazil gradually has developed a tradition of indicative state planning and management that gives the government a pervasive, but generally constructive, role in economic life. Public ownership and investment are very important in such areas as transportation, electric power, petroleum production and refining, iron and steel, and commercial banking. The exact scope of the public sector is difficult to measure, however, because public and private enterprise merge in a number of large firms that are capitalized with funds from both sectors. In addition to direct controls, the government influences the economy through its wage, price, and credit policies and through its subsidy and tax incentive programs.

Throughout the postwar period, government policy has promoted industrial development as the mainspring of economic growth. By 1972 industry accounted for more than one-third of GNP, occupying about the same relative position held by agriculture 20 years earlier (Figures 3 and 4). Important structural changes also have taken place within the sector. In the early 1950's traditional light consumer goods industries—primarily textiles and processed foodstuffs—produced nearly three-fifths of total manufacturing output, and virtually all the rest was accounted for by intermediate goods. By 1972, traditional consumer good industries contributed less than two-fifths of total manufacturing, and durable consumer goods such as automobiles and household appliances had emerged as an important share of industrial output. Moreover, capital goods production has grown to nearly 20% of total value added in manufacturing. Domestic production now supplies about 75% of Brazil's machinery and equipment requirements—by far the largest share in Latin America—and some capital goods are exported.

Agriculture also underwent important changes during these years. In the mid-1950's, coffee

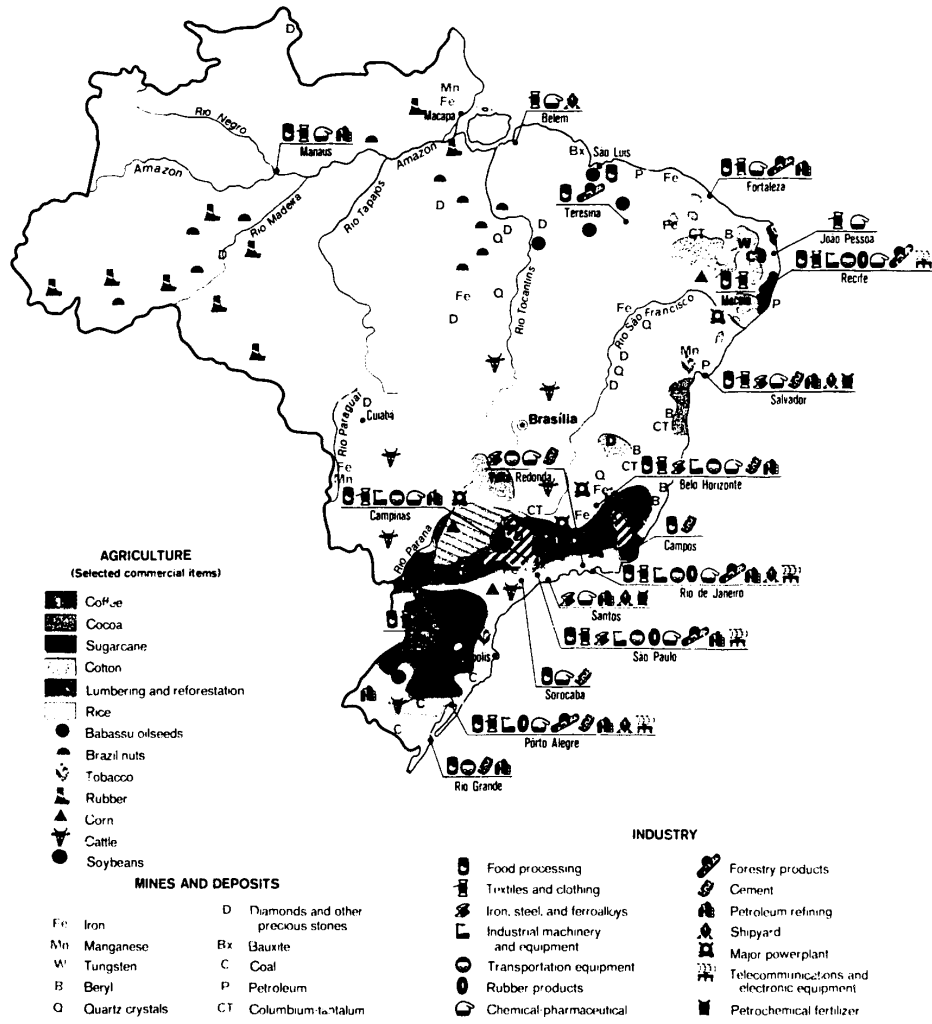


FIGURE 2. Economic activity

production accounted for one-fifth of total agricultural output, but by 1972 its share had been reduced to less than 10%. Coffee production actually declined in absolute terms after 1965, while other crops and livestock production continued to grow rapidly. Agriculture also has diversified substantially, and crops that were formerly insignificant—notably wheat and soybeans—have expanded to major importance.

The development process in Brazil has been accompanied by chronic inflation (Figure 5). The problem generally has been kept within manageable limits, by Brazilian standards at least, and only during the administration of Joao Goulart in the early 1960's did prices soar out of control. Goulart's policies spurred inflation to an annual rate of 140% in the early part of 1964 and were a major factor leading to the military revolution in that year. The new military regime immediately adopted a stabilization program

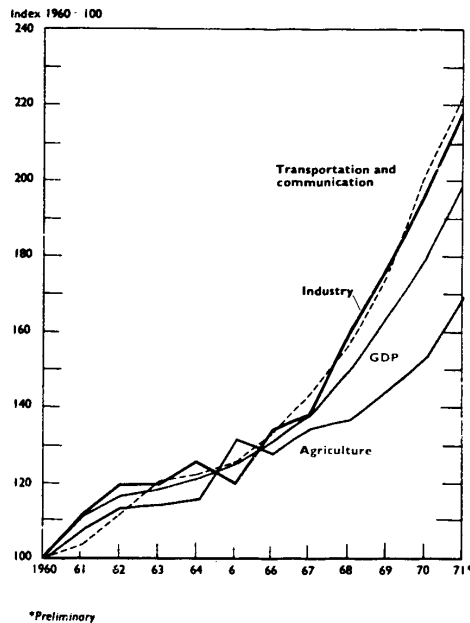


FIGURE 3. Growth of output in major sectors (at constant prices)

that fairly rapidly reduced the inflation pace. By the end of 1967 inflation was deemed under sufficient control to permit a shift to growth-oriented policies. During the subsequent years of economic boom, slower progress was made in the fight against inflation, and in 1972 prices were still rising by 15% per year.

Brazil's economic development has been oriented primarily toward satisfaction of the domestic market. Until the mid-1960's, exports grew slowly because of an overvalued exchange rate, weak export prices, and a policy that limited many exports in order to assure adequate domestic supplies. At the same time, high protective tariffs encouraged rapid growth in import substitution industries. Consequently, foreign trade is a fairly small component of the economy. Although industrial expansion for export has been a keynote of government growth policies in more recent years, and total exports grew by 38% in 1972, they were only about 8% of GNP.

Coffee's traditional domination of exports declined sharply during the 1960's. In 1961 coffee accounted for half of all export earnings, but by 1972 its share was reduced to little more than one-fourth. The

position of Brazilian coffee in the world market also has declined. For many years, Brazil supplied about half of total world coffee exports, but by the early 1970's its share was only about one-third. Reduced dependence on coffee earnings is the result of a successful government effort to diversify into a wide variety of other exports, including nontraditional agricultural products, iron ore, and a broad list of manufactured goods.

Economic growth has been very unevenly distributed among the country's several regions. The modern economy is heavily concentrated in the Southeast, primarily in the States of Sao Paulo,² Guanabara, Rio de Janeiro, and Minas Gerais (Figure 6). The well-developed agricultural regions of the South are closely linked to the modern urban complex, but much of the rest of Brazil's vast rural area remains outside the modern sector. The states of the Central-West and North, which together contain less than 10% of the population, are essentially a huge undeveloped frontier area. The Northeast, with 30% of the population, is a poverty-stricken underdeveloped country within a country. Some industrialization has occurred there since the mid-1960's, but this development has done little to absorb the region's excess manpower or to change its basically agricultural character. Moreover, the agriculture of the Northeast is like that of most underdeveloped regions where large commercial estates are found side by side with numerous small essentially subsistence farms.

²For diacritics on place names see the list of names at the end of the chapter and map Figure 6.

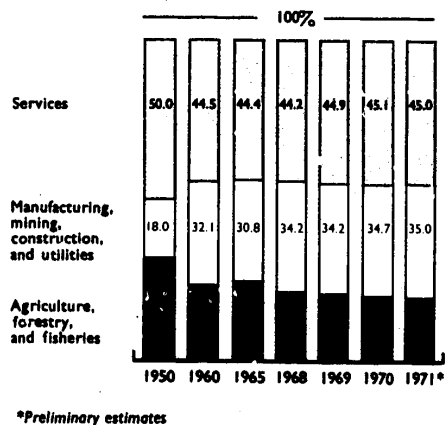
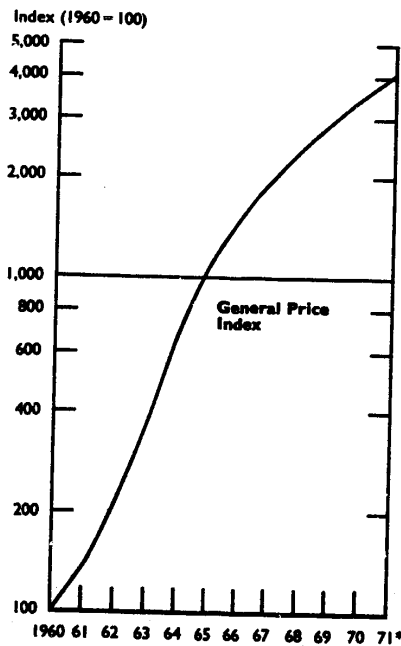
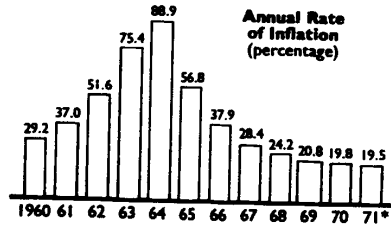


FIGURE 4. Origin of gross domestic product



*Preliminary

FIGURE 5. General price index

The uneven regional development is closely related to disparities in income distribution. The 5% of the population at the highest income level receive about 35% of the total income, while the poorest 20% receive little more than 3%. The link between Brazil's income distribution and its regional development pattern is seen in the fact that average per capita income in the Northeast is less than half that for the whole country and about one-third that for the Southeast. Poverty is found throughout Brazil, but it is more heavily concentrated in the Northeast than in any other part of the country.

Brazil's uneven income distribution has created considerable criticism both at home and abroad, and the government itself has set income redistribution as one of its more important objectives. The regime, like others before it, has undertaken various programs to improve living conditions in the Northeast. An earlier program to encourage industrial development in the area proved a disappointment because the new industries created relatively few jobs, and by 1971 a new program had shifted the emphasis to land reform, irrigation and land development, and the encouragement of agricultural processing industries. Equally important, the Trans-Amazon Highway, begun in 1970, is designed partly to aid the northeast by opening new economic opportunities for a portion of its surplus population. In addition to these regional development projects, the government has initiated other efforts—notably the Social Integration Program—intended to give the working classes a greater stake in Brazil's economic progress. In fact, the government tends to pursue all of these programs very cautiously, however. Brazil's leaders probably are genuinely concerned about the country's widespread poverty, but their actions are inhibited by the fear that extensive income redistribution will weaken the country's savings capacity and feed inflationary pressures.

As in all less developed countries, low per capita income hinders generation of the savings needed to sustain economic development. The government has done much since the mid-1960's both to encourage private savings and to increase public sector savings. The latter has been particularly successful because of carefully controlled operating expenditures, increased tax revenues, and improved financial management in the public sector enterprises. To some extent, however, increased public savings has occurred at the expense of private savings. The total savings rate rose from very low levels in 1966-67 to 17% of GNP in 1969 and then leveled off.

Investment on the other hand, grew very rapidly throughout the 1968-72 boom years and reached 20% of GNP by the end of the period. The investment boom was set in motion in 1967 by new government policies designed to restore vigorous economic growth after several years of quasi-recession. The private sector was encouraged through a variety of price and tax incentives, special credit programs, and exchange rate reforms stimulating exports. Capital formation in the public sector contributed directly to the rise in investment and also acted as a stimulus to the private sector. Propelled by all of these factors, real investment grew at an average rate approaching 16% annually during the years 1968 through 1972.

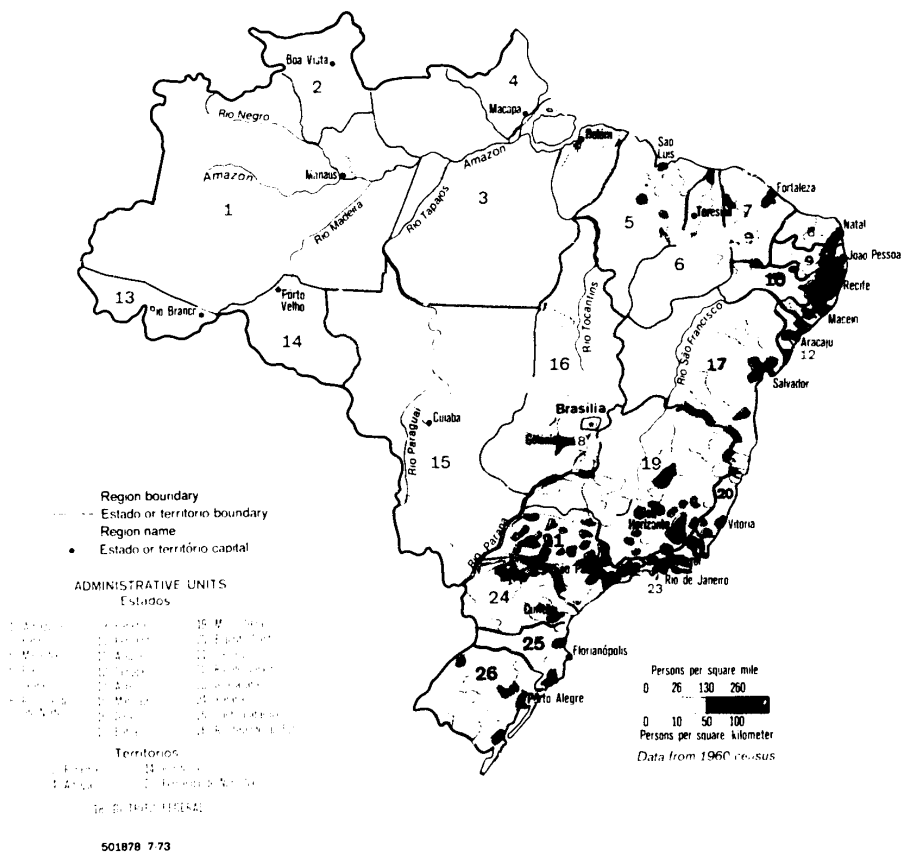


FIGURE 6. Economic regions, states and territories, and population density

The growing gap between domestic savings and investment has been covered by a large net inflow of foreign capital that rose from US\$400 million in 1967 to about \$4 billion in 1972. The military governments' policies have actively encouraged foreign capital entry, and the economy's vigorous growth has provided additional important incentives to foreign investors. Nevertheless, direct equity investment has been fairly small compared with loan capital inflows. Brazil has received a steady flow of credit from the U.S. Export-Import Bank, official international lending agencies, and foreign suppliers. Commercial banks and private business firms have borrowed very heavily in the international money market, and this borrowing accounts for the largest part of the growing foreign debt.

Brazil's credit standing abroad remains sound, despite its mounting debt, largely because of its strong domestic economy, rapidly growing exports, and rising

fore exchange reserves. By 1972, however, the debt service burden had reached 50% of export earnings, and debt management had become a serious concern. In 1972, the government began to sharply curtail new short- and medium-term borrowing in order to improve the foreign debt structure by stretching out maturities. Although longer term capital inflows are expected to rise substantially in response to these new credit guidelines, total net capital receipts probably will level off.

Stabilization of net capital inflows is likely to force Brazil to stabilize its investment rate as well, since it appears doubtful that much further improvement in the domestic savings rate can be achieved in the short term. As a result, the investment rate will remain at about the level reached in 1972, a rate well above the average of the past 20 years and one that should support a vigorously growing economy. Over the medium term, growth probably will decline from the

very high rates of recent years, however, as investment is gradually diverted to infrastructure projects with a lower or delayed production impact. Moreover, the expected leveling off in net foreign capital receipts and a probable slackening in export growth will limit the rise in import capacity. Despite these constraints, Brazil should be able to maintain growth rates comparable to those of the past two decades—and probably somewhat higher—at least through the mid-1970's.

B. Sectors of the economy

1. Agriculture, fisheries and forestry

Agriculture has declined in relative importance in recent decades, but it still employs over two-fifths of the labor force, contributes one-fifth of GDP, and provides a major share of the raw materials consumed by industry. Brazil is largely self-sufficient in food production (wheat is a major exception), and agricultural commodities are the source of nearly two-thirds of its export earnings. Fishing and forestry are relatively undeveloped, although their potential is great.

Agricultural output grew by about 4.4% annually between 1960 and 1970, compared with a 6.3% growth rate for the rest of the economy and a 2.9% yearly increase in population. Food crops have been the most dynamic element, but output of many export crops also grew more rapidly than the population. Expansion of the cultivated area has been a major factor in increasing agricultural production.

Brazil's varied climate permits cultivation of most crops, but tropical and subtropical products predominate. Although rainfall is generally adequate, the Northeast is subject to alternating droughts (Figure 7) and floods. Precipitation in the Amazon Basin is excessive, and heavy tropical rain forests in the area are formidable barriers to resettlement efforts. More than half of agricultural production originates within a four-state area in the South and Southeast, with the coastal states of the Northeast providing most of the remainder.

a. Land use and tenure

During the last two decades, the area under cultivation has almost doubled, as shown by the following tabulation, in millions of acres:

1950	47.2	1967	77.4
1960	63.3	1970	88.8
1962	70.4	1971	89.5

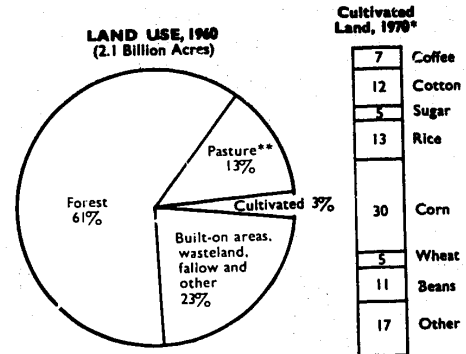
Nevertheless, cultivated land and used pastures together still account for less than one-fifth of total



FIGURE 7. In the Northeast rainfall is irregular, and droughts frequently occur in the interior, making agricultural production precarious. The withering of crops results in widespread migration.

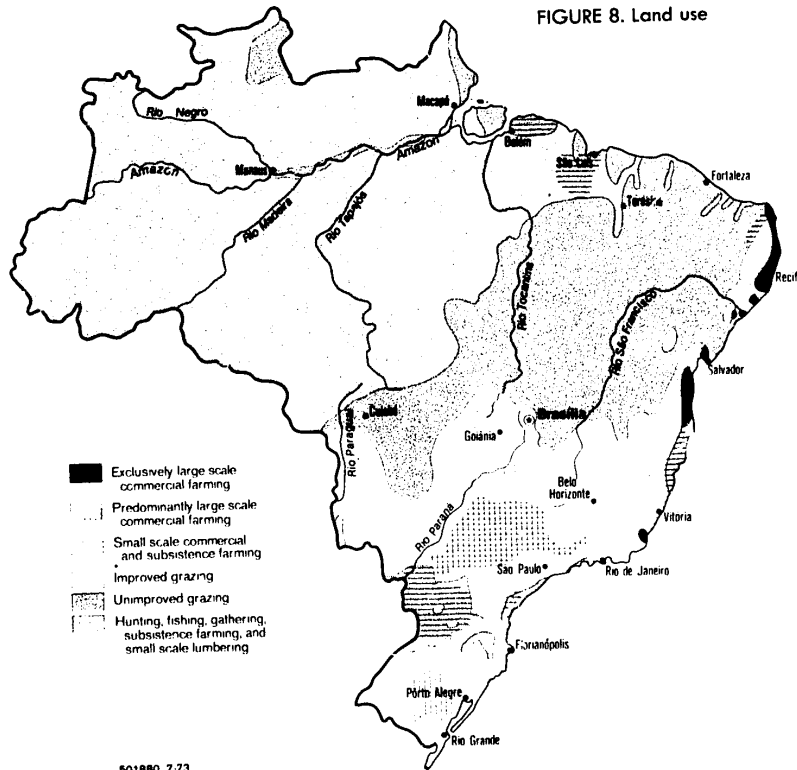
land area (Figure 8). Three-fifths of the country is under some kind of forest cover, varying from the savanna regions of the Mato Grosso to the Amazonian jungles (Figure 9). Equivalent to almost three-fifths of the United States, this virtually unexploited land represents the world's largest remaining frontier area.

Land ownership in Brazil is unequal, but the pattern is changing as a result of colonization, consolidation, and redistribution efforts. About 1% of the total number of farm units contains nearly half of all privately owned farmland (Figure 10). These large estates of 2,500 acres or more are predominantly pasture land, and many are underutilized. But, whereas 45% of the farms in 1960 had less than 25 acres, by 1967 this figure had diminished to 37% of the total farms. During this same period, the percentage of farms in the 25 to 249 acre category increased from 45% to 51% of the total, and the percentage of farms ranging from 250 to 2,500 acres increased from 9% to 11%. Between 1960 and 1967, the number of farms exceeding 25 acres increased from 1.8 million to 2.3 million.



*For 1970 cultivated land was equal to 88.7 million acres or slightly more than 4% of total land area
 **Includes only pasture land in agriculture holdings

FIGURE 8. Land use





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FIGURE 9. Natural vegetation

b. Agrarian reform

The government of Castello Branco issued an agrarian reform law in 1964 in an effort to secure a more productive and balanced tenure system. The central feature of the law is a land tax that varies

FIGURE 10. Land tenure, 1967

SIZE OF FARM (ACRES)	PERCENT DISTRIBUTION		EXPLOITABLE AREA AS PERCENT OF LANDHOLD- INGS
	Number of farms	Total land- holdings	
Under 25.....	37	2	91
25 to 249.....	51	17	93
250 to 2,499.....	11	32	93
2,500 to 25,000.....	1	33	92
Over 25,000.....	<i>Insig</i>	16	91
All farms.....	100	100	92

inversely with the intensity of land use and thus is intended to encourage more efficient exploitation or the breaking up of large unutilized holdings. This land tax has not been forcefully implemented, however. The law also provided for expropriation and redistribution of private land and for the colonization of public lands (about 55% of the total land area of Brazil). Legal barriers impeding redistribution were eliminated in the spring of 1969 by Institutional Act Number Nine and a new decree law, which provided the government with powerful legal machinery to expropriate land. There is little effective political support, however, for a massive redistribution of private landholdings, as has occurred in Chile and in other Latin American countries.

In 1970, responsibility for agrarian reform, rural colonization, and related programs was given to the National Institute of Colonization and Agrarian Reform (INCRA), an autonomous agency under the

Ministry of Agriculture. The Medici government has emphasized regional development programs in its effort to cope with large pockets of rural poverty, unemployment, overpopulation, and stagnant production. Government-approved programs underway in the problem areas of the North and Northeast alone will cost an estimated US\$1.4 billion to carry out. They have a heavy agricultural content. The

National Integration Program (PIN) launched in mid-1970, includes a plan to colonize an area larger than Mexico in the now empty spaces of the Amazon Basin (Figure 11). The government has reserved for homesteading land strips of 60 miles on either side of the gigantic Trans-Amazon Highway network, which forms the basis of the PIN. The complementary Program of Land Redistribution and Encouragement



FIGURE 11. One of the first farm villages established along the Trans-Amazon Highway. The National Institute of Colonization and Agrarian Reform (INCRA), under the Ministry of Agriculture, provides each homesteading family with a small wooden house and provisional title to a plot near the village.

to Agroindustries in the Northeast and North (PROTERRA) was initiated in July 1971. This 4-year program emphasizes land redistribution and modernization of agroindustrial activity in the area. Funds will be provided to buy lands, to lend land purchase funds to small- and medium-farm owners, to finance agroindustrial projects, and to improve farming methods and infrastructure. A third regional program—PRODOESTE—was launched in November 1971 and benefits the Federal District and the southern parts of Mato Grosso and Goias. This program includes a vast highway-communications system emanating from Brasilia, a network of silos, grain mills, slaughterhouses, and storage plants, and a large-scale land restoration effort.

The PROTERRA authorizes expropriation and distribution of land in the social interest, although the program emphasizes voluntary compliance. According to a plan announced in August 1972, landowners in three overpopulated areas of the Northeast could be forced to sell between 10% and 50% of their holdings in excess of 2,200 acres. Payments for this land and credit financing for new buyers will be financed by the Bank of Brazil. The government estimates that only about 15,000 families will receive land under the new plan because of the relatively few oversized holdings in this area of some 6½ million people. The government also announced in August 1972 that some lands would be expropriated in the wealthy, more advanced southern state of Sao Paulo—a plan that is expected to meet with more intense political opposition.

c. Agricultural inputs

Brazil has modern large-scale farms, mainly in the coastal areas of the Northeast and in the South and Southeast, and Japanese immigrants have introduced intensive truck farming. Subsistence farms using primitive tools and inefficient methods, nevertheless, are numerous. Mechanization has spread rapidly during the last decade or so, thanks in part to a tripling in domestic tractor production. Brazil's ratio of about 1.5 tractors per 1,000 acres of cultivated land is about average for Latin America.

Farm expenditures for chemical fertilizers, pesticides, and improved varieties of seed also have greatly increased. Fertilizer consumption increased from about 600,000 metric tons in 1964 to an estimated 2.5 million tons in 1970, although many farmers remain skeptical about its beneficial effects. During this period, the government has encouraged fertilizer use by eliminating import tariffs, extending credit to importers and farmers, and granting subsidies

to domestic fertilizer producers. Pesticide consumption, which approximately doubled between 1965 and 1970, is expected to exceed a market value of some US\$60 million by the mid-1970's. Many state and federal research stations breed and test countless new seed varieties for all types of crops, including wheat, corn, rice, and cotton.

In 1969, more than two-thirds of the estimated 1.2 to 1.5 million acres under irrigation were in the southernmost state, Rio Grande do Sul, where rice fields are irrigated by flooding. Sprinkler and infiltration systems are also used in other parts of the country. Development plans for the Northeast include a high-cost project to irrigate some 330,000 acres of drought-plagued land. The Superintendency for Development of the Northeast (SUDENE), has authorized the construction of 23 wells and 17 dams for water control. Domestic investment expenditures are being supplemented from abroad, and in early 1972 the Inter-American Development Bank was considering financing 19 irrigation projects covering some 175,000 acres at a cost of \$30 million. Soil and water management problems in the arid Northeast are complex, however, and the real economic return from irrigation still is in question.

d. Principal crops

Virtually every known crop is grown in Brazil, and wheat is the only important crop not grown in sufficient quantity to satisfy domestic demand. Brazil is also a major world exporter of several agricultural commodities.

(1) *Export crops*—Coffee, sugar, soybeans, cotton, and cocoa are the principal export crops. Earnings from some traditional exports, such as tobacco and sisal have stagnated or declined, while those from corn and fruit products have increased. Aside from weather conditions and periodic insect and bacterial damage, changes in international prices and government price support programs have been the major influences on production and export earnings.

The most important export crop is coffee, a product grown primarily in the Southeast. Brazil long has held first place in the world, both as a coffee producer and exporter. While the area planted to coffee has steadily declined to only about half its 1960 acreage, output has fluctuated widely throughout the period because of weather conditions and plant disease (Figures 12 and 13). During 1966-72, coffee production averaged about 1.2 million metric tons, some 30% lower than its 1960-65 average level. Export earnings from coffee have generally ranged from US\$700 to \$800 million

FIGURE 12. Area of principal crops
(Thousands of acres)

	1960	1962	1964	1966	1967	1968	1969	1970
Export crops:								
Coffee.....	10,931	11,036	9,140	7,560	6,905	6,487	6,358	5,943
Cotton.....	7,246	8,552	9,288	9,639	9,200	9,650	10,374	10,631
Cocoa.....	1,164	1,150	1,204	1,128	1,170	1,071	1,083	1,098
Sisal.....	349	396	549	819	824	853	769	709
Soybeans.....	422	777	890	1,214	1,513	1,786	2,241	3,262
Sugarcane.....	3,314	3,628	3,756	4,045	4,157	4,172	4,135	4,266
Tobacco.....	527	574	621	655	645	683	638	606
Domestic crops:								
Beans.....	6,331	6,716	7,743	8,223	9,028	9,059	9,058	8,618
Corn.....	16,522	18,171	20,046	21,523	22,935	23,703	23,874	25,974
Jute.....	69	101	104	84	106	119	114	82
Manioc.....	3,319	3,650	4,244	4,402	4,733	4,941	5,018	5,008
Peanuts.....	720	1,177	1,063	1,593	1,716	1,499	1,516	1,657
Rice.....	7,335	8,285	10,342	9,904	10,611	11,373	11,428	11,371
Wheat.....	282	1,837	1,815	1,773	2,055	2,399	3,480	4,686

annually since 1960 but jumped to almost \$1 billion in 1970 as world prices soared. Coffee earnings returned to more normal levels in 1971 (Figure 14).

The Brazilian Coffee Institute (IBC), a government enterprise, is charged with supervising coffee trade, both domestic and foreign. The IBC, created in 1952, is authorized to support internal coffee prices and to supervise the grading, storage, and export of coffee. An export tax, the so-called contribution quota (which finances the IBC's purchase of surplus coffee, loans and financial assistance to the coffee sector, and administrative costs), is generally about half of the export price of coffee.

Brazil for many years produced more coffee than it exported and consumed, so that large stocks accumulated. In order to reduce coffee production, improve its quality, and free land for other crops, the government in 1962 embarked on a coffee tree eradication program. Administered by the Executive Council for the Rationalization of Coffee Culture (GERCA), the program was aimed at removing the least economical half of Brazil's 4 billion coffee trees. Coffee growers were to plant only one tree for every four old trees eradicated and were encouraged to increase plantings of other crops such as corn, rice, cotton, and beans. The GERCA program eliminated

FIGURE 13. Production of principal crops
(Thousands of metric tons)

	1960	1962	1964	1965	1966	1967	1968	1969	1970	1971*	1972**
Export crops:											
Coffee.....	1,740	1,620	600	2,262	1,200	1,380	1,100	1,140	600	1,416	1,440
Cotton.....	400	550	472	437	561	595	730	721	670	490	700
Cocoa.....	122	111	119	168	167	145	130	202	162	182	205
Sisal.....	164	174	220	242	287	310	328	311	263	na	na
Soybeans.....	206	345	305	523	595	716	654	1,057	1,509	2,100	3,600
Raw sugar.....	3,319	3,238	3,391	4,614	3,852	4,275	4,270	5,048	5,106	5,298	5,340
Tobacco.....	161	187	210	248	228	243	258	250	244	na	na
Domestic crops:											
Beans.....	1,731	1,709	1,951	2,290	2,148	2,548	2,420	2,200	2,211	na	na
Corn.....	8,672	9,587	9,408	12,112	11,371	12,825	12,814	12,693	14,161	13,500	14,500
Jute.....	39	47	51	62	44	40	51	49	38	na	na
Manioc.....	17,613	19,843	24,356	24,993	24,710	27,268	29,203	30,074	29,464	na	na
Peanuts.....	408	648	470	743	895	751	754	754	928	825	850
Rice.....	4,795	5,557	6,345	7,580	5,802	5,792	6,653	6,394	6,320	5,130	6,200
Wheat.....	713	706	643	585	615	620	856	1,374	1,844	1,734	2,000

na Data not available.
*Preliminary.
**Estimated.

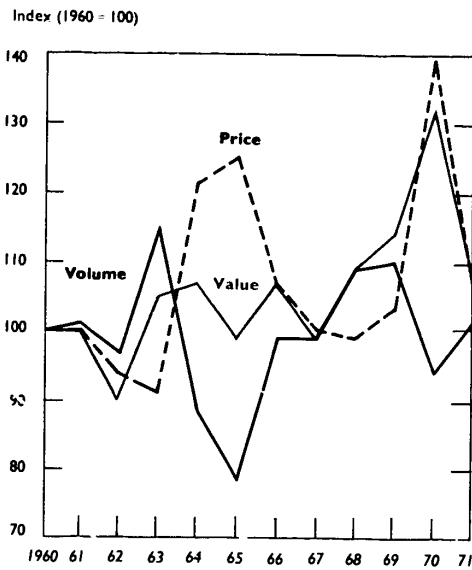


FIGURE 14. Trends in coffee exports

about 700 million old coffee trees by 1966 when financial incentives and controls were strengthened to encourage more rapid diversification. As a result, approximately 700 million additional old coffee trees were eradicated in the next 2 years.

The area planted to coffee had been reduced some 40% by 1968 when the IBC decided that further reductions were unnecessary and revised its programs accordingly. Coffee output nevertheless was maintained at an average level of about 20 million bags (1.2 million metric tons) annually during 1966-69 by planting new high-yield trees and fertilizing old trees. Severe freeze and drought conditions cut the 1970 harvest to slightly less than 10 million bags, and Brazil was forced to draw down heavily on stocks. Although production recovered in 1971 and 1972 to 24 and 23 million bags, respectively, output has lagged somewhat behind current requirements of 17 to 18 million bags for export and 8 to 9 million bags for domestic consumption. By the end of June 1972 stocks held in Brazilian ports and official stockpiles had declined to 18 million bags, compared with the peak level of 71 million bags reached in 1966, and extensive new plantings appeared to be required to assure the adequacy of future supplies.

Brazil was a charter member of the International Coffee Agreement (ICA), which was in force among the world's principal producing and consuming nations between December 1963 and December 1972.

At that time the economic provisions of the Agreement were suspended. Under these provisions the ICA regulated supply to consumer markets by fixing export quotas. It also administered a Coffee Diversification Fund aimed at assuring long-term balance between supply and demand. Brazil's ICA export quota had been fairly stable at about 18 million bags (1.1 million metric tons), or 38% of the global quota. As of mid-1973 the future of the ICA was in doubt.

Traditionally, cotton was Brazil's second most important agricultural export, but in the early 1970's soybeans and beef exports were becoming more important. In 1969 cotton production amounted to 721,000 metric tons and exports reached 439,000 tons—a level higher than total production in 1960. This large increase reflects both expanded acreage and higher yields. Farmers have been encouraged to expand cotton plantings by increased domestic prices and, from 1968 on, by the rise in cruzeiro export receipts resulting from currency devaluation. Cotton export earnings rose from US\$91 million in 1967 to \$196 million in 1969 and then declined somewhat in 1970. Severe drought brought a sharp drop in cotton production and exports in 1971, but the 1972 crop returned to normal output levels.

There are two distinct areas of cotton production—the South and the Northeast. The South has one-third of the cotton-growing area but produces two-thirds of the total crop because yields are more than three times those in the Northeast. Yields are higher in the South because of more favorable climate and greater commercialization of farms. Many of the smaller planters operate in conjunction with ginners and processors that supply insecticides, fertilizers, and other assistance on credit. Cotton farms in the Northeast are relatively backward.

Sugar production increased by 60% between 1960 and 1971, when production reached a record high of 5.3 million metric tons. During this period, the volume of sugar exports more than doubled and totaled 1.2 million tons in 1971. Export earnings reached US\$147 million in 1971—two and a half times their 1960 level. Exports exceeded \$400 million in 1972 as a boom in the world sugar market sharply increased prices and enabled Brazil to double its export volume by selling a substantial part of its reserve sugar stock.

In the Northeast, sugarcane typically is produced at high cost by tenants on mill-owned lands or on privately owned small farms. In sharp contrast, most of the cane grown in the South is produced on large plantations and processed in relatively large, efficient mills. The lack of alternative employment opportunities and the political power of mill owners have

forced the government to subsidize Northeast producers at the expense of the more efficient South. Sugar policy is largely under the control of the quasi-government Sugar and Alcohol Institute, which sets annual prices for sugarcane, sugar, and alcohol and assigns each mill a production quota.

Brazil produces about one-sixth of the world's cocoa, nearly all of it in the State of Bahia. Unusually good weather and a sharp rise in world prices boosted both output and export earnings to record levels in 1969. Production in that year totaled 202,000 metric tons, compared with an average 152,000 tons during 1965-68. Output remained at relatively high levels in 1970-71 and in 1972 is expected to exceed the 1969 record. Export earnings from cocoa and cocoa products have consistently topped \$100 million since 1969.

Although a relative newcomer to the field, Brazil now ranks second in world soybean exports. Since 1968, soybean output has increased at an average of 50% annually in response to rising domestic and foreign demand. Export sales in 1972 probably reached US\$250 million; in 1971 sales had reached \$106 million. Almost three-fifths of all soybeans are grown in the State of Rio Grande do Sul. Between 1968 and 1971 the area planted to soybeans more than doubled.

Brazil is a major world producer and exporter of tobacco. Between 1960 and 1968 production rose, as the cultivated area increased by 30%. Conversely, tobacco exports declined from US\$28 million in 1964 to \$19 million in 1968 because of an unfavorable exchange rate, a nearly disastrous partnership between Brazil's largest cigarmaker and a European firm, and reduced U.S. demand for Brazil's cigar-type tobaccos. Both output and plantings declined somewhat in 1969-70. Earnings recovered in 1969, however, and achieved a new record high of \$37 million in 1971.

The States of Bahia and Rio Grande do Sul produce about half of the tobacco crop and Minas Gerais and Santa Catarina about one-third. Bahia tobaccos are mostly dark, air-cured types; Rio Grande do Sul and Santa Catarina produce both air-cured and flue-cured leaf for cigarette manufacturing. The government does not provide minimum prices for tobacco growers. Nevertheless, tobacco is a preferred crop, generally grown on small commercial farms under guaranteed price contracts with processors. Cigarette manufacturers provide technical services and finance purchases of fertilizer, seed, and insecticide.

Sisal production doubled between 1960 and 1968 but then declined because of falling international prices in the face of competition from synthetic fibers.

Because export earnings have plummeted since the mid-1960's, the Brazilian Government has initiated a comprehensive plan to convert sisal plantations to more profitable crops.

Jute exports are not competitively priced in the world market because of obsolete processing equipment and the high cost of domestic transportation. About one-third of the domestic crop is processed at Belem, relatively near where it is harvested, and the remainder is shipped to obsolete mills in Rio de Janeiro and Sao Paulo. Jute growers and processors, particularly in the Belem area, may benefit from increased demand for jute cloth in the United States for use in making carpets.

(2) *Domestic crops*—Production of the principal domestic crops—corn, rice, beans, manioc, peanuts, and wheat—has been encouraged by the coffee eradication program, government price policies, and new road construction improving access to markets. Considerable amounts of corn and peanut products are exported.

Cereals are the most important food crops in terms of production and acreage. Corn, rice, and wheat account for one-third of the total value of agricultural production and almost half the area under cultivation. Brazil is the second largest corn producer in the world and ranks seventh in rice production.

Corn is a staple food crop on most of the small subsistence farms throughout the country and a profitable commercial crop in the South, where 75% of it is grown. More than one-fourth of total cropland was devoted to corn production in 1970. Output has increased, in part because of increased use of hybrid seed and fertilizer. Although most corn is consumed domestically, exports have climbed from negligible amounts in the early 1960's to an average of about 1.2 million metric tons. Corn exports earned some US\$81 million in 1970.

Rice is important in the daily diet of most Brazilians and accounted for about 14% of the total area devoted to crop production in 1970. Production dropped because of drought in 1971 but was expected to regain its 1970 level in 1972. Domestic prices have stayed well above government support prices, and less than 5% of output has been exported since 1966. More than 80% of the rice crop is produced in the South and Southeast. Nearly all rice exports come from the State of Rio Grande do Sul, where irrigated rice is grown.

Despite successful government attempts to increase domestic production, wheat continues to be a major deficit food item. Four consecutive record crops in 1968-71 nearly tripled output, and domestic production at the end of the period supplied

somewhat more than half of total consumption, compared with one-fourth in 1968. Heavy rainfall in 1972, however, sharply cut production to a mere 600,000 tons, necessitating a large increase in imports. Wheat is grown almost exclusively in the South, and Rio Grande do Sul alone accounts for 90% of total acreage. Wheat imports are supplied mainly by the United States, Argentina, and Canada.

Brazil is the world's largest producer of edible beans. In 1970 bean plantings occupied more than 10% of total cultivated land and yielded an output of 2.2 million metric tons. The State of Parana accounts for about 25% of production, and Minas Gerais, Santa Catarina, and Sao Paulo together produce an additional 30%. In the South two crops are raised, whereas usually only one is harvested in the North. Beans are cultivated in conjunction with other crops, especially corn, and require little attention. They are grown mostly by small farmers and are considered a crop of the poor.

Starchy root crops, principally manioc and potatoes, are widely grown. Manioc can be produced on relatively poor land and is very drought resistant. Almost all production is consumed domestically, primarily as a food for both humans and animals. Part is processed into such forms as starch, meal, and tapioca. Manioc flour, consumed throughout the country, is one of the cheapest foods and a staple of the rural poor.

Peanut production approximately doubled between 1960 and 1970. The State of Sao Paulo accounts for most of the output. About three-fourths of production is consumed domestically and is an important source of protein. Peanut exports earned some US\$28 million in 1970.

Over the last half century, Brazil has fallen from the position of the world's leading rubber producer and exporter to that of a net importer. This erosion in market position was largely the result of competition from southeast Asian plantations and the introduction of synthetic rubber. In recent decades, rapidly growing domestic demand has more than surpassed domestic supply, but this deficit is narrowing as high-cost Amazon area rubber production is augmented by expanded output from Bahia's efficient rubber plantations. Total annual output of natural, synthetic, and reclaimed rubber approximated 87,000 metric tons annually during 1968-70, compared with 31,000 tons annually during 1956-58. Synthetic rubber production has increased to more than 58,000 tons annually, while natural rubber production averages about 24,000 tons per year.

Production of fruits, primarily bananas and oranges, averaged only about 7 million metric tons annually in

the early 1960's but has since increased rapidly in response to rising demand. Commercial orange production, for example, reached 15.5 million tons in 1970, and frozen orange juice exports rose to 33,468 tons in 1970. Brazil also produces grapefruit, tangerines, and lemon, for both domestic and foreign markets. The citrus and tropical fruit industry as a whole has a vast potential and is expected to become a major source of export earnings.

e. Livestock

With approximately 78 million head (Figure 15), Brazil ranks third, behind the United States and the U.S.S.R., in the number of cattle, but is the leading beef-exporting nation in the world. Beef production, however, remains incredibly low in comparison to countries of high cattle population, reaching 1.85 million tons in 1970 (Figure 16). The slaughter rate is only 10%, compared to 26% in Argentina and 31% in the United States. Meat yields average only 380 pounds per animal slaughtered. It takes over 4 years to bring cattle to slaughter, compared to 16 months in the United States. Herd and weight losses during the dry season (August to December), poor breeding and feed management, and hoof and mouth disease are chiefly responsible for low slaughter rates and meat yield per carcass. Hoof and mouth disease reportedly kills as many as are slaughtered each year. In the seventies, however, Brazilian cattlemen, with the help of government financing and foreign loans, began to modernize the industry. Through incentive programs and technical assistance, Brazil has reduced the problems of disease and losses in the dry season. The Transamazon Project and the Export Corridor Program have opened up previously untapped grazing land in the Amazon and Mato Grosso. In addition, two IBRD livestock projects valued at \$66 million have provided technical help. West German and Italian investments of approximately \$1 billion are being made to start several beef production facilities aimed chiefly for exports. Recently, several thousand high quality Santa Gertrudis stock were imported from the United States to improve breeding in Southern Brazil. As a result of these measures, conditions are excellent for high production throughout the seventies.

FIGURE 15. Livestock numbers (Thousands of head)

	1950	1960	1970
Cattle.....	44,600	56,041	78,258
Hogs.....	22,971	25,580	31,502
Chickens.....	73,920	132,275	213,461

FIGURE 16. Livestock and fishery products
(Thousands of metric tons except as indicated)

	1960	1965	1966	1967	1968	1969*	1970*
Beef.....	1,197	1,312	1,452	1,506	1,694	1,827	1,846
Pork.....	370	485	546	559	599	608	615
Mutton and lamb.....	22	33	35	31	35	34	34
Goat meat.....	17	21	22	21	21	22	21
Poultry.....	6	21	25	31	44	63	na
Lard and beef fat.....	98	102	100	101	101	99	na
Bacon.....	163	210	234	242	257	261	na
Wool (greasy).....	23	35	27	31	31	30	31
Fish catch.....	282	377	450	531	500	501	526
Milk (Millions of gallons).....	1,294	1,748	1,650	1,795	1,825	1,858	1,884
Eggs (Millions of dozens).....	520	692	717	753	767	809	841

na Data not available.

*Preliminary.

Brazilian cattle are predominantly mixed breeds. Range cattle are generally native stock (criollo), with a varying percentage of Indian zebu blood which provides some additional resistance to pests, tropical heat, and diseases. Herds of purebred Shorthorn, Hereford, Aberdeen Angus, and Charolaise cattle are raised in Rio Grande do Sul, where the climate is more favorable to European breeds. In addition to cattle herds, there are large numbers of oxen which are used as draft animals.

Beef prices are among the lowest in the world, although low incomes keep Brazilians from consuming much beef. Per capita consumption, unchanged since 1960, averages 40 pounds.

Dairying is not a highly specialized industry, although milk sheds have grown up around the larger cities and milk production has increased fairly steadily. Minas Gerais is the leading milk-producing state, accounting for almost 40% of total production. Sao Paulo ranks second, contributing about 25% of the total. The supply of fresh milk in urban areas increased in the 1960's, but per capita consumption still is very low by international standards.

During 1961-70, the hog population increased 37%, and pork output rose by about 40%. Although a corn-hog economy has developed in Rio Grande do Sul, Santa Catarina, and parts of Parana, elsewhere hogs generally depend upon forage or are fed farm waste. Disease, parasites, and nutritional deficiencies are prevalent and result in slow growth and high death losses. Like cattle, hogs in Brazil take more than twice the time to attain slaughter weight than do U.S. hogs—an average of 14 months, compared with 6 months. Farms and villages account for more than 62% of hog slaughter, government-owned plants 30%, and private commercial slaughterhouses only 8%.

Because of firm pork prices and the steady increase in corn feed production, further growth in the hog raising industry is expected.

The climate generally is not well suited for sheep. Over half the country's approximately 25 million sheep are raised in Rio Grande do Sul, and an additional one-fourth are raised in the States of Piaui, Ceara, and Bahia. Sheep are raised in Rio Grande do Sul for wool but in other areas mainly for food on a noncommercial basis.

Output of the commercial poultry industry is growing at a rate of 5%-10% annually. Several U.S. firms are operating hatcheries in Brazil, and large-scale production from improved breeds is rapidly increasing. Poultry meat demand has remained relatively low, however, in part because of high poultry prices and competition from beef.

f. Fisheries

Brazil's fishing industry is relatively undeveloped and backward, and its abundant marine resources are inadequately explored and underexploited. Much fishing is carried out in primitive open boats and rafts with crude traps. Fishermen also use cast nets from the beach and seine by lantern at night. An increasing number of commercial fishing operations, involving mainly Argentine, Soviet, Japanese, and joint Brazilian-Japanese companies, use modern vessels and methods, however.

Ocean fishing accounted for more than three-fifths of the 501,147 metric ton catch in 1969. Production of salted and dried fish in that year was about 60,000 tons. Canned fish, mostly sardines, totaled 29,470 tons and frozen fish products, 44,582 tons.

Shrimp are abundant along the entire Brazilian coast, and Brazil has the largest shrimp reserves south

of Mexico. A large shrimp fishery supplies the domestic market, and an export industry was established in 1965 with the opening of a modern freezing plant at Sao Sebastiao, near Santos. Exports of shrimp, mostly to Argentina, the United States, and Japan, rose from 5 metric tons in 1963 to 725 tons in 1967 and 3,058 tons in 1970. In 1970 Brazil also exported approximately 2,800 tons of lobster, most of it to the United States. Fish export earnings for 1970 totaled approximately US\$19 million.

To attract investment into the fishing industry, the government has made it eligible for financing from the National Economic Development Bank (BNDE). In 1967 Brazilian fishing companies were permitted bank financing for construction of several shrimp trawlers in Mexico, and a credit was granted to build a large shrimp-processing plant in Sao Paulo. In addition, since the mid-1960's the Superintendency for Development of the Northeast (SUDENE) has used tax credits to stimulate formation of six fishing companies and to improve port and refrigeration facilities. Since 1967 some U.N. financing has gone into fishing industry projects, and Brazil has applied for one of the fishmeal flour plants that the United Nations is establishing in protein-deficient nations. In response to more liberal legislation affecting foreign investment in the fishing industry, several firms have drawn up development plans. Provisions for establishing processing, storage, and marketing facilities are included in the new law.

g. Forestry

Brazil's forested area exceeds that of all countries except the Soviet Union and Canada, but only one-fifth of its forest resources are being utilized. More than 75% of the forested area lies in the undeveloped expanses of the Amazon Basin, the world's largest reserve of tropical timber. Exploitation has been limited by inaccessibility, the use of primitive methods, and lack of demand for many of the species. Since the mid-1960's, however, investment capital—some of it from U.S. and European firms—has been attracted to the Amazon Basin by tax inducements and growing Western European demand for hardwood veneers. The completion of the Trans-Amazon Highway will aid greatly in exploiting these reserves.

Although accounting for only a small portion of total forested area, Parana pine forests in the four southernmost states provide 70% of total lumber output. Timber extraction methods are generally backward, and there are few large mechanized logging

operations. Output has not kept pace with rising demand from the booming construction industry because a lack of timber has kept many of the 3,500 sawmills in the area idle. To help meet domestic requirements, restrictions on pinewood exports were imposed in early 1969.

Important nonwood forestry products include fats, oils, nuts, gums, waxes, and tannins. Exports of Brazil nuts were valued at \$14 million in 1970. Brazil depends on imports for specialty products, such as naval stores, cork, and certain gums and resins, and for much of its supply of woodpulp and paper.

Poor forest management over the years has created serious problems in some regions. Reforestation programs are needed particularly in the Northeast and in Minas Gerais, where wholesale devastation of forest reserves has occurred due to land clearing and the use of timber for fuelwood and for producing charcoal for the iron and steel industry. Despite government efforts at forest conservation, the Parana pine forests also are threatened with depletion. Token reforestation activities began in 1945 under the direction of the National Pine Institute (INP), which now has nurseries in 10 forest reserves that raise and sell seedlings to private sawmill owners. A new forest code issued in 1965 contains special provisions for the reforestation of Parana pine and requires enterprises using large quantities of wood to maintain their own reserves. Because the Parana area has one of the world's fastest pine-growth cycles, a serious reforestation effort could effectively ward off depletion.

2. Fuels and power

Brazil ranks second among Latin American countries in total energy consumption but depends upon imports for a substantial portion of its energy requirements. The country has excellent hydroelectric power resources but poor-quality coal and only small amounts of known petroleum reserves. Despite very extensive hydroelectric power potential, electric power provides only about one-fourth of energy supply. Petroleum, most of which must be imported, provides more than 45% of energy consumed. A relatively large share of energy supply—some 25%—comes from fuelwood and bagasse (a byproduct of sugar processing). Coal, some of it imported, provides only about 5% of energy consumption.

a. Solid fuels

Proved coal reserves, mainly bituminous, are estimated at 3.5 billion metric tons, located primarily

in the States of Rio Grande do Sul, Santa Catarina, and Parana. Domestic run-of-mine coal production has increased as follows (in thousands of metric tons):

1960	2,330	1965	3,137
1961	2,390	1966	3,665
1962	2,508	1967	4,339
1963	2,828	1968	4,828
1964	2,990	1970	5,182

In 1970 almost three-fourths of production came from the Santa Catarina deposits. Only about 30% of domestic coal production is used in making coke for metallurgical purposes, while about two-thirds is consumed by thermal powerplants. Because domestic coal is of poor quality, access to the deposits is difficult, and transportation costs are high, high-grade imported coal is used extensively by the metallurgical industry. Imported coal costs about half the delivered price of domestic coal, but the domestic industry is subsidized because of its importance to the producing states and to reduce foreign exchange costs. Coal imports, almost entirely from the United States, totaled 2.1 million metric tons in 1970, compared with 1.6 million tons in 1969.

b. Petroleum and natural gas

Proved reserves of petroleum totaled only 857 million barrels at the end of 1970—less than a 5-year supply at current consumption rates. Approximately 80% of these reserves are located in the Reconcavo basin in the coastal region of the State of Bahia. Crude oil from this area has a high paraffin and salt content, which makes it flow-resistant and causes processing difficulties.

Exploitation of petroleum resources is controlled by the National Petroleum Council (NPC), which was established in 1941 under the Ministry of Mines and Energy. PETROBRAS, the government petroleum enterprise established under NPC in 1953, is responsible for exploration, drilling, importation, and most refining. Distribution still remains largely in the hands of private companies. A stock corporation, PETROBRAS is jointly owned by the federal government (75%), state and municipal governments (22%), and private stockholders (3%).

In 1970 crude oil production totaled 60 million barrels, or about one-third of domestic requirements. The Miranga field, the leading producer in the Reconcavo basin, accounted for about one-fifth of output. Crude oil imports have tripled since 1960, totaling 117.5 million barrels in 1970. During this period, refined petroleum imports declined from 31 million to 5 million barrels.

In 1970 PETROBRAS owned five of the country's 11 refineries; the combined capacity of the PETROBRAS installations, 449,000 barrels per day (b.p.d.), was more than 90% of total refining capacity. Brazil has about 800 miles of pipelines used for crude oil; most of these pipelines are owned and operated by PETROBRAS. PETROBRAS also operates a fleet of 40 tankers under a division called Frota Nacional de Petroleiros (FRONAPE).

PETROBRAS has continued to give high priority to exploration, with activity centering on offshore areas, particularly at the mouth of the Amazon and along the continental shelf off the coast of Sergipe and Alagoas. An offshore petroleum field located 10 miles off Aracaju, Sergipe, and discovered by PETROBRAS in 1968 has been brought into production and is expected to reach a rate of 20,000 b.p.d. The Caioba offshore field, discovered in 1969, was scheduled to begin producing in late 1972.

Proved reserves of natural gas total 918 billion cubic feet—equal in energy value to about one-fifth of the country's crude oil reserves. Natural gas is an associate product of 42 petroleum fields and the primary product in three gas-producing areas in Bahia. Production reached 44.6 billion cubic feet in 1970, more than 90% of which came from associated crude oil production. Most of the gas output is used for repressuring oilfields, but some is used for fuel or as feedstock for the petrochemical industry.

c. Electric power

Electricity is generally adequate to meet the country's present requirements, but considerable expansion is needed to keep pace with demand growth, which since 1966 has averaged 11% annually. At the end of 1972 installed capacity was 13.9 million kilowatts (kw.), and production was nearly 57.3 billion kilowatt hours (kw.-hr.). Per capita consumption averaged 500 kw.-hr. Of the total national capacity 80% is hydroelectric, and 20% is thermal. Hydroelectric production contributes about 85% of total output.

Industry is the principal user, accounting for 51% of electric energy consumption. The other consumers are households (23%), commercial (14%), public services (8%), transportation (2%), and agriculture (2%). Consumption is concentrated in the heavily populated, highly industrialized Central South electric power region, one of the six major areas into which the power industry is divided. This region, which encompasses the States of Minas Gerais, Sao Paulo, Espirito Santo, Rio de Janeiro, Guanabara, Parana, and Santa Catarina, consumes about 77% of total power. Per capita consumption in the cities of Sao

Paulo and Rio de Janeiro is over 1,500 kw.-hr. Another 20% is consumed in the electric power regions of the Northeast (States of Ceara, Maranhao, Piaui, Pernambuco, Goias and Bahia) and South (State of Rio Grande do Sul) in approximately equal proportions. The scarcely populated areas of the North (State of Para), Northwest (State of Amazonas), and Central-West (State of Mato Grosso) account for about 3% of total national consumption.

Some 79% of electricity is generated by public utility installations and 21% by privately owned powerplants. Public utility ownership includes federal, state, and municipal companies. A state-sponsored holding company *Centrais Eletricas Brasileiras, S.A.* (ELECTROBRAS) administers 15 large public utility companies and is associated with 21 major enterprises. These organizations account for about one-third of national capacity and 35% of total production. In addition, ELECTROBRAS functions as an executive organization to implement the government's electric power policy and to assist the Ministry of Mines and Energy in the planning, financing, and coordination of electric power development throughout the country.

Equipment for the construction of power generating and transmission facilities is manufactured in Brazil, mainly by companies that are subsidiaries of or joint ventures with United States, European, or Japanese firms. Large turbines and generating units are imported from Sweden, Italy, West Germany, the United Kingdom, and the United States. About half of electric power development is financed by the federal and state governments, 30% by power companies, and 20% by foreign loans. Foreign financing has been supplied by the Inter-American Development Bank, the International Bank for Reconstruction and Development, the U.S. Agency for International Development, the Export-Import Bank of the United States, and other financial agencies and banks. During the last 5 years, an average of US\$700 million annually has been invested in expanding electric power capacity; ELECTROBRAS has been responsible for about 30% of total investments.

Extensive waterpower potential and limited oil and coal resources have been the determining factors in the extensive hydroelectric development in Brazil. Waterpower potential is estimated at 150 million kw., only about 8% of which has been utilized. The Central South area contains about 55% of total waterpower potential, mainly in the Rio Parana and its left-bank tributaries. Another 10% of potential is in the Northeast in the Sao Francisco River basin, while about 45% is in the Northwest in the Amazon Basin.

The largest hydroelectric installations, all in the Central South, are the 1,100,000-kw. Jupia Powerplant, the 900,000-kw. Furnas Powerplant, and the 700,000-kw. Estreito Powerplant. In the Northeast the largest hydroelectric plants are the three Paulo Afonso stations with an aggregate capacity of more than 1 million kw. The largest thermal installations are the 450,000-kw. Piratininga Powerplant in Sao Paulo and the 160,000-kw. Santa Cruz Powerplant in Rio de Janeiro. The latter plant is being enlarged and by the end of 1972 will have a capacity of 560,000-kw.

Electricity is transported from powerplants to consumption centers by two major transmission systems and by several short, isolated transmission lines. The transmission systems are not integrated into a national power grid. The densest grid supplies the Central South and South regions with 440-kilovolt (kv.), 345-kv., 230-kv., and 110-kv. lines. Other lines at lesser voltages are used to transmit power over short distances. The second most important transmission system is in the Northeast serving towns and ports along the coast. In this area, the major lines are 230-kv. and 110-kv. Small grids serve the rest of the country with lines at 110-kv. or less. By 1975 current throughout the country is expected to be standardized at the 60-cycles, 127/220 volts compatible with U.S. manufactured equipment, but at present voltage varies considerably. International connections are few and consist of low-voltage lines to Uruguay. The amount of electricity exchanged is about equal and totals about 5 million kw.-hr. annually.

Expansion plans emphasize continued rapid development of hydroelectric capacity but also call for some increase in the thermal base and the interconnection of presently separated grids. The power industry plans to install an average of 1.3 million kw. annually to attain the 17 million kw. national capacity needed by 1975. Although the bulk of new facilities will continue to be built in the Central South and South regions, a number of new installations are scheduled for the Northeast, North, and Central-West to service the planned spread of large power-consuming industries to those areas. Largest among planned hydroelectric projects is the 10-million kw. Itaipu (Sete Quedas) Powerplant on the Rio Parana, near the Brazil-Paraguay border. Power produced by this plant is to be equally shared by the two countries; work is to start in 1973 and the first unit is to become operative by 1980. Other large hydroelectric projects include the 3.2 million kw. Ilha Solteira, the 2 million-kw. Agua Vermelha, the 1.5 million-kw. Sao Simao, and the 1.4 million-kw.

Maribondo Powerplants, all in the Central South region. In the Northeast the Paulo Afonso (IV) plant will have a capacity of 1.8 million kw.

In the thermal sector, planned development is on a more modest scale and consists mainly of standby and emergency installations near large consumption centers. Among these is the 400,000-kw. plant in Belo Horizonte and the 232,000-kw. Jorge Lacerda plant in Santa Catarina. In the nuclear field, a 500,000-kw. installation is under construction at Angra dos Reis, near Rio de Janeiro. The first of its kind to be built in Brazil, it will include a pressurized water reactor which is being constructed by Westinghouse (U.S.) and is to be operational by 1976. Two other nuclear powerplants are planned for construction between 1975 and 1980. High-voltage lines at 400-kv. and 500-kv. will be built to interconnect the Central South and the Northeast transmission systems and to join the new powerplants with the major consumption centers of Sao Paulo and Rio de Janeiro. Lower-voltage transmission lines and distribution systems are to be constructed throughout the country.

3. Metals and minerals

Brazil has large deposits of iron, manganese, bauxite, and columbium and significant deposits of nickel, lithium, beryllium, mica, and quartz. Mineral deposits of lesser importance include copper, lead, tin,

tungsten, zinc, and zirconium. Only a small part of the country's known mineral wealth is exploited, but undiscovered resources are suspected to exist. Although mining activity increased throughout the 1960's, it contributed less than 2% of GDP at the end of the decade.

Mining development is impeded by the inaccessibility of many deposits and lack of domestic capital, and in the past government discouragement of foreign investment was also a factor. However, after the advent of the Castello Branco government, private foreign and domestic interests were encouraged to invest in this sector. Private industry has responded favorably to the government's new attitude, and substantial amounts of capital have become available. Numerous groups, both foreign and domestic are actively exploring for new deposits. Not only has the economic and political climate stabilized, but the potential for success resulting from exploration efforts is relatively high.

a. Ferrous metals

Brazil's mostly high grade iron ore reserves, the second largest in the world, are estimated at about 100 billion metric tons. Iron ore production (Figure 17), which was 9.3 million tons in 1960, probably reached 45 million tons in 1972. Although Brazil's iron ore output is only about 2% of world production, its

FIGURE 17. Production of ores and metals
(Thousands of metric tons)

	1965	1966	1967	1968	1969	1970
Aluminum:						
Bauxite.....	156.0	239.0	302.9	313.7	348	500
Metal.....	30.4	38.0	37.7	41.5	43.2	57.6
Columbium and tantalum.....	1.2	4.8	4.6	5.0	8.7	13.3
Copper:						
Ore.....	126.2	141.0	119.2	162.8	314.0	340.0
Blister copper.....	1.8	2.0	1.8	3.0	3.3	3.8
Iron ore.....	18,160	21,000	22,298	25,123	33,000	40,200
Lead:						
Ore.....	266.9	266.5	295.7	321.0	336.5	351.6
Metal.....	5.3	17.4	17.2	16.2	18.7	19.3
Manganese ore.....	1,396	1,393	1,358	2,097	1,691	1,880
Nickel:						
Ore.....	59.3	70.0	62.3	70.0	114.0	190.0
Ferronickel.....	1.1	1.4	1.1	1.1	1.3	2.5
Tin:						
Gross wt.....	2.8	2.9	2.7	3.5	4.0	5.1
Metal.....	1.6	1.5	1.4	1.7	2.3	3.0
Titanium ores.....	10.2	13.5	15.0	18.0	20.3	20.8
Tungsten (80% WO ₃ equivalent).....	0.4	0.5	0.6	0.9	1.8	2.4
Zinc (Concentrate 30% zinc).....	15	na	8	20	15	35
Electrolytic.....	0.08	1.4	1.8	4.8	4.9	10.5

na Data not available.

exports amount to almost 10% of the world iron ore trade. About 70% of production is exported, mainly to Japan, Western Europe, and the United States. Adversely affected by lower world iron ore prices since the late 1960's, Brazilian producers are attempting to lower production costs by mechanizing mines, improving mine-to-port transportation, and modernizing port facilities. The government is encouraging the construction of pelletizing plants to meet the growing world demand for enriched ore and is promoting the association of Brazilian mining interests with foreign steel companies to create captive export markets.

About 95% of the iron ore production comes from the State of Minas Gerais. The state's so-called "Iron Quadrangle"—an area of about 3,100 square miles between Belo Horizonte, Itabira, Congonhas, and Mariana—contains the principal exploited deposits. The Rio Doce valley is the main producing area in the Iron Quadrangle, contributing three-fourths of total output. The remainder comes from the Rio Paraopeba valley. Although some of the ore mined in the Rio Doce area is used in the *Companhia Belgo-Mineira* or *Usina Siderurgica de Minas Gerais, S.A.* (USIMINAS) steel plants, most is exported through the port of Tubarao (near Vitoria). This port, which was opened in 1966, handled nearly 22 million metric tons of iron ore in 1970. A pelletizing plant with a 2-million-ton annual capacity has been constructed at the port to process fine ores for export and domestic consumption. Part of the ore mined in the Rio Paraopeba valley is used in domestic steel mills, and the remainder is exported via Rio de Janeiro.

The ferrous metal mining industry is dominated by five enterprises which together produce about 90% of total iron ore output. The largest company is the *Companhia Vale de Rio Doce, S.A.* (CVRD), which is 90% government owned. CVRD mined 23 million metric tons in 1970 or about 58% of total production, and accounted for about 78% of Brazil's total iron ore exports of 28 million tons. *S.A. Mineracao da Trindade* (SAMITRI), a subsidiary of *Cia. Belgo-Mineira*, is the second largest producer and exporter. Other important companies include the state-owned *Companhia Siderurgica Nacional*, the German-owned *FERTECO S.A. Administracao e Fomento Industrial*, and *Mineracoes Brasileiras Reunidas* (MBR), which is owned by private U.S. and Brazilian interests.

Two important contracts were signed in 1967 between CVRD and Japanese interests. One contract involves the sale of 35 million metric tons of ore during 1969-73 which will gradually raise CVRD exports to Japan to over 7 million tons annually by 1973. The second contract was for financing and construction by

Japan of two Brazilian iron ore-oil carriers with a capacity of 104,000 deadweight tons each. These vessels will carry oil from the Middle East to Brazil and then transport iron ore to Japan.

The Brazilian steel industry accounts for about 60% of South America's steel production. The industry supplies some 95% of domestic demand, compared with 88% in 1962 and 64% in 1951. The steel and nonferrous metallurgical industries accounted for 17% of value added in manufacturing in 1969 and employed 19% of the industrial labor force. Steel production has grown rapidly, rising from 0.5 million metric tons of steel ingots in 1949 to 6.0 million tons in 1971. Production was expected to increase to about 8 million tons by 1972.

The steel industry is dominated by *Companhia Siderurgica Nacional*, which accounts for about one-third of the total ingot steel produced. This company, founded in 1941, operates facilities at Volta Redonda in the State of Rio de Janeiro.

The second and third largest steel companies are *USINAS Siderurgicas de Minas Gerais* (USIMINAS) and *Companhia Belgo-Mineria*, which produced 790,914 and 585,121 metric tons, respectively in 1969. The government holds about 90% of the two largest companies, at least 50% of *Companhia Siderurgica Paulista* (COSIPA, the fourth largest steel company), and a majority interest in two smaller steel firms. These six steel plants together account for the bulk of steel ingot production and almost all flat finished products, rails, and heavy structural steel. To reduce duplication of product lines among the five state-owned plants, the Commission for Steel Industry Development (CONSIDER) has been established to coordinate their production.

Brazilian imports of iron and steel products increased 39% in 1970, from \$112.4 million to \$156.1 million (c.i.f.). The principal countries of origin were Japan, West Germany, Poland, and the United States. During the same period, Brazilian exports of iron and steel products more than doubled from \$45.9 million to \$97.8 million, with the principal countries of destination being Argentina, Japan, and Algeria. During 1970 iron and steel exports amounted to almost 770,000 metric tons, while iron and steel imports amounted to almost 586,000 tons.

Brazil is a major producer of ferroalloy minerals. Manganese exports rose from 860,000 metric tons in 1969 to 1.6 million tons in 1970 and were 1.5 million tons in 1971. The largest producer, *Industria e Comercio Brasileira de Mineratis S.A.A.* (ICOMI), is owned by Brazilian private interests and U.S. Bethlehem Steel and operated in the Territory of

Amapa. *Sociedade Brasileira de Mineracao Ltda.* (SOBRAMIL), in which the U.S. Steel Corporation has a minority interest, operates in the State of Mato Grosso. These two companies, together with *Companhia Meridional de Mineracao*, a subsidiary of U.S. Steel, produce about 90% of ore and account for nearly all exports. Manganese ore reserves are estimated at 100 million to 150 million tons.

Brazil is the only country in the Western Hemisphere that produces chromite, although in terms of world production its output is insignificant. In 1970, the three small, privately owned chromite companies produced 27,617 metric tons, an amount almost sufficient for domestic requirements. Additional reserves, mainly in the State of Minas Gerais, are known to exist and, if present expansion plans are carried out, exportation of the product will be possible.

b. Nonferrous metals

Refined lead production has tripled since 1965 (Figure 17) and in 1970 was almost enough to meet domestic demand. Lead mining and smelting is a virtual monopoly of *Companhia Brasileira de Chumbo* (COBRAC), a U.S.-French-Brazilian private company. All lead ore is produced in the States of Bahia, Parana, and Sao Paulo, and reserves are estimated at over 1 million metric tons. COBRAC's two smelters have a combined capacity of 31,000 tons annually.

Brazil has extensive bauxite deposits and a large hydroelectric potential, the major requisites for an aluminum industry. Nearly all bauxite is processed domestically. During 1970 over 500,000 metric tons of bauxite were used to produce 119,000 tons of alumina, which was in turn transformed into 58,000 tons of aluminum—a substantial increase from the 1961 figures of 111,000 tons of ore, 36,000 tons of alumina, and 20,000 tons of aluminum. Most domestic production comes from *Aluminio Minas Gerais S.A.* (ALUMINAS). This company, with a capacity of 27,000 tons, produced 25,129 tons of metal in 1970. *Companhia Brasileira de Aluminio* (CBA) produced about 23,000 tons in 1970. *Companhia Mineira de Aluminio* (ALCOMINAS), a newly formed joint venture of Aluminum Co. of America (ALCOA), the Hanna Mining Co., and private Brazilian investors, produced over 9,000 tons in 1970.

Brazil has important tin deposits, mostly in the Territory of Rondonia. Production, which increased after the mid-1960's, reaching about 4,300 metric tons (metal content) in 1971, is adequate to meet domestic

requirements and permit a small volume of exports. Five smelters are in operation, the largest of which is in Volta Redonda.

The government has a monopoly on exploration for and mining of uranium and thorium. Although no commercially exploitable deposits of uranium have yet been discovered, there is a promising area of exploration near Pocos de Caldas in Minas Gerais.

Brazil is a leading world producer and exporter of several minerals of strategic importance in nuclear energy production. Beryl, which is mined by private Brazilian companies from deposits of pegmatites in Minas Gerais, is exported mainly to the United States. Production and exports declined in 1963-66 following cessation of stockpile purchases by the United States but revived in 1967. Beryl exports, which are now subject to government control, reached 3,333 metric tons in 1970.

Brazil is the world's major producer of columbium and tantalum. Exploitation of the columbium deposits at Araxa by the *Companhia Brasileira de Metalurgia e Mineracao* in Minas Gerais began in 1961, and the first shipments were made in 1963. Pegmatites located in Bahia and in other areas of the North and Northeast are the sources of tantalum which is usually found in association with columbium. Production of columbite-tantalite comes from a number of small mines. All output of columbite and tantalite, which totaled 41 and 209 metric tons, respectively, in 1970, is exported, mainly to the United States.

The *Companhia Brasileira de Cobre* with its mine at Camaqua in Rio Grande do Sul is the only copper producing company in Brazil. In the wake of an intensive program of exploratory drilling and sampling at the Camaqua property, a reported 6 million tons of ore with a 1.4% copper content has been discovered, and a new concentration mill is being completed to process this ore. This unit, rated at 50,000 tons per month ore capacity, will raise total capacity to 80,000 tons per month of milled ore, and will double the output of refined metal. An important copper deposit in the State of Bahia has been explored. Although exploitation has been slow, development of the deposit may enable Brazil to achieve self-sufficiency in copper.

In 1970 officially reported gold production decreased slightly from the 1969 level of 5,503 kilograms to 5,329 kilograms. *Mineracao Morro Velho S.A.* operates the only lode gold mine known to be active, and the Rio Tapajos area in the State of Para is the major placer mining area.

c. Cement

Cement production rose 15% in 1970 to just over 9 million metric tons. Despite this advance a shortage of cement continues, and 334,510 tons were imported during the year. The 1970 output represents 82% of capacity at the existing 32 plants within 17 states. Ten new plants were under construction at the end of 1970, and plans are underway for two additional plants.

4. Manufacturing

Brazil has one of the most highly developed industrial complexes in South America and leads the continent in industrial output. The range of industrial establishments embraces handicraft shops, small factories using antiquated methods, and large plants using the most modern techniques. Brazilian industry satisfies almost all domestic demand for durable and nondurable consumer goods and is increasing its already appreciable capability to provide intermediate and capital goods. Manufacturing has been the fastest growing sector of the economy since World War II, registering an average annual increase of about 7% from 1950 to 1965 and nearly 10% from 1962 to 1971 (Figure 18).

The relative importance of light consumer goods production, which traditionally dominated the manufacturing sector, has gradually declined. In 1970, manufacturing output was distributed as follows, in percent (figures do not add to 100 because of rounding):

Intermediate goods	42
Light consumer goods	38
Capital goods	17
Durable consumer goods	4

The relative importance of the various branches of manufacturing in 1969 is shown in Figure 19.

Most industry is located within the triangle formed by the cities of Sao Paulo, Rio de Janeiro, and Belo Horizonte. In 1969 the State of Sao Paulo produced about 57% of the value added in manufacturing, and the States of Guanabara and Rio Grande do Sul together accounted for 16%.

The development of manufacturing has been spurred by the ready availability of labor, many industrial raw materials, a relatively large domestic market, and an enterprising class of industrial leaders. It also has been stimulated since 1964 by liberal government investment incentives. More recently, government incentives have encouraged investment in industries with export potential. On the other hand industrial expansion has been limited by inadequate transportation facilities and wide regional disparities in income.

Foreign private investment has been important in developing many manufacturing industries, including automobiles, machinery, electrical and electronic equipment, chemicals, and pharmaceuticals. The United States, with over US\$2 billion invested, is the largest source of private foreign capital, although Canada, West Germany, and the United Kingdom are also important in this regard. The automobile industry has received the largest share of foreign investment, followed by the chemical and electrical equipment industries.

a. Food products

The production of food, beverages and tobacco, the largest manufacturing sector as recently as 1967, is

FIGURE 18. Indexes of output of selected branches of manufacturing (1962 = 100)

	1963	1966	1967	1968	1969	1970
Manufacturing.....	99.7	112.1	114.8	133.0	147.4	163.7
Nonmetallic minerals.....	99.9	104.1	113.0	129.2	136.9	171.7
Metallurgy.....	103.4	130.3	127.1	150.1	171.7	181.8
Machinery.....	102.6	93.1	88.1	117.2	127.1	148.1
Electrical and communications equipment.....	96.2	145.9	159.8	197.5	208.3	224.2
Transportation equipment.....	89.3	113.7	113.9	144.0	193.7	225.2
Sawn lumber.....	102.5	76.2	77.8	na	na	na
Paper and paper products.....	107.8	123.1	142.7	149.6	154.8	181.5
Rubber products.....	100.9	128.5	139.0	157.0	166.3	202.9
Leather and hides.....	92.8	111.2	121.2	132.8	na	na
Chemicals.....	103.6	126.6	130.9	147.2	163.2	192.4
Textiles.....	97.3	81.1	79.5	94.9	97.3	97.2
Shoes and clothing.....	100.8	114.8	108.2	129.5	96.4	113.7
Food products.....	99.2	100.4	107.8	114.4	130.2	142.8
Beverages.....	102.0	119.0	104.2	108.1	128.8	129.9
Tobacco products.....	100.5	96.9	106.1	119.8	128.6	136.7

na Data not available.

FIGURE 19. Distribution of value added and employment in manufacturing, by branch, 1969

	SHARE OF VALUE ADDED	NUMBER OF EMPLOYEES	SHARE OF EMPLOYMENT
	<i>Percent</i>	<i>Thousands</i>	<i>Percent</i>
Nonmetallic minerals	5.8	174	7.5
Metallurgy	11.4	270	11.6
Machinery	6.0	124	5.3
Electrical and communications equipment	6.3	128	5.5
Transportation equipment	8.6	169	7.3
Furniture and wood products	4.2	165	7.1
Rubber products	2.1	31	1.3
Chemicals and plastics	17.7	217	9.4
Textiles	10.1	340	14.6
Clothing and shoes	2.8	123	5.3
Food, beverages, and tobacco	17.0	360	15.5
Printing and graphics	3.0	86	3.7
Paper and paper products	2.7	65	2.8
Other	2.3	73	3.1
Total	100.0	2,325	100.0

now in second place behind the chemical industry. In 1969 the food sector supplied 17% of value added in manufacturing compared with 27% in 1967. Domestic manufacturers supply most requirements for processed foodstuffs, oils, beverages, and tobacco products. The leading food-processing industries are coffee and meat processing. Other important industries process dairy products, fish, sugar, alcoholic beverages, fruits and vegetables, fats and oils, and cigarettes and cigars. Most raw materials except for wheat and hops are domestic.

b. Textiles

The textile industry is one of the oldest and most important in Brazil. It accounts for about 10% of value added in manufacturing and employs some 15% of the industrial labor force. Until recently, most plants were obsolete, and productivity was low. Since 1970, however, the larger mills, supported by government investment incentives and Brazil's rapid economic growth, have made sharp improvements in management and productivity and in 1971 reported the best sales and profits results in the past 10 years. Increased exports, also enjoying strong government encouragement, have been another major factor contributing to the industry's prosperity. Cotton textile manufacture remains the most important component of the industry, although production has been decreasing since 1964 because of increased demand for synthetic textiles. Brazil exports cotton textiles and yarns to the United States under a "voluntary restraint" program. These exports totaled about US\$9 million in 1970.

The manufacture of synthetic fibers is an increasingly important segment of the textile industry. The increase in production of synthetic fibers from 1964 to 1970 is shown in the following tabulation (in metric tons):

	1964	1967	1970
Cellulose fibers	44.0	50.2	55.0
Noncellulose fibers	12.5	20.8	41.4
Total	56.5	71.0	96.4

The government is using financial incentives to encourage the textile industry to modernize its facilities. These incentives include low-interest loans to purchase machinery and equipment, exemption from customs duties and accelerated depreciation allowances. The government is also encouraging mergers of small- and medium-sized firms to obtain economies of scale.

c. Chemicals and pharmaceuticals

In 1969 chemical and pharmaceutical enterprises accounted for 17.7% of value added in manufacturing and employed over 9% of the industrial labor force. Brazil possesses adequate quantities of most basic raw materials required in the chemical manufacture but is deficient in sulfur and alkalis. The budding petrochemical industry is heavily dependent on imported raw materials. There are some 120 large manufacturing firms in the chemical industry and an additional 500 to 600 small- and medium-sized producers. In pharmaceuticals, there are about 450 manufacturers and laboratories. Industrial chemical production is dominated by a few large companies.

The chemical industry is centered in Sao Paulo, but a major petrochemical complex is being established in the State of Bahia.

Brazil produces about 55% of its requirements of caustic soda, a basic ingredient for manufacturing soap, rayon, and paper. In 1970 some 13 firms produced 147,000 metric tons of caustic soda, compared with 125,000 tons in 1969. The sole manufacturer of soda ash, used in manufacturing glass, is the government controlled *Companhia Nacional de Alcalis*. It is a high-cost producer with virtual monopoly of the market.

Sulfuric and nitric acid capacity is approximately 520,000 and 125,000 metric tons per year, respectively. An expansion project is expected to add roughly 150,000 tons to annual nitric acid capacity. A firm at Cubatao, Sao Paulo, the only producer of phosphoric acid in 1967, produced 50 tons per day.

The petrochemical industry is still in its formative stage. A government decree of 1967 permits *PETROBRAS Quimica, S.A.* (a subsidiary of the state oil company) to join with private investors in developing the industry. One joint venture involves the construction of a refinery at Santo Amaro, Sao Paulo, to produce a broad variety of petrochemical products. Total investment in the project will be US\$71 million, including funds provided by the International Finance Corporation (IFC). *PETROBRAS* also is participating in an ammonia and urea plant at Camacari, Bahia, and in other joint ventures to produce ethane, propane, and aromatic hydrocarbons. Investment in petrochemical facilities, including cracking and raw materials units, is expected to total about \$500 million through 1974.

Chemical fertilizer production amounted to 813,729 metric tons in 1970, about 33% of total consumption. Although the cost of producing fertilizers is relatively high because of low quality inputs, production has grown rapidly during the last decade. Some 90% of the fertilizer produced is phosphatic and the remainder is nitrogenous. In 1970 Brazil produced over 100,000 tons of pesticides, involving about 200 different chemical compounds.

d. Pulp and paper

The paper industry, founded in the early years of the century, developed significantly only as a result of import shortages that occurred during World War II. Pulp production developed still later, and large quantities were imported until 1950.

Brazil ranks first among the South American countries in the production and consumption of pulp and paper. Paper production doubled to over a million

metric tons between 1963 and 1970. Nevertheless, 186,000 tons of paper imports were required in 1970. Brazil is self-sufficient in mechanical pulp, but some chemical pulp is imported.

The industry, consisting of approximately 100 pulp and paper mills, most of which are modern, is concentrated in the southern part of the country near the large consuming centers. *Industrias Klabin* of Sao Paulo is the largest producer and is among the 20 largest companies in Brazil.

e. Motor vehicles and agricultural equipment

The Brazilian automotive industry began in 1919 with the establishment of a Ford assembly plant at Sao Paulo. With strong government encouragement, especially after 1956, the industry has converted from assembly to manufacture and is now large enough to meet domestic requirements for standard motor vehicles. Output has increased sharply (Figure 20), rising from less than 31,000 units in 1957 to almost 610,000 units in 1972. In 1971 industry sales of \$1.9 billion represented about 4% of Brazil's gross national product. Manufacturers have predicted that the market for new vehicles will reach 1 million units by the second half of the decade.

Since 1966 the industry has undergone a consolidation that reduced the number of companies from 12 to 10 and the number of major producers to 6. The remaining companies include such well-known names as General Motors, Chrysler, Ford, and Volkswagen (Figure 21). An additional 1,800 factories manufacture automotive parts and supply more than 90% of the components used in automobile production. In 1970, seventy-two manufacturers exported US\$4.98 million worth of automobile parts.

FIGURE 20. Motor vehicle production

	PASSENGER			TOTAL
	CARS	TRUCKS	BUSES	
1957.....	1,656	28,388	498	30,542
1958.....	11,354	48,971	658	60,983
1959.....	30,471	64,336	1,307	96,114
1960.....	62,264	68,881	1,806	133,041
1961.....	85,131	58,838	1,615	145,584
1962.....	110,342	79,925	927	191,194
1963.....	122,662	50,250	1,179	174,091
1964.....	132,685	48,777	2,245	183,707
1965.....	138,667	44,214	2,306	185,187
1966.....	158,000	63,820	2,754	224,574
1967.....	170,388	51,729	3,301	225,418
1968.....	161,000	*118,000		279,000
1969.....	239,000	*113,000		352,000
1970.....	303,000	*113,000		416,000
1971.....	443,386	68,288	4,393	516,067

*Only combined figures available.



FIGURE 21. Section of a Volkswagen auto assembly line

Some 80 companies produce agricultural equipment and, although the industry began only in 1959, it supplies most of the country's requirements. During the 1960's the tractor industry, which is made up of six mostly foreign firms, shifted its emphasis from light to medium and heavy tractors, and production of crawler tractors began in 1967. Tractor production, which was 12,538 units in 1966, increased to 29,457 units in 1972.

f. Machinery and equipment

This sector produces machine tools, electric and diesel-electric locomotives, electric power generating and distribution equipment, and a limited range of scientific, technical, and industrial instruments. About 85% of the industry's facilities are located in the State of Sao Paulo. In 1966 the five leading heavy machinery manufacturers formed the Brazilian Industry Consortium (INBRACON) to promote the export of heavy industrial machinery.

g. Electrical and communications equipment

About 90 firms manufacture telecommunications and electronic equipment, satisfying nearly all domestic demand for radio and television receivers and radio broadcast transmitters. The main companies, which include Philco, General Electric, and Philips, are foreign owned. International Business

Machines, Inc., which assembles data processing equipment, began exporting to other countries in 1964. The industry employs about 5% of the industrial labor force.

h. Shipbuilding

Brazil is the leading shipbuilder in Latin America, although large-scale shipbuilding began only in 1958. The largest and most modern of Brazil's 10 major shipyards is the Japanese-Brazilian Ishikawajima Shipyards, in Rio de Janeiro, which in 1967 employed 2,100 workers, only 70 of whom were Japanese nationals—all technicians and supervisors. Second largest is the Verolme United Shipyards of Brazil, a subsidiary of a Netherlands-based company. This yard also employs about 2,000 people, less than 100 of whom are Dutch.

The shipbuilding industry, having delivered the biggest ship ever constructed in South America, has now entered the field of the supertankers and is scheduled to build 10 vessels of over 100,000 d.w.t. each between 1972 and 1975. Ishikawajima is to build five oil/ore carriers, each 131,000 d.w.t., at a total cost of US\$120 million. Verolme is also scheduled to build three 116,500 d.w.t. bulk carriers for Brazilian interests at a total cost of \$110 million. The Brazilian Navy has also increased its shipbuilding capacity and technology to the point of undertaking warship construction on a modest scale.

i. Aircraft and missiles

The aircraft industry in Brazil is the largest in Latin America and is growing steadily. A newly established government-controlled aircraft company and the most important of Brazilian aircraft manufacturers, *Empresa Brasileira de Aeronautica S.A. (EMBRAER)*, is assembling 112 jet trainers under a manufacturing license and with technical assistance from Aeronautics Macchi of Milan, Italy. Two other companies engaged in aircraft production are *Sociedade Construtora Aeronautica Neiva Ltda.*, whose principal buyer is the Brazilian Air Force, and *Sociedade Aerotec Ltda.*, which, in conjunction with EMBRAER, is starting production of the agricultural aircraft, expected to reach a production rate of 72 units per year in 1973.

Two government entities under the Ministry of Aeronautics and the Aerospace Technical Center are engaged in aeronautical research and development: the Aeronautical Institute of Technology (ITA) and the Institute for Research and Development (IPD), both of which are capable of designing and manufacturing with EMBRAER a limited number of

prototypes. In 1968, IPD developed a 12 passenger twin-turboprop transport suitable for both military and civilian markets. Called the Bandeirante, it has been tested and flown extensively. High production costs, however, limit the foreseeable domestic market beyond military purchases and the hoped-for potential market in the Latin American Free Trade Association (LAFTA). Nevertheless, the industry is moving toward a broader and more sophisticated level of capability with the aid of the government. Bandeirante production is forecast to be 12 units in 1973, 36 units in 1974, and 44 units in 1975.

Brazil is one of the leading Latin American countries in space research, although the capability for rocket and guided missile research is very limited. In addition to being involved in various space research projects with other countries, Brazil has been developing small sounding rockets for meteorological research at the *Avibras Ltd.* plant in Sao Paulo. The launch facility for these rockets is Barreira do Inferno, located on the coast 12 miles south of Natal. Brazil has imported various small missiles from Western countries for possible study and future development.

5. Construction

The housing and construction industry has developed fairly rapidly since 1965, following a period of relative stagnation. The value of construction increased at an average annual rate of 6% during the late 1960's, and the industry is expected to remain active during the early 1970's because of private building and government public works and housing programs. In 1970 the construction industry consisted of several thousand—mostly small and ephemeral—companies and employed 1.4 million persons, or about 4.6% of the total labor force.

Another important contributor to construction activity is the military establishment. Military personnel and equipment are used extensively in the construction and maintenance of highways and railroads, and military forces are helping to build the Trans-Amazon Highway, under construction since late 1970. Brazilian Army personnel also have the responsibility of building the 1,000 mile North-South road from Santarem on the Amazon River to Cuiaba. Civilian public works constitute the largest component of the construction sector in terms of value and labor. Plans and specifications for such works are usually prepared by either the Ministry of Transportation and Public Works or a government-controlled agency or corporation. Private companies then compete for the construction contracts.

Although statistical data on the construction industry are inadequate, available information indicates that construction increased sharply in the late 1960's. The number of building licenses issued in capital cities rose from 37,291 (for 9.6 million square meters of floorspace) in 1967 to 60,650 (for 16.2 million square meters of floorspace) in 1969. Total floorspace authorized in the city of Sao Paulo, the industrial center of Brazil (Figure 22), amounted to 4.9 million square meters in 1967, 5.9 million square meters in 1968, and 7.1 million square meters in 1969. In the 3 years cited, nearly 45% of the total floorspace licensed in the capital cities of Brazil was in Sao Paulo. Of the total urban building space licensed for construction in 1969, 76.3% was for residential structures (60% for apartment houses and 40% for private homes), 13.8% of the floorspace was for commercial buildings, 6.3% for industrial installations, and 3.6% for miscellaneous buildings. The value of the total building construction licensed in capital cities in 1969 amounted to Cr\$4.4 billion.

Housing construction continued high in 1971, but still did not meet the country's requirements. The 1965 housing shortage of 10.5 million dwelling units is believed to be increasing. The housing deficit includes some 6 million badly deteriorated units and urban slum shacks.

The building of transportation and power facilities is also an important part of the total construction effort. In 1971, the government was in the middle of a 10-year program to modernize railroads, highways, ports, and shipping. The projected investment expenditures for 1971-76 average Cr\$4.2 billion, or nearly US\$1 billion yearly. This will be over 13% of the expected fixed investment in the economy during the period. About 60% of investment in the transport sector in recent years has been for highway improvement, 15% for railroads, 13% for ship construction, 9% for ports and navigable waterways, and about 3% for air transport facilities.

C. Economic policy and development

1. Economic policy

The policies of the federal government are the dominant factors shaping the Brazilian economy. Policymaking is concentrated in a small corps of technicians and administrators within the executive branch, who enjoy a high degree of independence from both the legislature and from special interest groups within the private sector. While this concentration of power has prevailed during most of

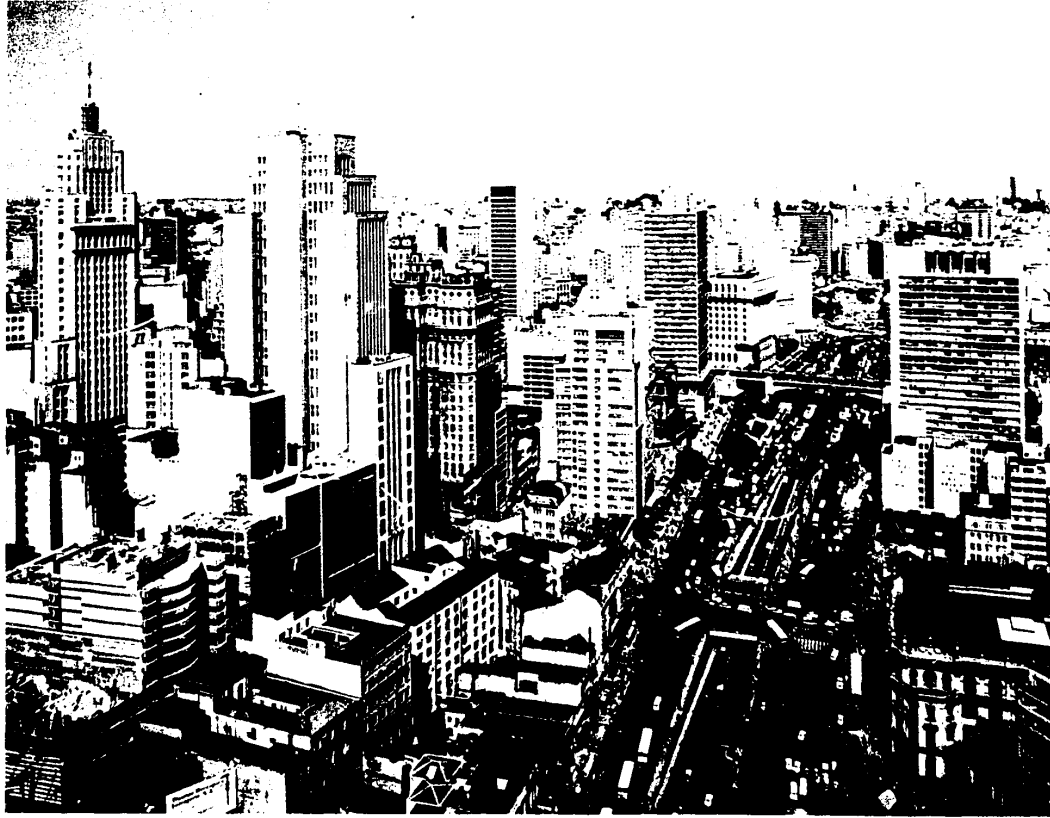


FIGURE 22. Sao Paulo, one of the world's fastest growing cities

the postwar period, it has been particularly marked since the establishment of a military-backed authoritarian regime in 1964. Furthermore, economic policy under the military governments usually has been dominated by one or two strong personalities at the head of either the Ministry of Finance or the Ministry of Planning and General Coordination.

While policymaking is highly centralized, the execution of policy decisions is scattered through a loose, decentralized institutional structure. Because of Brazil's federal system, governmental authority is divided among 22 states and nearly 4,000 municipalities as well as the federal government. Moreover, the economic activities of the federal government itself are diffused among a large number of autonomous or semiautonomous agencies and state enterprises.

Since World War II, the chief objective of economic policymakers has been rapid development, and circumstances only occasionally have forced inflation

or balance of payments problems to the center of attention. The government normally is willing to tolerate considerable inflation rather than risk an economic slowdown as a result of stabilization policies. The steady rise in GNP over the last two decades has been accompanied by annual price increases that rarely measured less than 15%. Balance of payments management also has been approached with growth primarily in mind. Attitudes toward foreign investment have wavered over the years, but foreign capital entry usually has been encouraged in order to help finance imports needed for development. During the 1950's and early 1960's, import substitution was promoted in order to further economic development goals while minimizing balance of payments strains.

The military governments ruling Brazil since 1964 have followed this tradition. At first, economic crisis forced adoption of a strict austerity program, but as

inflation was brought under control and the balance of payments became stronger, the government returned to development-oriented policies. Since 1967 it has pursued a highly successful growth strategy based on rapid export expansion and a wide variety of fiscal incentives to stimulate exports and private investment.

2. Public finance

The central government's fiscal policies since 1967 have reflected both its development objectives and its continuing desire to reduce further the rate of inflation. Growth has been promoted by tax credits to the private sector and by increased government spending for investment purposes. At the same time, the central government's cash deficit has been steadily reduced and steps have been taken to minimize the inflationary impact of deficit financing.

In real terms, the cash deficit has declined in almost every year since 1964. By 1972, the deficit was less than .2% of GNP, compared with a deficit exceeding 4.0% of GNP in 1962-63 (Figure 23). Moreover, the

deficit has increasingly been financed without borrowing from the monetary authorities. Since 1964, the treasury has been authorized to issue securities with a "monetary correction" clause under which their nominal value is periodically raised to reflect increases in the general price index. With their real value thus protected, federal securities have been sold readily to the general public and to commercial banks. Because these sales have exceeded the treasury's current financial requirements since 1967, the government has been able to reduce its outstanding debt to the monetary authorities.

a. Revenues

Brazil is a heavily taxed country, and revenues collected at all levels amounted to almost 30% of GNP in 1972. The central government's budget and nonbudget operations now account for about two-thirds of all tax revenues. State governments collect most of the rest, as the municipalities have relatively small tax resources of their own and depend heavily upon transfers from the federal and state governments for their income. Tax collection has improved at all levels since the mid-1960's, but the federal government has accounted for most of the increase. Federal tax revenue equaled only 13% of GNP in 1964, but by 1972 it amounted to almost 20% of GNP. During the same period, state and municipal revenues rose from 8% to about 10% of GNP.

Revenue increases have resulted mainly from tax reforms and improved administration, although some tax rates also have been raised. In 1967 federal and state sales taxes were converted from turnover to value-added taxes. The withholding of income taxes at the source has been greatly expanded, and the minimum income level requiring the filing of a tax return has been lowered substantially. Tax evasion has been cut not only through better administration but also by applying the principle of monetary correction to all tax debts. Moreover, the government has managed to improve the general public's sense of tax responsibility. These measures have succeeded sufficiently to permit the extension of liberal tax credits as incentives to increase private investment outlays and to channel funds into priority sectors of the economy. In 1971, about 10% of the federal government's potential revenue was sacrificed through these tax credits.

Revenue-raising at both the federal and state level depends heavily on indirect taxes (Figure 24), but the tax system probably is not excessively regressive. The federal individual income tax is sharply progressive, with rates ranging from 5% to 60%. Only about 25% of central government tax income is derived from this

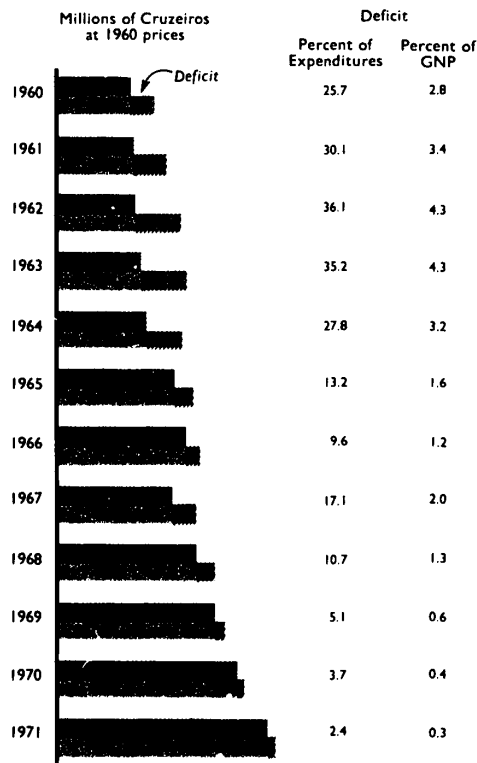


FIGURE 23. Federal government budget: revenues, expenditures, and deficit

FIGURE 24. Summary of federal budget revenue
(Millions of Cr\$)

	1965	1966	1967	1968	1969	1970	1971
Indirect taxes.....	2,655	4,289	4,416	7,683	10,366	12,997	17,043
Industrial products tax (IPI).....	1,308	2,215	2,840	5,075	6,751	8,316	10,817
Import duties.....	209	416	370	816	1,078	1,330	1,844
Petroleum products tax.....	674	896	1,069	1,597	2,289	2,833	3,673
Electric energy tax.....	97	194	105	157	233	450	613
Minerals tax.....	19	29	32	38	45	68	96
Stamp tax.....	348	539
Direct taxes.....	1,023	1,339	1,552	2,176	3,768	4,899	6,358
Income taxes.....	1,023	1,339	1,550	2,173	3,764	4,895	6,353
Real property transfer tax.....	<i>Insig</i>	<i>Insig</i>	2	3	4	4	5
Miscellaneous and statistical discrepancy.....	234	282	846	416	-211	1,298	3,579
Total revenue.....	3,912	5,910	6,814	10,275	13,953	19,194	26,980

source, however. The federal sales tax on industrial products (the IPI) accounts for about one-fourth of total central government revenue and contains some progressive elements. Rates on foods and some other basic consumer items, for example, are relatively low while luxury goods are taxed heavily. Tobacco goods, however, are taxed at extremely high rates and produce about 30% of IPI revenues. Excise taxes on petroleum products and electric energy, which produce about 10% of all federal revenue, probably fall most heavily on upper-income groups. The burden of the coffee export tax, the source of somewhat more than 5% of all federal tax income, falls on the coffee producers. The rest of the federal government's revenue is produced mainly by import taxes and by business taxes earmarked for the various social security funds and the unemployment insurance fund. These taxes may have a regressive impact, but their incidence is not easy to determine. State revenues are produced almost entirely by a sales tax (the ICM) and probably are fairly regressive. The small revenues produced at the municipal level derive mainly from real estate taxes.

b. Expenditures

Government spending at all levels rose during the second half of the 1960's, both in absolute terms and relative to GNP. This increase, however, was less than the rise in tax revenues, the difference being reflected primarily in the shrinking federal budget deficit. Following the 1964 revolution, the military regime endeavored to contain federal spending as part of its program to control inflation. Nevertheless, federal spending increased somewhat faster than the

economy, largely because of higher social security expenditures and expanded investment programs. Spending through the formal budget has been controlled fairly well, however, and in 1972 it was still about 12% of GNP, virtually the same share registered in 1964.

Direct federal budget expenditures have been cut as a share of total spending, but transfer payments have increased. Some of these transfers are payments to the general public as part of a family assistance plan and to cover various pensions and annuities. (These payments are in addition to expenditures by the autonomous National Institute of Social Welfare.) Most budget transfers, however, are payments to federal autonomous agencies, public enterprises, or local governments to help cover their personnel costs, debt service payments, and investment expenditures. While some transfer payments are discretionary, many are financed by federal revenues earmarked by statute for use by the federal agencies or by other components of the public sector. Beginning in 1967, some federal revenues were set aside to be shared with local governments. Since 1968, about 12% of federal revenue from income and sales taxes have been earmarked for distribution to state and municipal governments through the Participation Fund and the Special Fund. In addition, almost all revenue from federal excise taxes on petroleum products, electric energy, and minerals is earmarked for use by various agencies, local governments, and public enterprises.

The federal government's personnel costs account for about two-thirds of its direct spending. Since the 1964 revolution, however, the federal payroll has been controlled by a fairly stringent wage policy. As part of

its stabilization program, the military regime limited annual wage increases to the rate of inflation during the preceding year. In fact, salary adjustments lagged behind cost-of-living increases during the early years of military rule, and real wages of government employees declined. In more recent years, however, the gap has gradually closed, and by 1971 salary adjustments probably were adequate to compensate for rising prices.

3. Money and banking

a. Monetary policy

During the late 1960's, monetary policy became an increasingly important aspect of the government's economic management. Until 1965, Brazil lacked a central bank, and the government-owned Bank of Brazil performed some central bank functions along with the Ministry of Finance and the Superintendency of Money and Credit. The Bank Reform Law of December 1964 unified these various functions in a newly constituted Monetary Authority, which is headed by the National Monetary Council and includes a newly created Central Bank, as well as the Bank of Brazil. The Central Bank now functions as the bank of issue and the bank of rediscount and deposit for the commercial banks. The Bank of Brazil, however, in addition to being the country's largest commercial bank, continues to function as the federal government's fiscal agent.

The Monetary Authority is empowered to regulate the supply of money and credit by adjusting commercial bank reserve requirements, by rediscounting paper held by the commercial banks, and by setting interest rates the banks may charge. Since 1965, open market operations in inflation-adjustable government securities have been a principal tool of monetary policy. In 1970, the government began to issue short-term treasury bills sold at auction, and this development both broadened the market for federal securities and added new flexibility to Central Bank operations.

The monetary authorities have utilized open market operations extensively to control the growth in money supply. Since 1968, these operations have aimed mainly at neutralizing the monetary impact of Brazil's large inflow of foreign capital, which has exceeded balance of payments requirements and greatly increased the country's foreign exchange reserves. To prevent this increase from generating an excessive growth in Central Bank monetary liabilities (commercial bank reserves and currency in circulation), the Monetary Authority and the Treasury

have steadily reduced the bank's holdings of federal government debt. Open market operations were supplemented by Coffee Reserve Fund operations which captured some of the Central Bank liabilities created by rising foreign assets. Coffee Reserve Fund income exceeded its expenditures during 1968-72 through increased revenue from the coffee export tax (contribution quota) and through the sale of a substantial part of Brazil's large coffee stocks.

Since 1967, monetary policy has faced the difficult task of supporting efforts to promote rapid economic growth while simultaneously helping to reduce the inflation rate. With this objective in mind, the monetary authorities have attempted to limit the increase in the money supply to a rate which would produce a gradual decline in the rate of inflation without sacrificing any of the real growth potential of the economy. This policy has been strikingly successful since very high real growth rates in GDP have been maintained over the last 5 years, while the rate of inflation has been slowly reduced, with a notable reduction in 1972.

b. The money market

As part of the general program of economic development, much has been done since the mid-1960's to expand Brazil's money market. The stock market, in particular, has experienced a phenomenal growth. The combined value of shares traded on the Rio de Janeiro and Sao Paulo stock exchanges rose from Cr\$151 million in 1966 to Cr\$4,550 million in 1970, and the 1971 boom raised the volume to Cr\$25,564 million. Following the collapse in mid-1971, volume fell to a total of Cr\$17,880 million in 1972. Other components of the money market also have expanded rapidly. The public's holdings of acceptance bills (*Aceitas Cambias* or *Letras de Cambio*), which are used in Brazil to finance both working capital and installment sales of durable consumer goods, rose from less than CR\$1.0 billion at the end of 1966 to more than Cr\$15.0 billion by the close of 1971. The market for real estate bills and housing bonds also has grown significantly.

Much of the money market's growth resulted directly from government stimulation. The stock market benefited from income tax credits extended to individuals who invested in the market and to business firms that opened their capital to public subscription and placed their shares on the exchanges. Tax credits are not extended to individuals for direct investment in the stock market but for investments in a special type of mutual fund operating in the market. This provision contributed to a proliferation of mutual

funds; by 1971 there were 121 in operation. The administration of these funds is a major function of private investment banks, although a number of smaller funds are administered by finance companies and brokerage firms.

Government action also has been decisive in strengthening the real estate credit market. The marketability of real estate debt instruments was greatly improved by applying the principle of monetary correction to protect their real value against inflation. Equally important, the government's rent policy has aimed at restoring the value of rental properties. Before the 1964 revolution, rents were generally held at low levels in an attempt to check the cost-of-living rise. Under the military regime, however, rents have been allowed to rise faster than general prices in order to regain their real value.

Despite its remarkable development, Brazil's money market still has several serious shortcomings. The number of firms willing to have their shares traded on the stock market remains rather small. The government's incentive program has increased the supply of funds seeking investment faster than the supply of stocks seeking capital. The stock market boom and subsequent recession of 1971 resulted in large measure from this disparity between investable funds and the available supply of shares.

Brazil's capital market also has failed to provide an adequate outlet for long-term debt instruments—a

legacy of the long history of chronic inflation that is difficult to correct. Enterprises seeking loan capital for development purposes usually must borrow on short term, hoping to refinance repeatedly for an extended period of time. Some long- and medium-term credits available through institutions such as the National Economic Development Bank (BNDE), nine state development banks, and the Fund for Financing the Acquisition of Machinery and Equipment (FINAME)—a subsidiary of the BNDE which finances purchases of domestically produced capital goods. Brazil had 40 private investment banks at the end of 1971, but these institutions have not helped substantially to develop a market for long-term debentures. Rather, they continue to function primarily as finance companies providing working capital and administering the larger mutual funds (Figure 25).

4. Development

a. Planning

Development planning in Brazil began in the decade before World War II. The war itself furthered this trend in that it was necessary to create plans for the orderly supply and transportation of certain critical materials. In the early postwar years, two joint U.S.-Brazilian study teams reviewed the economy's requirements and recommended strategies for meeting them. These early planning efforts were narrow in

FIGURE 25. Consolidated assets and liabilities of the banking system
(Millions of Cr\$)

	1965	1966	1967	1968	1969	1970	1971*
Assets:							
Net foreign assets	- 760	- 495	- 1,077	- 1,493	686	2,880	9,850
Credit to public sector	2,889	3,440	5,126	7,130	8,088	9,988	8,640
Federal government	2,116	2,427	3,562	4,930	5,051	5,464	2,840
Independent agencies	697	834	1,102	1,752	2,383	3,559	4,350
Local governments	76	179	462	448	654	965	1,450
Credit to private sector	5,187	6,964	10,937	17,410	25,012	34,000	49,600
Capital and unclassified accounts (net)	1,956	1,637	1,704	1,864	- 423	- 3,386	- 12,425
Total assets	9,272	11,546	16,690	24,911	33,363	43,482	55,665
Liabilities:							
Currency in circulation	1,729	2,343	2,944	4,080	5,390	6,750	8,555
Deposits of private sector	6,329	7,209	11,105	16,150	21,301	27,568	36,150
Demand	6,035	6,443	9,792	13,769	18,305	23,302	29,500
Time and savings	294	766	1,313	2,381	2,996	4,266	6,650
Deposits of public sector	1,249	1,724	2,436	3,849	5,135	6,435	8,700
Coffee account (net)	- 35	270	205	832	1,537	2,729	2,260
Total liabilities	9,272	11,546	16,690	24,911	33,363	43,482	55,665

*Preliminary.

scope, were generally focused on specific sectors, and were usually no more than a collection of specific projects with little attempt at functional integration. Over the years, plans have become more sophisticated and have been extended to cover the whole economy. Fairly detailed plans for public investment have been supplemented with broad goals for the private sector and with incentives of various kinds to encourage private investment in priority areas. Planners gradually have improved their effectiveness in matching goals with resources and in integrating growth objectives with fiscal and monetary policies designed to combat inflation and maintain balance of payments equilibrium.

Development planning remains seriously handicapped, however, despite these improvements. The decentralized character of the public sector makes unified planning and administration difficult. Statistical data covering important areas, such as employment and private investment are inadequate. The skill and dedication of central government planners usually are not matched in the bureaucracy that must execute their plans. Probably the greatest defect has been the lack of continuity in plan implementation. This problem has not been eliminated by the military governments that have ruled the country since 1964 in spite of their improved planning procedures. The well-developed Program of Government Economic Action, drawn up during the administration of Castelo Branco shortly after the revolution, was largely abandoned during the administration of Costa e Silva. The Medici government produced still another plan, the First National Economic and Social Development Plan, announced in September 1971.

b. Approaches to development

Brazil's development strategy has changed over time. During the 1950's, planning heavily emphasized industrial growth and the development of critical sectors of the economic infrastructure, such as electric power and transportation. Industrial growth was fostered by protective tariffs that encouraged rapid import substitution. Agriculture, on the other hand, was handicapped by attempts to control inflation through low farm prices. Exports were depressed by an overvalued exchange rate, poor world market prices, and the deliberate restriction of some exports in order to assure domestic supplies. By the mid-1960's opportunities for import substitution had been largely exhausted, and the economy needed a new direction in order to sustain growth. Beginning in 1967, a new economic strategy began to appear that maintained

industrial growth but integrated it into a more balanced development of the whole economy. The neglect of agriculture was corrected by more realistic price policies and other incentives to investment. The growth and diversification of exports was encouraged by a wide array of direct incentives and by exchange rate devaluation.

Current policies are based on the judgement that import capacity is the basic constraint on Brazil's economic growth. To ease this constraint, a broad program to expand foreign exchange earnings has been carried out. Income tax credits are granted on profits generated by exports. Materials and goods used in the production of exports are exempt in many cases from sales and import taxes, and special credit programs aid export industry expansion. Moreover, the business community is now subject to considerable "moral suasion" from the government to expand export sales as much as possible. Finally, the "crawling peg" exchange rate system, which features small but frequent devaluation, keeps the cruzeiro from becoming overvalued.

To supplement foreign exchange income from exports, Brazil has encouraged a rapid increase in foreign loans and investments. Because of its improved creditworthiness, Brazil's net foreign capital receipts totaled about US\$4 billion in 1972, compared with less than \$200 million in 1967. Most of this capital inflow reflects borrowing abroad; only about 10% of net capital receipts during 1968-72 was classified as direct foreign investment. Direct investment has been limited somewhat by regulations restricting foreign participation in key areas of the economy—primarily commercial banking, fuels and power, communications, transportation, and steel. In other areas, however, foreign capital is welcomed. In fact, direct investment is probably considerably higher than official figures indicate because in many cases borrowing by a Brazilian subsidiary from a parent company is a disguised transfer of equity capital.

Fiscal incentives have been used extensively to encourage private investment, and public investment spending also has increased. As a result, the economy's investment rate rose from only 15% of GNP in 1967 to about 20% in 1972. The First National Economic and Social Development Plan projected a 60% investment growth for the period through 1974, about the same rate achieved in 1968-70. The investment targets of the plan included approximately US\$5,450 million for housing, health, and basic sanitation; \$5,200 million for education; \$5,070 million for manufacturing; \$4,070 million for electric power development; \$3,350 million for transportation; \$2,600 million for

agriculture and marketing; and \$1,760 million for development of the Northeast and Amazon regions. Public sector investment through the mid-1970's is expected to continue to account for about a third of total fixed capital formation. Transportation and fuels and power will absorb almost half of all public sector investment during this period, while the share going to iron and steel development will increase significantly.

The government's incentive program has been used to encourage private investment in underdeveloped regions, e.g., the Northeast, and to stimulate some underdeveloped areas of the economy, such as fishing and tourism. In 1972 incentives also were used to encourage the merger of small and medium-sized firms in order to achieve more efficient scales of operation. Primarily, however, incentives have been used to channel private capital into high priority areas of manufacturing. During the late 1960's, intermediate goods industries—mainly chemicals and metals—and some capital goods industries benefited most from the incentive program. After 1970, some change in priorities occurred, and light consumer goods production received greater attention with special emphasis on textiles. During the remainder of the 1970's, however, heavy industry is expected to continue to dominate development in the private sector, led by motor vehicles, petrochemicals, and shipbuilding.

The government's development policy for agriculture does not make extensive use of fiscal incentives but relies on direct public investment combined with various programs to improve farm profits. In 1970, agriculture directly accounted for only 1% of total public sector investment, and this share is not likely to increase in the period through 1975. Much of the investment in transportation, however, is designed to open new agricultural areas and to improve feeder roads in established areas. Various agricultural credit programs are available for financing purchases of farm equipment and materials. Interest rates under these programs usually are subsidized and often are less than the inflation rate. Equally important, farm profits have been improved under a program of price supports covering a wide variety of crops.

c. Development prospects

The economy should be able to maintain high growth rates for the foreseeable future. Official forecasts are projecting continued growth at about 10% throughout the 1970's, but this rate appears to be overly optimistic. Balance of payments constraints may force some reduction in the pace of economic activity. More stringent debt management policies, in

particular, probably will limit further growth in net foreign capital receipts. As its economic boom has advanced, Brazil has encountered a widening domestic resource gap. Domestic savings grew no faster than the rest of the economy during 1969-72, while investment increased much more rapidly—thanks to a large and rapidly rising capital inflow. By the end of the period, investment was over 20% of GNP, while savings probably were not much more than 17%. The expected leveling off in net foreign capital receipts will force Brazil to stabilize its domestic resource gap.

Further increases in the domestic savings rate will be difficult. Some improvement in public savings may occur, but the tax burden already is high and current spending has been under fairly tight control. Moreover, the government probably has done about as much as it can do in the short-term to improve private savings, notably through its fiscal incentives and through its monetary correction program protecting savings accounts and other financial assets against inflation. Low per capita incomes will continue to inhibit a voluntary improvement in savings.

Faced with limitations imposed by a leveling off in the domestic savings rate and net foreign capital inflow, Brazil probably will be forced to stabilize its investment rate somewhat above 21% of GNP, the level expected for 1973. This rate should be adequate to support growth within a range of 8% to 10% annually, provided that Brazil can maintain the high capital productivity achieved in the past two decades. Various factors are tending to reduce the productivity of new investment, however. An increasing share of available resources will have to be channeled into housing, urban development, education, and other social infrastructure projects having at best a long-term economic impact. Large highway and colonization projects in the Amazon are more directly productive, but output from them probably will develop rather slowly. Offsetting these factors, at least in part, are the high priority being given to advanced technology imports and to investments in agriculture, where output is high relative to capital input. On balance, these trends suggest a moderate decline in capital productivity and an annual economic growth rate in the 7% to 8% range over the next several years.

5. Manpower

a. Size and structure of the labor force

The 1970 census reported an economically employed population of about 30 million. This figure

represented 32% of the total population and 54% of the population 14 years and older. The full size of the labor force is not certain because of a lack of reliable data on unemployment. Household surveys conducted by the Brazilian Institute for Geography and Statistics (IBGE) indicate that outright unemployment is relatively low, perhaps no more than 3% of the labor force. Underemployment, however, is quite serious. The IBGE surveys indicated that about 15% of the economically active population in 1970 worked less than 35 hours per week. On the reasonable assumption that the surveys undercount both categories, it is likely that at least 20% of the labor force, and probably substantially more, are either unemployed or underemployed.

Of the economically active population in 1970, 43% were on wages or salaries, 33% were self-employed, 13% were classed as employers, and about 10% were employed without pay, primarily in agriculture. Agricultural employment in 1970 accounted for about 42% of the labor force, compared with 52% in 1960. During the decade, employment in manufacturing, mining, construction, and utilities expanded only moderately, rising from 14% to 18% of the labor force.

b. Productivity

Brazil's high economic growth rates have been achieved largely through rapid gains in productivity. While the economy grew at rates above 6% annually during the 1960's, employment probably increased no faster than the growth in population—slightly under 3% per year. In the 1968-72 boom years, this gap was even wider as GNP increased at nearly 10% yearly while the maximum gain in employment was only 4% in any one year. The disparity between economic growth and employment increase is accounted for partly by normal productivity gains achieved as an expanding modern economy absorbs labor from relatively unproductive occupations in subsistence agriculture and other less developed sectors. Rapid productivity gains also reflect, however, the capital-intensive nature of Brazil's economic growth, in which heavy industrial development has added more to output than to employment.

The process of labor transfer from relatively primitive to more productive employment has been hampered in Brazil by the population's low educational level, which has left most people poorly prepared to participate in a modern economy. The military regime is trying to correct the long neglect of education. Spending on all education levels is being increased, and vocational training also is expanding rapidly. For some time to come, however, the booming

modern economic sector will continue to demand more professionally educated and vocationally trained people than the country can supply.

c. Wages and social benefits

The Brazilian Government regulates wages through minimum wage scales, its wage decisions covering government employees, and an official wage formula governing private sector raises. The latter primarily covers workers in the industrial sector, while most of the labor force is covered by the minimum wage rates. The official wage formula is generally respected, but noncompliance with minimum wages is widespread, particularly in rural areas.

Real wages declined throughout most of the 1960's. During the early part of the decade, spiraling inflation eroded real wages, and after 1964 this trend was carried further as the government deliberately held wage increases below the inflation rate as part of its stabilization effort. Since 1968, however, average wage gains allowed by the government have kept pace with inflation, and wages actually paid may have exceeded these legal rates because of the heavy demand for skilled and semiskilled labor created by the economic boom. Rising demand for basic consumer goods during the last few years also suggests some increase in real wages. There is little doubt, however, that real wages are far from regaining the ground lost since 1960.

A substantial body of legislation exists to protect the rights and interests of labor. While some of the legislation goes back to the turn of the century, most of the basic laws—establishing a 48 hour week, minimum wages, vacation, overtime, and severance pay, and a social insurance structure—came into existence during the 1930's. In 1960, the social security system was reformed providing old age pensions and various illness and hospitalization benefits.

The most important labor legislation in recent years established the Tenure Guarantee Fund in 1967 and the Program of Social Integration in 1970. The Tenure Guarantee Fund administered by the National Housing Bank and is financed by an 8% payroll tax. The fund was designed to replace older legislation guaranteeing substantial severance payments to workers discharged without cause and establishing permanent tenure for all workers after 10 years of employment. In fact, however, workers could rarely collect the full severance pay to which they were entitled and equally rarely could they achieve tenure because most employers would discharge an employee as he approached the 10-year requirement. The new system established by the 1967 law has the advantage

that a worker's equity in the Tenure Guarantee Fund is not limited by term of employment or any given job. Under the Program for Social Integration a payroll tax is paid into worker-held accounts in the Federal Savings Bank. As in the case of the Tenure Guarantee Fund, principal of the fund may be withdrawn only upon a worker's marriage, home purchase, disability, or death. Interest and profits, however, can be withdrawn annually.

d. Labor organization

Trade unionism dates from the early 1900's, but the basic legislation governing modern labor organization took form in the late 1930's. Local unions are organized into state federations and in turn into national confederations. Eight national confederations, with a combined membership of more than 12 million workers, are recognized by the Ministry of Labor. Only one union is legally recognized for a particular trade or occupation in any given part of the country. All workers in a trade or industry so organized must pay a tax to support union activity, even if they are not members.

Since 1964 unionism has been an unimportant factor in Brazil's economic life. Brazilian law recognizes the right to strike when salaries are not paid, but for other grievances, compulsory mechanisms of consultation and labor court appeals make strikes practically impossible. Furthermore, the unions are largely dominated by the government. Labor unions have little political force, and their point of view is ignored. Although the military regime does have considerable interest in labor's welfare, its attitude is essentially paternalistic. Labor considerations are meshed into the regime's overall economic objectives, and there is little attempt to respond directly to the unions' expressed wishes or complaints.

D. International economic relations

Foreign trade is a comparatively small component of Brazil's economy. In 1972, exports and imports were about 8% and 10%, respectively, of GNP. The relative importance of foreign trade was reduced considerably during the 1950's and early 1960's, when exports grew very slowly and the rapid expansion of industry substituted domestic production for a wide range of goods formerly imported. Nevertheless, imports still provide most of the country's petroleum requirements and supply several vital metals and minerals. Moreover, Brazil depends on imports for a variety of manufactured goods, particularly intermediate goods

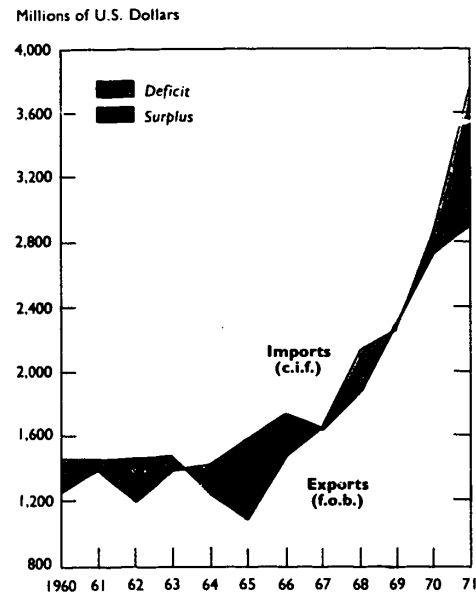


FIGURE 26. Balance of trade

and the more sophisticated capital equipment that Brazilian industry still cannot produce economically.

Beginning in 1967, foreign trade entered a period of extremely rapid growth that has continued (Figure 26). During 1968-72, exports rose by more than 19% annually while import growth averaged about 25% per year. This vigorous expansion resulted from a variety of causes. Although devaluations in the earlier 1960's had helped to correct the exchange rate overvaluation hampering foreign sales from 1950 on, they did not keep pace with rising domestic inflation, and exports continued to suffer from recurrent periods of serious overvaluation. This problem was finally solved in 1968 with the adoption of the "crawling peg" exchange rate. Since then, the cruzeiro has been devalued by small amounts every 30 to 60 days. Cumulative devaluations for a full year have averaged about 12%, approximately the difference between domestic inflation rates and inflation abroad. In addition to exchange rate reform, exports have been stimulated since 1967 by a broad program of tax credits and exemptions to exporters and by direct government pressure on industry to increase its export business. Brazil also enjoyed a period of generally rising export prices during 1968-72.

Imports have grown much faster than exports since 1965. By 1967, a trade deficit began to appear which has since widened substantially. Rapid import growth

has been triggered mainly by rising requirements of capital goods and industrial inputs to feed the ongoing economic boom. Related foreign capital inflows have more than offset the growing deficit on current account during this period.

1. Commodity composition of trade

Exchange rate reform and the fiscal incentive program have enabled Brazil to greatly diversify its exports and to free the economy from dependence upon a few agricultural commodities with only limited potential for export growth (Figures 27 and 28). The value of coffee exports grew only 10% during 1965-71 while total exports increased more than 80%. Earnings from other traditional agricultural exports, such as cotton, sugar, and cocoa, increased rapidly during this period, but the primary source of export growth was provided by nontraditional agricultural exports, iron ore, and manufactured goods. Brazil has greatly increased its exports of beef, corn, castor oil, and soybeans since the mid-1960's. Iron ore exports more than doubled from 1965 through 1971, and for a time iron ore was Brazil's second largest export, though it

was third in 1972. As a group, manufactured exports led the growth of all categories, increasing more than twice as fast as total exports. Manufactured exports now cover a broad spectrum ranging from simple processed foodstuffs to some fairly sophisticated capital goods.

Brazil's imports are heavily concentrated in capital goods and industrial inputs (Figure 29). In 1971, capital goods and the raw materials and intermediate goods category were virtually of equal importance, and the two groups together accounted for three-fourths of all imports. Consumer goods have not been a large import category for many years, and they represented only 15% of the total in 1971. Although wheat imports have declined in recent years as domestic production expanded, in 1971 they still accounted for two-fifths of all consumer goods imports. Petroleum and its derivatives were 10% of total imports in 1971, and about three-fourths of Brazil's total petroleum supply was derived from this source.

2. Direction of trade

The United States is still Brazil's most important single-country trading partner (Figure 30), purchasing

FIGURE 27. Composition of exports
(Millions of U.S. dollars)

	1965	1966	1967	1968	1969	1970	1971
Coffee beans.....	707	764	705	774	813	939	773
Principal traditional agricultural exports (excluding coffee).....	269	342	326	395	546	496	487
Cotton.....	96	111	91	131	196	154	137
Cocoa (beans & butter).....	41	72	84	72	136	116	91
Sugar.....	54	81	80	102	115	127	147
Pine lumber.....	52	56	51	71	72	68	75
Tobacco.....	26	22	20	19	27	31	37
Principal nontraditional agricultural exports.....	118	128	96	159	190	265	330
Beef (fresh, chilled, and frozen).....	24	13	7	20	42	69	100
Corn.....	28	32	22	57	33	80	75
Soybeans and products.....	15	28	39	25	62	71	106
Castor oil.....	27	22	23	36	45	38	39
Rice.....	24	33	5	21	8	7	10
Minerals.....	144	143	132	144	192	280	315
Iron ore.....	103	100	103	105	147	210	237
Manganese ore.....	29	27	14	24	17	31	38
Other.....	12	16	15	15	28	39	40
Manufactured goods.....	156	154	208	201	287	455	600
Soluble coffee.....	1	10	28	23	33	43	50
Processed agricultural products.....	46	47	37	48	72	105	126
Others.....	109	97	143	130	182	307	424
Miscellaneous.....	202	210	187	208	283	304	399
Total exports.....	1,596	1,741	1,654	1,881	2,311	2,739	2,904

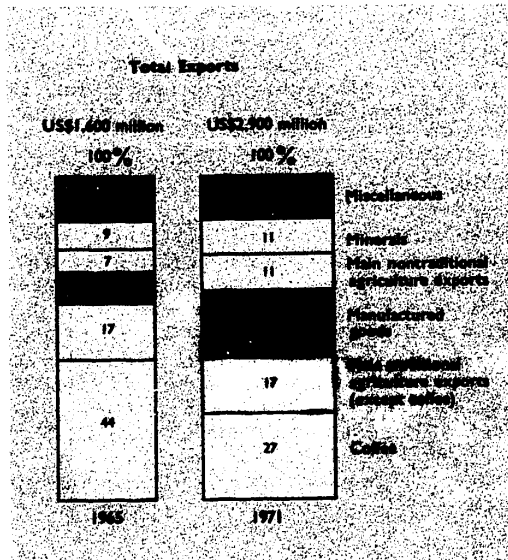


FIGURE 28. Shifts in export composition

about one-fourth of exports in 1971 and supplying about 29% of imports (Figure 30). The relative importance of exports to the U.S. market has declined over the past 15 years, however, as Brazilian coffee, sugar, and cocoa have encountered increasing competition from African and other Latin American producers. Coffee sales of US\$331 million accounted for 50% of Brazil's exports to the United States in 1970. Imports from the United States include a wide range of products, the most important of which are machinery and transport equipment, wheat, and chemicals.

Western Europe became an increasingly important market for Brazilian exports in the late 1960's. West

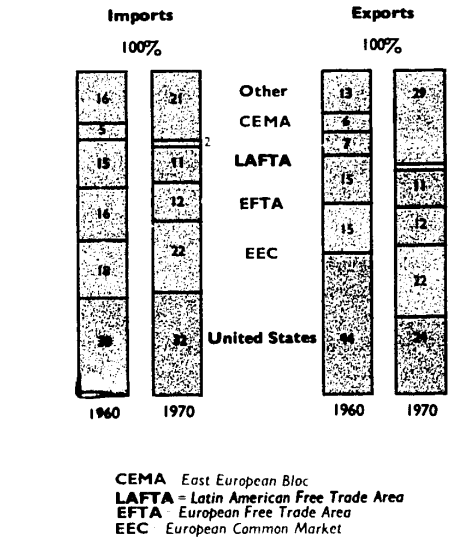


FIGURE 30. Geographic distribution of trade

Germany now ranks second among Brazil's trading partners for both exports and imports. Other important trading partners include the remaining countries of the European Economic Community (EEC) and Sweden. Western Europe as a whole bought nearly 40% of Brazil's exports in 1971 and provided 37% of its imports.

Brazil has been a member of the Latin American Free Trade Association (LAFTA) since its formation in 1960. Argentina is Brazil's most important LAFTA partner, receiving 58% of Brazil's exports to the area in 1971 and providing 42% of its imports from LAFTA. Exports to LAFTA countries were 10%-12% of total exports throughout the period 1966-71. Imports from LAFTA countries declined sharply after 1965 as Brazil

FIGURE 29. Composition of imports* (Millions of U.S. dollars)

	1965	1966	1967	1968	1969	1970	1971 ESTIMATED
Capital equipment.....	229	357	447	621	731	940	1,225
Raw materials and intermediate goods.....	334	491	489	676	712	945	1,213
Consumer goods.....	208	282	336	363	338	371	475
Foods and beverages.....	177	233	278	283	255	247	277
Other.....	31	49	58	80	83	124	198
Petroleum and derivatives.....	157	170	155	188	204	240	327
Other.....	3	3	14	7	8	11	60
Total.....	931	1,303	1,441	1,855	1,993	2,507	3,250

*Values are f.o.b. and thus differ from data in Figures 26 and 31.

increased its imports from more developed countries able to supply capital goods and other industrial products. LAFTA provides an important market for Brazilian manufactured goods, which represent about 50% of its exports to this area. Other important exports to LAFTA are coffee, cocoa, iron ore, and forestry products. Argentine wheat is the main item purchased from the area, but since 1967 substantial amounts of fruits and dairy products also have been imported from Argentina and Uruguay.

In 1971 European Communist countries accounted for only about 3% of Brazil's total trade. East Germany and Poland are the main trading partners in the area. Brazil's principal exports to Communist countries are coffee, cocoa, iron ore, raw cotton, rice, and sisal. Its main imports include crude oil, chemicals, and machinery and equipment. Brazil consistently has registered large surpluses in its trade with Communist countries.

Soviet trade with Brazil dropped to US\$2.6 million in 1970 after averaging \$16.5 million in 1967-69. In an effort to restore the level of trade, the Soviets in 1971 extended a \$12.5 million credit covering equipment for a hydroelectric plant. As part of the package, the U.S.S.R. agreed to increase substantially its purchases of Brazilian coffee. Their success in one project has led the Soviets to pursue similar agreements on two other proposed hydroelectric projects, the Agua Vermelha dam and the huge Itaipu (Sete Quedas) complex, though Soviet success in winning a major portion of this business is questionable, considering the aggressive international competition for these projects.

3. Trade regulations

Since 1964, Brazil has introduced various measures to simplify and liberalize its trade and foreign exchange control practices, reduce its dependence on bilateral payments agreements, and liberalize treatment of foreign investments and remittances. In addition, it removed stringent import restrictions on most manufactured goods and reduced all import duties in 1967. Brazil still levies special taxes on coffee and cocoa exports and on foreign profit remittances, however, and maintains other special trade arrangements. Moreover, the liberalization measures of 1967 already have been partly reversed by fixing high minimum values on some imports for customs tax purposes, temporarily increasing duties on consumer goods, and taking other actions to stem the rise in "nonessential" imports.

The government intends to adopt a comprehensive tariff reform. A reordering of the entire tariff structure is the subject of an intensive study being conducted by

the Customs Policy Council. Some steps towards liberalization already have been made. For some new products, including transistors and chemicals, Brazil has adopted the policy of setting tariff rates on a declining scale over a predetermined time period. Brazilian authorities are aware that lower levels of protection are essential, in some cases, to expose manufacturers to external competition. The final objective of the new tariffs is the expansion of both domestic and export markets.

4. Balance of payments

The balance of payments (Figure 31) has remained strong despite a steadily rising current account deficit. Because heavy inflows of foreign capital have more than covered these deficits, foreign exchange reserves rose from US\$200 million at the end of 1967 to nearly \$4.2 billion by the close of 1972. This apparent strength had some flaws, however. The capital inflow was largely in the form of loans, many of them of short- and medium-term maturity, and by the end of 1971 Brazil was carrying an extremely high debt service burden. During 1972 the average maturity of Brazil's debt lengthened appreciably, and the debt service ratio probably declined somewhat. In 1972 the balance of payments was supported by a significant windfall rise in a number of export prices, particularly prices for sugar, beef, cocoa, and coffee.

Brazil's growing current account deficit reflects its dependence on foreign savings to finance domestic investment. The rising deficit on services account has been due to strong increases in all elements, especially freights, and to heavy interest payments on Brazil's increasing foreign debt. The earnings of Brazil's growing merchant fleet have not been sufficient to stem the deficit on freight account, which has risen steadily because of rapidly expanding imports.

Brazil's capital inflow has resulted mostly from borrowing abroad. A substantial portion of these credits has been provided by the U.S. Government, and nearly 25% of Brazil's outstanding debt at the end of 1971 was accounted for by Treasury, AID, P.L. 480, and Export-Import Bank loans. Official international credit agencies accounted for about 10% and private suppliers of Brazil's imports about 13%. Nearly half of Brazil's outstanding debt at the close of 1971 was in the form of short- and medium-term financial credits obtained mostly in the international money market. These financial credits in part reflect borrowing by commercial banks and business firms seeking to raise cruzeiro working capital through the domestic sale of the foreign exchange proceeds from their loans. Probably one-third of the outstanding financial credits

FIGURE 31. Balance of payments
(Millions of U.S. dollars)

	1965	1966	1967	1968	1969	1970	1971
Trade balance.....	500	245	- 13	- 251	46	- 110	- 803
Exports (f.o.b.).....	(1,596)	(1,741)	(1,654)	(1,881)	(2,311)	(2,739)	(2,904)
Imports (c.i.f.).....	(-1,096)	(-1,496)	(-1,667)	(-2,132)	(-2,265)	(-2,849)	(-3,707)
Service balance.....	-207	-270	-301	-279	-358	-473	-521
Tourism.....	(-1)	(-31)	(-34)	(-121)	(-89)	(-130)	(-130)
Transportation & insurance.....	(121)	(141)	(168)	(205)	(126)	(144)	(193)
Investment income.....	(-174)	(-197)	(-257)	(-228)	(-261)	(-353)	(-411)
Interest.....	(-156)	(-155)	(-184)	(-144)	(-180)	(-234)	(na)
Profit & dividend.....	(-18)	(-42)	(-73)	(-84)	(-81)	(-119)	(na)
Other.....	(-153)	(-183)	(-178)	(-135)	(-134)	(-134)	(-173)
Transfer payments.....	75	79	77	22	31	21	12
Balance on current account.....	368	54	-237	-508	-281	-562	-1,312
Direct investment (net).....	70	74	76	61	127	108	124
Other long- & medium-term capital (net)...	59	158	86	151	554	830	1,241
Drawings.....	(363)	(508)	(530)	(654)	(1,164)	(1,634)	(2,166)
Amortizations.....	(-304)	(-350)	(-444)	(-414)	(-610)	(-804)	(-925)
Short-term capital (net).....	*	*	*	329	169	77	467
Other.....	-135	-108	-135				
Balance on capital account.....	-6	124	27	541	850	1,015	1,832
Errors & omissions.....	-31	-25	-35	-1	-20	92	35
Surplus or deficit (minus = deficit).....	331	153	-245	32	549	545	555
Net change in foreign reserves (minus = increase).....	-331	-153	-245	-32	-549	-545	-555

*Included in long- and medium-term capital.

at the end of 1971 represented borrowing by commercial banks to increase their reserves. Much of the remainder was accounted for by Brazilian subsidiaries borrowing from their parent companies abroad. A considerable part of this last category probably was an inflow of equity capital disguised as loans in order to avoid the restrictions and taxes associated with direct investments.

The short-maturity profile of Brazil's debt combined with rising interest payments had pushed the total debt service burden to over 50% of export earnings in 1971. Moreover, during 1970 and 1971 Brazil was forced to draw upon some of its financial credits to help cover its current account deficit; in previous years this had not been necessary, and the proceeds of these loans had gone entirely into foreign exchange reserves. The heavy debt service burden and the fact that reserves had begun to rise more slowly than financial credits induced the government to impose tight restrictions on short- and medium-term borrowing. During 1972 the minimum acceptable term for financial credits was steadily lengthened until it reached 6 years in September. As the year advanced, it was clear that the program was successfully extending the debt's maturity structure and easing the

debt service burden. Borrowing abroad increased during the year, however, in spite of the new restrictions, and the capital inflow far exceeded Brazil's balance of payments requirements. In order to slow the influx of credit by increasing the cost of borrowing, beginning in October a Brazilian firm bringing in a new credit was required to deposit 25% of the cruzeiro proceeds of the loan in a non-interest-bearing deposit with the Central Bank.

5. Foreign aid

Brazil has been the largest recipient of foreign aid in Latin America. Extension of economic and military loans and grants (excluding balance of payments support) from the U.S. Government and international financial institutions totaled US\$6.12 billion during U.S. fiscal years 1946-71—nearly 25% of their total assistance to Latin America. The U.S. Government has been the principal source of aid, authorizing \$4.17 billion during this period. Of this amount \$379 million was military assistance extended mainly on a grant basis.

Since the Alliance for Progress began, Brazil has benefited both from increased aid flows and improved financing terms. U.S. AID has authorized US\$550

million in program and project loans. In addition, the United States provided almost \$500 million in surplus farm products on credit or as grants under P.L. 480. Payments in cruzeiros for some of these agricultural deliveries have been loaned to the Brazilian Government to finance development projects, primarily in electric power, transportation, and agriculture. Loans from the Export-Import Bank—the major source of external financing in the 1950's—totaled \$1.4 billion during 1946-71; these loans carry commercial terms.

Loans from international financial organizations carry varying repayment conditions. Among these institutions, the International Bank for Reconstruction

and Development (IBRD) and the Inter-American Development Bank (IDB) have been Brazil's main sources of funds. The IBRD's operations in Brazil have fluctuated markedly. In the early 1960's the bank stopped lending because of the country's deteriorating economic situation. Following a review of the economy and the government's financial stabilization program in early 1965, however, the IBRD resumed lending to Brazil and has loaned a total \$998.3 million through 1971. Since initiating operations in 1961, the IDB has authorized \$835.7 million in loans to Brazil. IDB credits have financed a wide variety of activities including industrial and agricultural projects, water and sewerage services, and loans to small private producers.

Places and features referred to in this chapter

	COORDINATES	
	° 'S.	° 'W.
Amazon Basin (<i>drainage basin</i>).....	2 30	60 00
Amazon River (<i>stream</i>).....	0 10	49 00
Angra dos Reis.....	23 00	44 18
Aracaju.....	10 55	37 04
Araxa.....	19 35	46 55
Belém.....	1 27	48 29
Belo Horizonte.....	19 55	43 56
Brasília.....	15 47	47 55
Caioba (<i>oilfield</i>).....	25 42	48 33
Camaçari.....	12 36	38 12
Camaquã.....	30 51	51 49
Congonhas.....	20 30	43 52
Cubatão.....	23 53	46 25
Cuiabá.....	15 35	56 05
Itabira.....	19 37	43 13
Mariana.....	20 23	43 25
Miranga (<i>oilfield</i>).....	12 23	38 11
Natal.....	5 47	35 13
Poços de Caldas.....	21 48	46 34
Recôncavo (<i>basin</i>).....	12 29	38 13
Rio de Janeiro.....	22 54	43 14
Rio Doce (<i>stream</i>).....	19 37	39 49
Rio Paraná (<i>stream</i>).....	33 43	59 15
Rio Paraopeba (<i>stream</i>).....	18 50	45 11
Rio Tapajós (<i>stream</i>).....	2 24	54 41
Santarém.....	2 26	54 42
Santo Amaro.....	12 32	38 43
Santos.....	23 57	46 20
Não Francisco (<i>drainage basin</i>).....	9 00	40 00
São Paulo.....	23 32	46 37
São Sebastião.....	23 48	45 25
Tubarão.....	20 17	40 14
Vitória.....	20 19	40 21
Volta Redonda.....	22 32	44 07