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INDUSTRY - PRELIMINARY DIAGNOSIS

by O. J. Menezes



August, 1965 -

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by O.J. Meneses

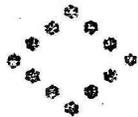
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INDUSTRY - PRELIMINARY DIAGNOSIS

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INDUSTRY - PRELIMINARY DIAGNOSIS

by O. J. Menezes

This paper contains a description of what appear to the author to have been the principal characteristics of Brazilian industrial development in the postwar period.

An attempt is also made to explain the phenomena noted. The hypotheses advanced should be considered as preliminary and not fully demonstrated in the subsequent analysis. They are, therefore, really suggestions regarding lines of further study.

The coverage of this work relates to the period starting about 1950.

It is intended to subsequently extend the analysis to earlier periods. This will depend on the existence of data, which seem to be rather scarce. It is also intended to undertake more exact empirical tests of some of the hypotheses mentioned below.

1 - FINANCING OF INDUSTRY

The following data are preliminary and based on company balance sheets, published in the Conjuntura Econômica, and on the usual sources of data on banking and on foreign capital. Various aspects of the first type of data, including the question of the degree of their reliability, are discussed in the footnote below. (It will also be desirable to estimate industrial investment from physical data -- i.e. on imports and domestic production of industrial equipment, on factory construction, etc. -- a type of calculation similar to one that has already been carried out by the Fundação Getúlio Vargas for the economy as a whole). For the period 1955-63, it is estimated that investment in industrial fixed assets fluctuated between US\$ 300 millions and US\$ 500 million per annum. The reliability of data on stocks is of quite doubtful; but it is estimated that investment in these was of the same order of

magnitude, if not larger. (The yearly increase, converted to real terms, of liquid assets -- i.e. cash, etc. -- was relatively small).

The sources of finance for these investments were the following. Retained profits fluctuated between US\$ 300 millions and US\$ 550 millions p.a. Capital issues (excluding the purely nominal portion, i.e. the counterpart of monetary revaluation of existing assets) fluctuated between US\$ 200 millions and US\$ 300 million p.a. The predominant portion of this volume of capital issues was accounted for by closed companies (i.e. those without shares held by the general public)¹. Thus, these two items represented more than US\$ 600 millions p.a., out of a total investment, in fixed assets and stocks, averaging somewhat more than US\$ 800 millions p.a. during 1955-1963, i.e. about 75% of the total.²

Entry of new foreign risk capital into the country reached an annual average of US\$ 91 millions during the eight years 1954/1961.³ Practically all this investment was in manufacturing. Net loan capital inflow averaged US\$ 175 millions during this period.⁴ However, these last figures include capital for the public sector -- i.e. in the main, for activities other than manufacturing. A more detailed breakdown of loans is, therefore, necessary.

1 - See EPEA - Documento Nº 2, "O Mercado Brasileiro de Capitais", p. 59

2 - On analysing the consolidated data of company balance sheets, two important and interconnected points may be noted. What one may call "nominal real profits" (i.e. nominal profits, as they appear in balance sheets, deflated by a price index) grew roughly in proportion to industrial output. One would expect "normal" stocks to grow in proportion to fixed investment in industry, in order to meet operational needs. Stock accumulation, in excess of this "normal" rate, is generally believed to have occurred on a considerable scale (this resulted, mainly, from the prevalence of a negative real interest rate -- i.e. a nominal interest rate much below the rate of inflation; and secondarily, from other speculative factors).
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3 - Programa de Ação, p. XVI - 9, Table XVI-1. Remittances of profits were not subtracted from entries of new foreign capital (to obtain a net inflow figure); as only retained profits, which of course exclude remitted profits, are included in building up the figures of total supply of industrial finance.

4 - Programa de Ação, p. XVI-10, Table XVI-2.

Provisionally, the total inflow of foreign resources for manufacturing (risk capital and loans) may be estimated at less than US\$ 200 millions per year. The remainder of the estimated total of more than US\$ 800 millions per year in industrial investments, must have been financed by the "Credit, Finance and Investment Companies" and by the National Bank of Economic Development. As regards the first source, it will be necessary to obtain consolidated data from SUMOC.

These financial flows were affected in various ways by inflationary and exchange distortions. These had repercussions both on profits as well as on the supply of external finance to enterprises. The following effects seem to have been some of the most important ones.

Profits were affected by the following factors:

- (i) - the system of bank interest rates (negative in real terms); i.e. the net effect of deposit rates and loan rates, in relation to the rate of inflation;
- (ii) - the overvaluation of the cruzeiro, which subsidized industry and (import) trade, at the expense of the consumer and of the agricultural sector.

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2 - ... On the other hand, it must be noted that "nominal real profits" include fictitious profits arising out of the increase in monetary value of a given physical volume of the companies' own working capital (i.e. total working capital, minus bank loans). By common accounting practice, such fictitious profits are included in the total profit shown in the company balance sheet. Therefore, an estimate of such fictitious profits was subtracted from "nominal real profits" -- and a corresponding amount was subtracted from "nominal real stocks". The result of this calculation, however, showed an absurdly low rate of growth of stocks, in comparison with the growth of real fixed capital.

This suggested that industrial companies, in general, have (illegally) falsified their accounts so as to eliminate fictitious profits on owned working capital. They also seem to have succeeded in eliminating from their balances sheets the increase in monetary value of stocks.

This appears to be logical, as there is of course a close interrelation between profits and stocks shown in company statements.

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The following are some factors which influenced the supply of external finance to enterprises (loans from the banking system and the quasi-banking system -- i.e. the "Credit, Finance and Investment Companies"; and foreign capital):

- (i) - low nominal interest rates (substantially negative in real terms) which discouraged bank deposits from growing in real terms.
- (ii) - the B.N.D.E. (Banco Nacional de Desenvolvimento Econômico) supplied a large volume of financial resources to industry, principally to steel plants in the public sector.
- (iii) - The foreign exchange system: the famous Instruction 113 of SUMOC, of 1955 (which in effect subsidized amortization of foreign loans for approved industrial investment), together with the "Plano das Metas" (The Targets Plan", 1956-61) stimulated the inflow of finance. On the other hand, political and exchange instability in the sixties discouraged inflow of foreign capital.

As regards the banking system one may note the following point. In consequence of the growing difference between the rate of inflation and the interest rate on deposits, a disguised "tax" was levied on bank depositors by the banking system.

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2 - ... A fairly easy way of reducing declared profits was to understate current monetary value of stocks in the company's balance sheet. (The above discussion should not be taken as implying that companies were entirely unjustified in undertaking such accounting manipulation. In fact -- as business spokesmen have repeatedly pointed out -- any company would go bankrupt if it continued long enough to pay taxes on fictitious profits, as required by the letter of the law. The purpose of the above discussion is merely to examine the meaning, and shortcomings, of the data on consolidated company balance sheets). In view of the above mentioned unsatisfactory results of theoretically called-for corrections, figures of retained profits and of stocks were estimated as being approximately equal to their unadjusted nominal value. These figures seem reasonable. The profit estimates do not seem to be excessive in relation to capital plus reserves, especially in view of the

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The yearly average of these "taxes" is estimated as follows:

- (i) - on "popular" and "limited" current accounts (i.e. small non-business deposits, in general): an annual average of US\$ 82 millions of subsidies during the five-year period 1955/59 and of US\$ 237 millions during 1960/1964.
- (ii) - on "unlimited" current accounts (i.e. business deposits, in general): US\$ 122 millions per annum during 1955/59 and US\$ 528 million per annum in 1960/1964.

On the other hand, business received subsidies from the banking system in the form of interest rates (including other "charges" on loans) lower than the rate of inflation. As data on loan interest rates are not available, the exact amount of these subsidies cannot be calculated. However, the rate of the disguised subsidy on (commercial) loans given by the Bank of Brazil, was, considering the very low interest rates charged on them, practically equal to the rate of the disguised "tax" levied on depositors. As regards the private commercial banks, it is provisionally assumed that the loan subsidy rate was about half of the rate of "tax" levied on deposits. For example, as the deposit rates are about 6%, it is supposed that, when the rate of inflation was 66% p.a., the loan rate was about 36% p.a.

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2 - ... fact that industry benefited from various types of disguised subsidies (see subsequent discussion). The estimates of stocks show an increase of between US\$ 250 millions and US\$ 650 millions p.a.; that is, about the same as additional investment in fixed assets. This ratio seems to be roughly of the order one would expect, on account of operational needs. However, in view of the fact that accumulation of excess stocks did occur, actual stocks may have been somewhat higher than estimated. As far as capital issues are concerned, there seems to be no reason why their amount should have been falsely declared. The only motive (for inflating the value of capital issues) would be to reduce liability for "excess profits tax" -- since the rate of taxation rises as the ratio of profit to capital increases. However, as companies seem (as previously discussed) to have understated their taxable profits considerably, generally keeping them at a level below the maximum of the "ordinary profits" bracket, it hardly seems likely that the declared profits of any considerable number of industrial enterprises reached the "extraordinary profits" bracket.

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(This suppositions seems to be of roughly the right order of magnitude, in the light of general information about interest rates). It is thus estimated that industry, in particular, contributed about US\$ 48 millions p.a. of "taxes" to the banking system; and received from it in return US\$ 78 millions p.a., during 1955/1959. During 1960/1964 these figures were US\$ 210 millions and US\$ 215 millions respectively. Thus industry received net subsidies of US\$ 30 millions and US\$ 5 million respectively, during the two quinquennia.⁵

Thus in contrast to what occurred during the earlier quinquennium -- a small percentage of the sizeable "taxes" levied on non-business deposits by the banking system, was transferred to borrowers during 1960/1964 in the form of net subsidies. It seems that the remainder was chiefly channelled into loans to business (to be distinguished from subsidies) through the "Credit, Investment and Finance Companies" (it is a matter of general knowledge that many of these are subsidiaries of banks), or was invested in buildings.⁶

The annual growth, in real terms, of bank loans to industry, fluctuated greatly. During the period 1953-1964, the average yearly increase was small (about US\$ 25 millions per annum). This was the net

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- 2 - ... This preliminary examination would seem to indicate that a detailed discussion with the Fundação Getúlio Vargas, on company balance sheets, and in particular on the above-mentioned points, would be highly desirable.
- 3 - This estimate is based on the proportion of loans to deposits, and on the percentage of loans to industry in the total of bank loans, i.e. about 40%; and on the assumption that deposits of industrial enterprises constituted about the same percentage of total bank deposits, as in the case of loans.
- 6 - Though this point properly pertains to analysis of the banking system, a provisional examination was made, which showed that bank investments in buildings during 1950/1963 were appreciable.

result of an appreciable rate of growth during the fifties (at an average rate of about 5% p.a., or a little less than the rate of growth of national income and considerably less than the rate of growth of industrial production); and a slow decrease in real terms, on the average, during the sixties (which means an appreciable decrease relatively to industrial production). On the other hand, bank credit was supplemented during the sixties by loans from the "Credit, Finance and Investment Companies".

The above-mentioned trends in bank credit were the net result of the following factors. Personal bank deposits (non-business deposits) increased in real terms at a reasonable rate during the fifties (at a rate about equal to that of growth of national income); but declined substantially during the sixties, until in 1964 they fell to a level only a little higher than at the beginning of the fifties. Voluntary business deposits⁷ (the "unlimited" accounts) increased more or less in proportion to the national product throughout the period studied; that is, at an appreciable rate during the nineteen - fifties, and at a decelerating rate (roughly corresponding to the deceleration of the growth of national income) during the sixties. Thus total deposits (business and personal) grew at a reasonable rate in real terms during the fifties, but practically stagnated during the sixties. It thus seems that inflation discouraged the real growth of bank deposits, particularly as regards personal deposits.⁸ (However, one has to take into account public investments in securities issued by the

7 - i.e. excluding the compulsory import deposits.

8 - This conclusion would be strengthened if one supposes that, under conditions of monetary stability, bank deposits should have grown at a rate equal to that of industrial production (rather than of national income) -- which determines, in large part, the rate of growth of the urban and monetized sector of the economy.

"Credit, Investment and Finance Companies" -- data which are not yet available). Besides, due to increase in the rates of required bank reserves, there occurred a fall in the proportion of loans (including loans to industry) to total bank deposits. Inflation was also responsible for forcing the authorities to raise the compulsory reserve ratio (i.e. in order to prevent further aggravation of inflationary trends).

In the balance of payments sector, detailed information will be needed to reach conclusions regarding subsidies given to industry through overvaluation of the cruzeiro. An attempt should be made to measure these subsidies, breaking them down into:

- (i) - subsidies at the cost of export products (i.e. chiefly at the cost of agriculture), in virtue of the difference between the "equilibrium rate of exchange" and the official rate of exchange for imports of equipment and raw materials for industry;
- (ii) - subsidies at the cost of the consumer, in virtue of the excess of the percentage of total exchange availabilities which was allocated for imports of equipment, raw materials and relatively unfinished intermediate products (as against relatively finished products) over the percentage which would have been allocated for the purpose through operation of a free exchange market.

It would be difficult to measure these second type of subsidies; but some indication could be obtained through study of the trends of the percentage of each of the various groups of merchandise in total imports and from more detailed information on exchange allocation for imports.⁹

Besides the exchange subsidies for industry in general,

9 - However, for the period of exchange auctions, i.e. 1953-57, it would seem that the amount of subsidy could be measured by the difference between the rate for each of the various exchange categories (for imports) and the hypothetical "equilibrium rate of exchange" -- if it should be possible to estimate the latter.

there was a special subsidy arising out of the authorization (under SUMOC Instruction 113) to buy exchange at artificially low rates to the extent necessary to meet amortization payments on foreign credits received for import of equipment. To the extent that the consequent profits were reinvested, this was a subsidy used for the industrial development of Brazil. However, it should be noted that these subsidies constituted a cruzeiro donation towards the capital of the enterprises which benefited under the terms of Instructions 113. This donated capital appeared, by accounting convention, as profits; and must have earned further profits. Both (to the extent that they were not permanently reinvested) led to actual remittances abroad, or a potential for the same.

It should furthermore be noted that, whenever the cruzeiro was substantially overvalued, there were sizeable illegal outflows of capital and/or profits through the so-called "parallel market". It will be necessary to estimate such remittances in order to obtain an accurate estimate of net inflow of foreign capital.

2 - INDUSTRIAL GROWTH AND IMPORT SUBSTITUTION¹⁰

The principal characteristics of industrial growth were, on the favourable side: rapid growth, technical progress, economies of scale of output, and acquisition and diversification of industrial skills. These were due, in considerable measure, to the high degree of import substitution, which in turn resulted from balance of payments difficulties. The principal unfavourable features were: rigid and slow growth of industrial employment, the probable increase in the capital-output ratio for industry as a whole, and possible distortions due to arbitrariness in the exchange and credit systems (excessive use of capital, in substitution for labour; excessive inventory accumulation; and the growth of relatively uneconomic activities and enterprises, causing a distorted distribution of industrial activity by sectors and by size class of establishments).

During 1949/1962 value added in industry grew at about 10% p.a., or an average of about US\$ 200 millions per annum. (This implies a capital-output ratio of about 2 for industry - including under "capital" only fixed assets. These ratios will have to be estimated more accurately for each industrial sector. In 1962 -- in addition to the so-called "traditional industries": P.e. food products, beverages and tobacco products, leather, clothing and footwear, and various light consumer goods -- Brazil had practically reached self-sufficiency in the paper industry (excluding pulp and newsprint) and in rubber products (tires, tubes and minor products).

10 - Two important works on industrial growth are Werner Baer, "Industrialization in Brazil", and CEPAL, E/CN 12/664, 6/4/1963, "Problemas e Perspectivas del Desarrollo Industrial Latinoamericano". On import substitution, see Economic Bulletin for Latin America, March 1964, "The Growth and Decline of Import Substitution in Brazil". This article contains a detailed statistical analysis, though with some important shortcomings.

In cement and steel, the country had already reached a high degree of self-sufficiency (above 70%), and this percentage has been raised even higher by additional import substitution since then. The great import substitution since 1949 has occurred in electric household goods, automobiles, machinery and equipment, pulp, crude petroleum and refined products, and chemical and pharmaceutical products. In these categories, starting from a relatively low level in 1949, a high degree of self-sufficiency has been attained, if not completely so. In one important industry, newsprint, the degree of self-sufficiency has not risen since 1949.¹¹ Eliminating consumption of non-industrial raw materials, value added in industry was about US\$ 1,900 millions in 1949, against manufactured imports of about US\$ 760 millions; while these were respectively US\$ 4,000 millions and US\$ 820 millions in 1959.¹² Thus imports, as a percentage of the sum of these two items, fell from 28% in 1949 to 17% in 1959. Import substitution thus accounted for about 30% of the growth (in real terms) of value added.¹³

11 - For the above-mentioned industries, see "Economic Bulletin for Latin America", vol. 14, n° 1, March 1964, "The Growth and Decline of Import Substitution in Brazil", tables on pp. 44/49 -- with the exception of the following three industries. For domestic appliances see op. cit., table on p. 29 for data, on import trends. For chemical and pharmaceutical products, and machinery and equipment, see op. cit., table on p. 43, for indices of production and imports, and the table annexed to this paper, for the contribution of each to total supply. We consider that the latter source provides a more exact index of import substitution, but the two sources are broadly in agreement.

12 - All in 1964 prices.

13 - The concept of import substitution is rather complex. On the one hand, it could be argued that any increase in industrial production above the base-year level constitutes import substitution; because a corresponding increase in imports is thereby avoided. At the other extreme, it could be argued that only the excess (if any) of the increase in production over the increase in domestic consumption, in each group of industrial products, constitutes import substitution, because import requirements in that group are thereby reduced, in absolute terms. This seems to be the implicit reasoning in the statistical analysis of import substitution in the above-mentioned work, Economic Bulletin for Latin America, March 1964. A concept intermediate to these two extremes, seems to be more logical. According to this, only an increase in the percentage contribution of a particular domestic industry to total domestic consumption of the corresponding

The process of import substitution was basically due to stagnation of the capacity to import.¹⁴ (It is possible that the disincentive to exports due to overvaluation of the exchange rate, further aggravated the stagnation). Import substitution was facilitated in Brazil, up to a certain point, by relatively large markets for some imports, and (in the south) by the level of development the economy had already attained. However, disequilibrium and distortions in the exchange system greatly affected the pace and pattern of import substitution. The process was regulated neither by a relatively free and stable foreign exchange market, nor by a well defined official industrialization policy, except for the "Programa de Metas (1956/60)"¹⁵ for some basic industries.¹⁶ It seems that application of the incentives provided under this program was limited to a few, though important, basic sectors: chiefly the steel and petroleum industries in the public sector; and the automobile and equipment industries in the private sector. It would be interesting to examine how the economy bore up under the effort involved in the program. One obvious point is that the incentives given under Instruction 113 to various "basic" industries in the private sector, were exaggerated. While, on the one hand, these incentives stimulated the rapid growth of certain

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13 - products, should be considered as import substitution. (To avoid possible error, the contribution of domestic industry should be measured in terms of value added. For, it seems inevitable that a preliminary analysis of import substitution of the type undertaken here, has, in certain cases, to be carried out in terms of broad industrial groups, e.g. the chemical industries group, which have a fairly high degree of vertical integration. In such cases, the percentage contribution of domestic industry to value of output, may produce a distorted picture; because production may be limited to only the final stages, with a low percentage of value added in the industry group as a whole, to value of output.)

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14 - See, for example "The Growth and Decline of Import Substitution in Brazil, Economic Bulletin for Latin America, March 1964, pp. 12-18, 49-50.

15 - The Targets Program.

16 - See, for example, APEC, n° 70, April 5th, 1965: "The External Sector: Legacy of the Past".

sectors (automobiles, consumer durable goods, machinery); on the other hand, as already mentioned in the section on finance, there was a consequent loss, at least potentially, to the country's balance of payments: and besides, a loss may possibly have accrued to the economy in general (see discussion below of the automobile industry).

The following were the main lines of the exchange system, in the postwar period, as regards imports. Four periods may be distinguished. From the time of the rapid exhaustion of exchange reserves in the immediate postwar period (in the two years immediately following the war), until 1953, exchange was controlled -- i.e. allocated by administrative measures, the currency becoming progressively overvalued at official exchange rates. The allocation was based on the criterion of the (so-called) "essentiality" of needs for raw materials and intermediate products to maintain current production levels, and on the criterion of whether domestic production of so-called similars existed. During 1953-1957 this system was substituted by another, operating through the price system -- as modified by the actions of the exchange authorities. The system consisted in auctioning exchange, separately for five different import categories. The quota auctioned in each category was fixed by the exchange authorities. These quotas fluctuated somewhat in response to short-term pressures, but the abiding objective of the exchange authorities was to allocate exchange so as to achieve a certain hierarchy of the exchange rate

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- 13 - This concept can be applied when comparable data exist on value added in a particular industry and on value of imports of corresponding products. When one or another series is not available one can consider only the difference in the rate of growth in the series available, in comparison to the rate of growth of national income, as constituting import substitution (Thus it is implicitly assumed, as a first approximation, that the income elasticity of demand for the products of the industry concerned, is unity). This definition seems to be useful, as it should reflect structural modifications in industry, such as an increase in the degree of self-sufficiency, or of indigenous content, in certain lines, or the development of new activities. The above results, regarding percentage of import substitution, obtained as the sum of separate calculations for each

premia for each of the five categories. In this objective they were usually, but not always, successful. The classification of imports into the five categories was based on criteria similar to those in force prior to 1953. In 1957, this system was substituted by the Tariff Law. It appears that the principle followed in this legislation was to fix the "ad valorem" rates of import duties so as to reflect, in a general way, the various exchange premia previously in force. The substitution was thus merely one of legal and administrative form, but the effects of the exchange system continued to be the same. This law also established the National Tariff Council with responsibility for tariff revision, in particular for fixing of higher duties on goods deemed to be "similar". The law also consolidated the five import categories into only three: general, special (chiefly covering the former category number five, i.e. "inessential" consumer goods), and a subsidized category (petroleum, newsprint and certain machinery, in addition to wheat). The cost-of-exchange rate¹⁷ was applied to this last category.

The fourth and last period begins with Instruction 204 of March, 1961. From this date, compulsory import "deposits" (which represented a tax, since the currency continued to depreciate) took the place of the previously overt difference between import and export rates; the ultimate effect was, however, similar. A more basic

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13 - industry group, does not differ much from the result of the over all calculation earlier mentioned.

The latter (evidently less accurate) showed that the percentage of industrial value added, to the total of imports of industrial products and value added, increased from 72% to 83% in 1949/59; while the said total increased by 113%. This implies (on the preliminary assumption that the rate of growth of demand for each industrial product was approximately the same), that import substitution accounted for about 40% of the increase in value added.

17 - I.e. the (artificially low) exchange rate at which the authorities paid exporters.

difference was that, with the aggravation of political, monetary and exchange instability, from about the end of 1961, the general category import rate, or at least the Bank of Brazil's rate, suffered from substantial overvaluation from time to time. As a result, exchange control seems have returned in the form of arbitrary allocation of exchange sold by the Bank of Brazil,¹⁸ and through import licensing by CACEX. This phenomenon was superimposed on the tariff system instituted in 1957, which continued, legally speaking, to be in force. It should be noted, however, that in those cases where import duties were low, for example on machinery, they became ineffective as a result of overvaluation. The function of protecting domestic industry, was taken over by quantitative limitation of exchange allocation for imports. In addition, there was introduced during this period another type of exchange restriction: namely, a weekly limit on purchases of each firm, at each business centre.¹⁹ One would have to examine to what degree these nominal limits in fact restricted sales of exchange. It is possible that purchases by large firms may have been effectively restricted, but not those by small ones.²⁰

Besides these modifications in the exchange system, affecting allocation of exchange as between various imports, there was general instability of the exchange rate in real terms.²¹

18 - Sales, through private banks, of a considerable part of export earnings, was permitted, at apparently a relatively free rate (i.e. including a premium determined by supply and demand).

19 - It has been the practice of the Bank of Brazil to allocate quotas out of available foreign exchange to each important business centre where it has a branch dealing in exchange activities -- i.e. state capitals and some important towns.

20 - The limit has been the same for all firms, irrespective of size. However, the large ones can more easily get around the restriction by establishing branches at several centres.

21 - In consequence of the freezing of the rate for several months at a time, while the pace of inflation continued to accelerate.

The effects of these developments in the exchange system on the pace and pattern of industrialization, is discussed below. Throughout the period studied, exchange regulations discriminated most against imports considered to be "non-essential", or against those competing with domestic products ("similar") -- in both cases, chiefly finished products. This was the consequence of the discrimination between the various import categories and of the structure of import duties.²² Nevertheless, the resulting distortions of industrial growth may not have been so great as might appear at first sight. For it is exactly in many of these "final stage" industries that comparative costs are favourable to Brazil -- due to labour-intensity, relatively limited importance of economies of scale (in relation to size of the market), etc. This leads to the retort, that if such industries are in fact naturally economic, the high rates of protection could be abolished without adverse effects on them. Furthermore, a generalized reduction of tariffs may have some practical importance for those exceptions among "final stage" industries in which comparative costs are unfavourable. Low tariffs would prevent uneconomic development of such industries.

A closely linked aspect was that (administratively determined) exchange allocations for imports of capital goods and intermediate products was greater, while allocations for imports of finished products were smaller, than would probably have occurred under a free exchange system. This system of allocation was, necessarily, combined with an undervalued exchange rate for the former category, and an overvalued²³ exchange rate for the latter,

22 - For example, a cursory examination of tariffs rates set by the 1957 law showed that they were relatively high (around 80%) on finished drugs and dyestuffs, etc; while on intermediate products used in manufacture of the same, duties were progressively lower the less finished the product. Duties on other "basic" products were low, for example 15% on machinery.

23 - At any rate the "shadow price" of exchange for the latter was high, even when exchange for such imports was sold at a low official rate.

as compared with the single equilibrium rate that would have existed under a free exchange system. As previously mentioned, this gave a double incentive to manufacture of finished products: by raising their prices in the internal market, and by reducing the prices of imported machinery and materials for the manufacture of such products. Both incentives were at the cost of the consumer, in the short run. To examine these aspects, detailed measurements will have to be made, showing fluctuations of the percentages of each article in the total value of imports, the cost of importing it, and its internal price level.

In the third place, besides the discrimination by broad categories of imports, the exchange systems in force may have resulted in arbitrary exchange allocations for various individual articles. One may logically expect that such effects were more important during the exchange allocation regimes in force prior to 1953, and (partially) after 1961. Even during 1953-57 such effects might have followed from arbitrary classifications of articles as between the five categories, in addition to occasionally irregular fluctuations of quotas auctioned in each one.

Similar effects might have occurred during 1957-1961, due to singularities in the tariff structure. Obviously, more detailed information on the exchange regimes will be necessary to ascertain the occurrence of such effects. To check the consequences for development of each industry, more detailed data will be required as mentioned at the end of the preceding paragraph.

3 - CAPITAL/LABOUR/OUTPUT RATIOS AND THE SLOW RATE OF INCREASE OF INDUSTRIAL EMPLOYMENT

While industrial production increased at the rate of about 10% per annum, industrial employment increased by 25% in 1949/1959, or say at an annual average rate of 2.5%. As against employment, the population increased by 35% between the 1950 and 1960 censuses.²⁴

This mediocre attainment in growth of employment was due to three factors:

- (i) - The forced import substitution, resulting from a tight balance of payments, meant development of relatively capital-intensive industries.
 - (ii) - Modernization, rationalization and technological advance in some industries (notably the so-called "traditional" ones) reduced the input of labour per unit of output and perhaps per unit of capital used.²⁵
 - (iii) - In some cases, changes in demand patterns caused a rise in the relative consumption of products with a high capital (or foreign exchange) coefficient.
- Besides this, the following two factors may have produced results similar to (ii) and (iii) above respectively.
- (iv) - Exchange and credit distortions.

The former is relevant for imports of equipment. The exchange systems generally gave preference to these (at least in the first half of the nineteen fifties) and this tended to lower their prices. Thus the exchange regimes may have stimulated some

24 - And the population of working age, defined roughly as those of between 20 and 60 years of age, increased at about the same rate as total population.

25 - On the first point, see table annexed. To check the second point, reliable data on trends in real investment will be required.

substitution of capital for labour (see below). Low nominal interest rates on bank loans (negative real interest rates) may have had a similar effect.

- (v) - The exchange systems, by favouring imports of equipment and raw materials for certain industries (in effect, those industries in which self-sufficiency in final and intermediate products had not yet been attained) may have artificially stimulated demand for products with a high capital-output ratio, at the expense of demand for relatively labour-intensive products. Excessive finance (at interest rates that were in effect subsidized) for sales of some consumer durable goods may have had similar effects.

Before going on to detailed examination of the above-mentioned effects on the level of employment, the following consideration may be noted. It appears that the development of industry, and of the Brazilian economy in general, is not limited by lack of demand, but by (among other factors) shortage of capital. Therefore what is important for growth of total employment is not the labour/output coefficient in itself, but the capital-labour ratio. It is from this angle that the various factors which affect the level of employment should be examined.

Data on investments remain to be analyzed. From these data it is hoped to obtain an estimate of incremental capital-output ratios. For the time being, the analysis is limited to an examination, below, of labour-output ratios for various industries. These give an indirect indication of capital intensity. It is supposed that high productivity per worker was largely due to capital intensity (though it could have been due, in part to good administration, operational efficiency, etc.). Below, industries are classified according to output per worker:

I n d u s t r y	Output per worker	
	1949	1959
<u>GROUP I</u>	US\$ 1 000 - 1 500	US\$ 1 500 - 2 000
Non metallic minerals		
Lumber		
Furniture		
Textiles		
Hides, skins, etc.		
Clothing, footwear, etc.		
Food products		
Plastic products		
Miscellaneous		
<u>GROUP II</u>	US\$ 1 500 - 2 000	US\$ 2 500 - 4 000
Metallurgical		
Mechanical industries		
Electrical equipment		
Paper		
Chemicals		
<u>GROUP III</u>	US\$ 2 500 - 4 000	US\$ 4 500 - 7 500
Transport material		
Rubber		
Chemicals		
Pharmaceutical products		
Soap, toilet articles, etc.		

In view of the nature of textile technology, this industry ought perhaps to have been in Group II, especially if the recent advances (high speed spindles, automatic looms) were incorporated. The appearance of this industry in Group I may be explained by the relatively limited introduction of recent technological advances in Brazil, and by the high average age of equipment. From the table above, it is evident that, generally speaking, the traditional industries appear in Group I; while those in which considerable import substitution occurred since 1949, appear in Groups II and III.

In spite of capital intensity being apparently higher in the latter two groups of industries, it is estimated that as much as 40% of the increase in industrial employment was accounted for by them. Thus import substitution contributed, in a relatively important measure, towards raising employment. However, while this is valid statement as regards industrial employment, it is not necessarily true as regards total employment in the economy as a whole. If exports, particularly of agricultural products, had been more dynamic, thus reducing the rate of import substitution needed to maintain balance of payments equilibrium, it is probable that additional employment in export-producing activities, particularly agriculture, would, in view of the relatively high labour intensity in these lines, have been higher than the sacrifice in terms of growth of industrial employment. Besides, the relatively high proportion of additional industrial employment, accounted for by substitution of imports, was not due to the intrinsic nature of the respective industries; but rather due to the low rate of manpower absorption in the "traditional industries". The latter point is discussed below.

Table 1 (see annex) shows that output of the "traditional" industries grew at a substantial rate, though less than industrial production as a whole. From table 2 (see annex) it may also be seen that value added in the "traditional" industries also grew substantially.

between 1949 and 1959 (intercensal comparison), though (in most of them) at a slower rate than total value added in industry. The two exceptions are the textile and beverages²⁶ industries, in which value added increased, in real terms, by only 31% and 39% respectively. In the case of the textile industry, the difference from the general pattern might be explained by a change in the structure of demand, as discussed below. Thus it seems, in general, that the slow rate of growth of employment in the traditional industries was not due to a slow growth of demand for their products. This would seem to be the case, even though, as one would expect, the data indicate that the respective income-elasticities were somewhat lower than income elasticity for industrial products as a whole; and though the growth of demand for "traditional" products was retarded by distortions of the economy, particularly in the exchange system.

The chief cause of the low growth of employment in the traditional industries was the increase in productivity ranging from 30 to 40 per cent (with the exception of the food and tobacco industries, in which the increase in productivity was about 100 per cent), as may be seen by comparison of the annexed tables 2 and 5. It is suggested that one of the lines of further study should be an attempt to break down this increase in productivity as between its two causes, namely: better management, rationalization, etc.; and, on the other hand, modernization of equipment and/or technological change.

(In import substitution industries, there also occurred an increase in productivity of a similar order of magnitude, or greater -- notably in the transport equipment and chemical industries. However, in the case of each of these industries, excepting metallurgy, there appears to be a considerable difference between new products added, or

26 - In this, the rate of growth probably accelerated after the census year, 1959, because it was at about this time that production of some of the stronger alcoholic beverage (whisky, gin) was started

new activities undertaken -- i.e. a growth of vertical integration for the industry as a whole -- between 1949 and 1959; as compared to products or activities already in existence in 1949. In view of these differences, the comparability of the data as between these two years is doubtful).

The textile industry appears to be an example of the first type of effect: i.e. higher productivity due to improvement in organization. Besides, in this industry there may have been a reaction during the postwar period to changes that occurred during the war. In the latter period the industry absorbed manpower rapidly (to meet the suddenly enlarged domestic and export demand), with little or no additional investment in machinery (since it was not possible to import it). This meant a much more intensive use of existing equipment, with consequent deterioration. This seems to have meant that at the end of the war the industry found itself with a labour force that was excessive for a normal period. This hidden excess was gradually absorbed to increase output in the postwar period; accompanied, of course, by partial replacement and modernization of worn out and obsolete equipment.

It is also worthwhile examining the technological factors that may have affected labour input in relation to capital and output in each of the industry groups. In the first place, one may note that equipment used in industry has, in the main, been imported. Even where domestically produced equipment has been installed,²⁷ the "engineering has been imported from industrialized countries. In these, of course, the design of the equipment has been determined by their own economic conditions, -- whose principal contrast to those of the underdeveloped countries, lies in their greater supply of capital in proportion to labour. Thus processes designed in the industrialized countries are relatively capital-intensive; and technological innovation there, tends to proceed even further in this direction.

27 - See CEPAL -- Problemas e Perspectivas del Desarrollo Industrial Latinoamericano -- E/CN 12/664, pp. 54-55.

This may have prevented possible adaptation of technology to Brazilian conditions, in particular possible substitution of labour for capital (or, secondarily, recourse to different types of raw materials). Among the technological innovations that occurred on a world-wide scale in industries that are important in Brazil, one may mention high-speed spinning machinery; injection of oxygen (and, secondarily, of fuel oil) into blast furnaces and/or steel furnaces. The former innovation, however, does not yet seem to have been introduced into the Brazilian textile industry on an appreciable scale. On the other hand, the use of automatic looms has spread considerably -- an obvious case of substitution of capital for labour. In steel-making, oxygen-injection is still limited, but the practice is expected to spread, especially in Volta Redonda. Fuel-oil injection is already being practiced on a considerable scale. The effect of these practices on capital/labour/output ratios in the iron and steel industries is a point to be examined. It is also plausible that some technological change may have been the result of market growth, which has made it possible to produce on a more economic scale. For example, in various metal-machining processes, it is well-known that, with growth of the scale of output, it becomes economic to use more and more automatic equipment.²⁸ This implies, on the one hand, a fall in the capital/output ratio; and on the other hand, a rise in the capital/labour ratio.

Finally, there is the possibility that exchange and credit distortions may have artificially induced substitution of capital for labour -- a substitution that has been uneconomic from a social point of view.

28 - This tendency is also affected by the relative costs of capital and labour. That is the higher the relative cost of capital, the greater is the minimum scale of output at which it becomes economic to substitute more automatic machine tools for less automatic ones.

The principal possible effect relates to the fact that exchange for imports of equipment was sold at a relatively low rate;²⁹ while the amount of exchange allotted for this purpose was probably more than would have been allocated by the market mechanism under a single, free exchange rate system. It would seem that this combination of phenomena resulted in artificially stimulating imports of equipment. Secondly, excess bank credit, at artificially low interest rates, may have stimulated excessive capitalization. As against this, it should be noted that, in principle, the banks (excepting the CRAI department of the Bank of Brazil, and the so-called "credit and finance" companies) generally finance only circulating capital. Nevertheless, excess bank credit may have indirectly resulted in excessive investment in fixed assets, by freeing the financial resources of industrial enterprises for this purpose.

It should be emphasized that the objective of the preceding observations is purely descriptive, and not intended to convey any normative judgments. Any reorganization, modernization, technological change, etc. (excepting those due to exchange and credit distortions), by definition, raises industrial productivity,³⁰ and therefore the

29 - It should be noted that this factor, by itself -- without the one mentioned above immediately after it -- would not be enough to stimulate substitution of labour for capital. With only the former factor operating, the limitation, to a "normal" level, of the quantity of exchange supplied for importing equipment would keep its implicit price (or "shadow price") at a "normal" level, i.e. above the price actually paid by the importer (at an artificially low exchange rate). In other words, not enough foreign exchange would be available to industrial enterprises to (artificially) substitute imported equipment for labour -- as they would of course have wished to do, in view of the artificially low exchange rate. On the other hand it seems likely that an undervalued exchange rate did result in pressure, successful to a certain extent, for a relatively high allocation of exchange for importing equipment.

30 - Because, if this were not so, the preexisting organization, technology, etc. would continue to be used.

national output.

Therefore, savings should also be increased in subsequent years; and, in the long run, employment. Even with regard to the level of employment in the short-run, the effect of the above-mentioned factors is not necessarily adverse. Of course, in industries in which the coefficient of labour input per unit of product was reduced, the tendency was in the direction of lowering employment.³¹ However, for the Brazilian economy as a whole, it would seem that growth and employment, have not been limited by lack of effective demand (except during short, exceptional periods), but rather by the availability of capital, i.e. the rate of investment. Thus, the net effect on employment does not directly depend on changes in the labour-output ratio; but rather on two factors: the effect on the volume of investment³² and the effect on labour-capital ratios, or, more strictly speaking, the (multiplicative) product of these two effects. It may be noted that in some industries (textiles, mechanical and electrical equipment, transport equipment), reorganization, technical progress and/or economies of scale, reduced not only the labour/output ratio, but also the capital-output ratio.³³ The latter effect meant that a certain amount of capital was freed for investment in other

31 - However, even within those industries, the effect may have been neutralized to the extent to which reorganization, technological progress, etc. reduced costs; and thus stimulated demand for the respective products.

32 - Technological progress, and certain exchange and credit distortions, tend to increase the profitability of investment. (For example, exchange distortions restrict imports of finished products and therefore tend to raise their prices, while, on the other hand, reducing the cost of equipment and of intermediate products needed to manufacture these finished products. This obviously tends to raise the margin of profit in the manufacture of finished products. The effect on the volume of investment may be called "the elasticity of investment with relation to its profitability".

33 - For instance, in the textile industry, output increased considerably with little investment. The possible causes of this phenomenon have been examined above.

industries, or in other sectors of the economy; thus making possible the growth of employment in the latter. In the second place, it should be noted that, even when the immediate effect was to raise the capital-labour ratio;³⁴ the total effect may have been to raise the level of employment in absolute terms, when the rise in the capital-labour ratio was more than counter-balanced by the increase in investment in response to higher profit rates.³⁵

The next topic worth examining is change in the structure of demand, and in particular the effect of such change, on employment. In general, demand grew relatively fast for articles whose production is capital-intensive or requires a relatively large amount of foreign exchange — such as synthetic products (synthetic fibres, plastics, etc.) and consumer durable goods. As regards fibres, the first obvious point is that cotton is grown in the country, and, as there is plenty of unused land suitable for this purpose, its output can be increased considerably with, presumably, little investment (?). On the other hand, the production of synthetic fibre, excluding the spinning process (when necessary) and the weaving process, is a highly capital intensive industry, using very little labour. The second point worth noting is that synthetic fibres are expensive as compared to cotton; whereas the "textile processing" cost (i.e. spinning and weaving) is not very different for the two groups of fibres. This means that the percentage of value added in "textile processing" to gross value of output of textiles is lower in the case of synthetic textiles than of cotton textiles. This

34 - This effect, for example, would be produced by an artificial stimulus to investment due to exchange or credit distortions.

35 - The total effect would be the resultant of two factors: the "profit-elasticity of investment" (as earlier mentioned) and the elasticity of substitution between labour and capital in response to a change in their relative cost to the industrial entrepreneur.

factor is partly responsible for the fact that value added in the textile industries group as a whole has grown more slowly than total value of output (compare annexed tables 1 and 2). Furthermore, "textile processing" is of course less capital-intensive than the production of the synthetic fibres themselves. Thus, when the synthetic fibres are domestically produced, the combined effect of the high degree of capital intensity of their production, and the high percentage of the value of the fibres in the gross value of output of synthetic textiles, has been a sharp disparity in total capital required for production of a given value of synthetic textiles, as compared with the same value of cotton textiles. The third point to be noted is that the purely synthetic textiles (i.e. excluding rayon) are more durable than cotton textiles. This means that, to maintain a given stock of clothing, in physical terms, the consumer need maintain a smaller flow of purchases of synthetic textiles, in physical terms, than if he were buying cotton textiles. This largely offsets the higher price of synthetic textiles; meaning that the substitution of synthetics for cotton tends to raise total expenditure on clothing, in value terms, little, if at all. (This hypothesis is not inconsistent with the observed data, which show that total expenditure on clothing increased at a relatively slow rate during the postwar period -- a period that witnessed a rapid substitution of synthetics for cotton). This, in turn, together with the relatively low labour-intensity in production of synthetic fibres and synthetic textiles, as compared to cotton and cotton textiles, means that substitution of synthetics for cotton tends to lower total employment within the textile and textile fibres industries, even if the synthetic fibres themselves are produced in the country. Thus, summing up, it would appear, for the three reasons mentioned above, that substitution of synthetics for cotton has tended to retard the growth of employment, both in the economy as a whole, and

even in the directly relevant activities considered by themselves. Somewhat similar observations apply to certain other synthetic products.

The alterations in the structure of demand appear to have been due to three factors. In the first place, there were exogenous ones³⁶ (i.e. exogenous to the general economic conjuncture): changes in consumer tastes and technical advantages of new products. (As regards the rapid growth of demand for synthetic rubber, a special constellation of causes was responsible: rapid growth of road transport, the creation of a sizeable automobile industry and the stagnation in domestic output of natural rubber). But, in the second place, the allocation of resources was distorted in favour of new industries by artificially low exchange rates for importing the equipment and raw materials they required -- thus tending to artificially lower the prices of their products, and raise the demand for them. In the third place, changes in the income distribution due to rapid industrialization and urbanization (together with the income distribution effects of exchange and credit distortions, which generally favoured the higher income groups) caused demand for some of the above-mentioned, relatively expensive, articles -- such as synthetic products and consumer durable goods, to grow at a relatively rapid rate. Thus, industrialization was to a certain extent self-limiting, especially as far as industrial employment is concerned, since it favoured the growth of demand for articles whose production is relatively capital intensive, and in many of which the domestic market is as yet too small to permit production on a scale which would reduced costs to a level anywhere near the minimum. On the other hand, accelerated industrialization appears to

³⁶ - Among these exogenous tendencies, may be included the "demonstration effect", raising the demand for some new products -- and for many products that are relatively expensive.

have restrained the growth of the traditional industries, which mass produce for a relatively large-scale market, at relatively low cost and in a labour-intensive way.

4 - SPECIFIC INDUSTRY GROUPS

The iron and steel industry

A point to be noted is the large total volume of capital, as well as the high capital intensity, required for economic production on a large scale.

Attraction of foreign investment to this industry has been rather limited, even in the postwar period. This could have been due to the relatively slow growth of steel prices (implying a reduction in these prices in real terms), through indirect control of the market exercised by the Companhia Siderúrgica Nacional; or even merely by fear on the part of other companies of competition from the said government-owned company, which enjoyed a virtual monopoly on imports of steel products, at an exchange rate that was, in effect, frequently subsidized. On the other hand, failure to attract foreign investment might have been due to fears on the part of potential foreign investors regarding freedom to remit profits, and even regarding security of the capital, taking account of the large amounts that would be involved and the exchange and political difficulties through which the country has passed.

From 1961, the undoubted financial difficulties of the industry were aggravated by excessive wage increases; and, from 1964, by the tax on revaluation of fixed assets, which probably weighed relatively heavily on such a capital-intensive industry. In 1964/1965, the situation was further aggravated, especially for the small iron and steel plants, by the recession in demand; this, however, was partly offset by a consequent increase in exports. During the phase of rapid growth of the industry, many plants were installed which were much too small to enjoy reasonable economies of scale in production, especially those producing low quality pig iron. The stimulus for this uneconomic growth had been the rapid surge of demand for iron and steel, principally by the automobile industry, and

shortage of foreign exchange to import it. With the subsequent growth of competition from large iron and steel plants, the small ones found themselves in difficulty. It became obvious that investment in these had been uneconomic, from a long-term standpoint.

The machinery industries

Domestic output of machinery and equipment, especially of heavier types, increased rapidly after 1955. The causes were the rapid growth of various client industries; and, again, the shortage of exchange available for imports of equipment. The latter was due not only to the short overall supply of foreign exchange, but also to the rapid growth of import demand for raw and intermediate materials required in various industries. On the other hand, competition from imported equipment which could be bought on a medium-term credit basis, hindered sales of domestically produced equipment, for which medium-term financing was scarce, and especially so on account of the inflationary environment. But it should be noted that, in the interests of the economy as a whole, it was rational that growth of the equipment industries should have been restricted on this account. In other words, a great amount of domestic capital would have been required to finance sales of domestically produced machinery, in substitution of the medium-term credit that was actually obtained from foreign suppliers of equipment. However, in the sixties, and even towards the end of the fifties, there occurred a fall in imports of machinery on medium-term credit. This was partly due to restrictions imposed by the exchange authorities, both to avoid (in view of the persistently difficult exchange situation) incurring future liabilities for interest and amortization of such credits, as well as to protect domestic machinery industries. In part, the change was due to a decline in willingness of foreign suppliers to sell on credit. The handsome advantages offered by the well-known Instrução 113 (really amounting to large subsidies) for investment in the

automobile and other so-called "basic" industries, were withdrawn with the coming to office of the Janio Quadros government in early 1961. With this, and perhaps due partly to the fact that the major portions of investment programs had been completed even prior to this revocation, investments in the said industries practically ceased. These industries had accounted for a large portion of imports of equipment on credit, often from foreign suppliers with whom they had close connections; and this method of financing had of course been chosen (as an alternative to, say, greater equity investment, used to purchase equipment on an outright cash basis) so as to take advantage of Instrução 113. It is therefore not surprising that supply of imported equipment on credit declined considerably. This decline was also due to the increasing exchange difficulties of the country, which increased the risk of delay in payment of amortization and interest on foreign credits. The decline in credit sales of foreign equipment obviously encouraged domestic production of equipment. The industry made considerable progress in assimilating the technology of fabrication of relatively heavy equipment. Several large and well-known foreign firms established factories in the country. However, in some cases, technological complexities did hinder production, even though temporarily. However, the "know-how" for fabrication of equipment, and the "engineering" for their design are still imported.

The automobile industry

As for the automobile industry, as is well known, the controversy centers around passenger cars. Due to the importance of economies of scale in this industry, unit costs, even if production were entirely concentrated in a single factory large enough to meet the entire domestic demand, would be considerably higher than mass-production costs in the industrialized countries. Furthermore, the market has been divided between too large a number of factories,

and unit costs are therefore high in each one. Starting from the structure which has been set up in this industry, it will be somewhat difficult to secure economies of scale; since this could only be done in the case of several auto parts -- by installing new and different types of equipment, and not merely additional units of the existing type of equipment.³⁷ It should also be noted that installed capacity is much in excess of present requirements.³⁸ This might possibly be due to the fact that, in certain lines, equipment of considerably higher capacity can be obtained for a relatively small additional outlay (i.e. marginal investment cost, as capacity increases, is low).³⁹ In such a case, there would of course be a tendency to install equipment in excess of immediate production needs. On the other hand, it is possible that installation of excess capacity may have been due to Instruction 113 -- which provided a handsome subsidy on the new purchase of imported equipment, irrespective of whether it was actually used. Obviously, if this were the case, it meant a waste to the economy in the short run.

The textile industry

A characteristic of the textile industry, throughout the postwar period, has been the high degree of obsolescence of its equipment, and the low productivity (and perhaps excessive size) of the labour force, besides deficiencies of organization and of management. Nevertheless, it may be inferred that a certain degree of reorganization, and of modernization of equipment, has occurred during the postwar period; since production increased with a work force whose numbers were stable, or perhaps even declining gradually. The inadequate rate of investment for modernization might perhaps have been

37 - See ST/ECIA/Conf. 11/L.16 Eng. Eros Oroskos, "Considerações Preliminares sobre as Economias de Escala na Indústria Automobilística Brasileira".

38 - See CEPAL, "Problemas e Perspectivas del Desarrollo en América Latina", p. 134

39 - I.e. when one is faced with a choice, ab initio, of equipment serving a given function, but of different capacities; and not when one considers adding piecemeal, in the course of time, to equipment installed earlier.

due to the greater attraction of capital to other, newer industries, especially to those which succeeded in substituting imports to a considerable extent. Partly, this was a natural process in the Brazilian postwar economic environment; but it might have been further stimulated by exchange distortions.

Rubber and rubber products

Trends in the rubber products industries were largely determined by two factors. Firstly, needs for tyres and tubes grew rapidly in virtue of the rapid growth of road transport and the development of the automobile industry. On the other hand, domestic output of natural rubber has practically stagnated. Consequently, rubber imports grew rapidly; and this in turn led to establishment of two synthetic rubber factories in the public sector. These are highly capital intensive; and have absorbed considerable investments.⁴⁰

Chemicals and allied industries

In the chemicals and allied industries group, three points may provisionally be noted. Very large public sector investments were made in petroleum refining. Considering the highly capital intensive nature of this activity, some doubt arises as to whether it has been economic for the country, (at least as regards refining of imported crude). Offsetting this factor, it appears that prices of refined products are high relatively to crude in the world market — and this may make petroleum refining a worthwhile activity. In chemicals industries proper, a considerable dependence on imported intermediate products persists: particularly on petrochemicals and coal chemicals, but even on some inorganic chemicals whose production is not a particularly complex process (e.g. caustic soda, soda ash,

⁴⁰ - Though the scale of each is respectable, some foreign experts consider it modest by the standards of developed countries.

nitrogeaneous fertilizers). However, the production of these latter has been increasing recently, and there are projects to raise it still further in the near future. In the third place, it may be noted that, considering the great importance of economies of scale in chemical industries, it is doubtful whether many of the new activities that have been established on a modest scale are really economic, especially as regards intermediate (as distinct from final) products.

Table 1
Indices of Industrial Production

1949 = 100

Year	Industry Groups										
	Non-metal- lic miner- als	and Metallurgy	Paper and board	Rubber	Leather	Chemicals	Textiles	Food Products	Beverages	Tobacco	Printing and Publishing
1947	76	67	80	82	89	61	89	80	84	82	93
1948	92	83	86	88	98	92	93	89	89	86	102
1949	100	100	100	100	100	100	100	100	100	100	100
1950	109	126	115	117	102	113	106	113	119	114	120
1951	114	140	122	127	109	151	102	116	141	134	146
1952	126	147	122	136	103	138	108	118	128	148	175
1953	152	167	135	151	110	164	114	125	133	154	179
1954	182	180	146	173	111	184	134	123	132	177	196
1955	195	182	154	177	109	430	141	146	140	194	205
1956	215	210	177	167	121	574	141	130	123	205	214
1957	214	195	168	174	125	585	124	158	132	217	271
1958	218	232	193	197	137	684	166	174	144	234	250
1959	221	267	204	233	136	703	173	191	151	246	257
1960	258	297	220	264	152	802	189	203	147	254	280
1961	273	325	239	259	163	882	201	213	171	292	296
1962	294	347									

Fonte: Conjuntura Econômica

Table 2
Value Added in Industry

1949 - 1959

Industry Group	1949	1959	Increase of 1959 over 1949	% contribu- tion of to- tal increas- e 1949/1959	Index 1959/ 1949
	in thousands of US\$ at 1964 prices*				
Mining	33.665	90.224	56.558	2,62	269
Manufacturing Industries:	-	-	-	-	-
Non-metallic min- erals	133.020	264.082	131.062	6,08	199
Metallurgy	174.291	472.600	298.309	13,82	272
Machinery (non- electrical)	39.716	137.406	97.690	2,69	347
Electric & Com- munication equip- ment	29.762	154.864	125.102	4,42	522
Transport equip- ment	41.412	299.432	258.020	11,94	725
Wood	78.338	129.070	50.732	2,36	165
Furniture	40.157	87.934	47.777	2,22	230
Paper and board	41.826	121.295	79.469	3,68	231
Rubber	35.1719	89.780	54.609	2,53	236
Leather, etc.	24.452	43.591	19.139	0,89	179
Chemicals	99.058	346.091	247.033	11,44	330
Pharmaceuticals	52.096	99.508	47.412	2,20	192
Soap & other toilet articals	29.270	55.555	26.285	1,20	190
Plastic prod- ucts	4.749	32.909	28.160	1,30	695
Textiles	365.792	447.034	81.242	5,24	131
Clothing and footwear	79.343	142.031	62.688	2,91	180
Food products	381.438	774.936	393.498	18,26	204
Beverages	83.472	115.522	32.050	1,49	139
Tobacco prod- ucts	26.537	52.048	25.511	1,18	197
Printing and publishing	74.064	119.511	45.447	2,11	162
Miscellaneous	30.314	63.874	33.560	1,56	211
T o t a l	1.897.134	4.053.054	2.155.920	100,00	214

Fonte: Censo Industrial de 1960 - Aspectos Gerais, p. 1

* - The conversion rate used in calculating this table is Cr\$1,250 = US\$1. This is very close to the average of the official rates over the year 1964

Table 3A

The share of import substitution in the growth
of value added

Industry Group	1 9 4 9				1 9 5 9			
	Value added	Imports	Total	Value added as % of total (3)	Value added	Imports	Total	Value added as % of total (7)
	in 000US\$*			(4)	in 000US\$*			(8)
	(1)	(2)	(3)		(5)	(6)	(7)	
Non-metallic minerals	133.020	28.776	161.796	82,21	264.082	11.531	275.613	95,82
Metallurgy, Machinery (mechanical and electrical) and transport equipment	285.181	684.619	969,800	29,41	1.064.302	667.783	1.732.085	61,45
Paper and board	41.826	36.471	78.297	53,42	121.295	49.844	171.139	70,86
Rubber and rubber products	35.171	2.570	37.741	93,19	89.780	23.743	113.523	79,09
Chemicals, pharmaceuticals, soap and cosmetics, etc.	180.424	75.241	255.665	70,57	501.154	116.888	618.042	81,09

Sources: Censo Industrial de 1960 - Aspectos Gerais, p. 1; SEEF - Foreign Trade

* - At 1964 prices

Table 3B
Import Substitution
 1949-1959

Industry Group	Increase in share of Domestic Industry % ^a	Import Substitution (US\$ millions)	Import Substitution as % of Total Supply ^b
Non-metallic minerals	13,61	37,5	1,74
Metallurgy, Mechanical and electrical machinery, and transport equipment	32,04	554,9	25,74
Paper and board (including cellulose)	17,44	29,8	1,38
Rubber and rubber products	(-) 14,10	(-) 16,0	(-) 0,74
Chemicals, pharmaceuticals, soap and cosmetics, etc	10,52	65,0	3,01
T o t a l	59,51	671,2	31,13

^a - Increase over 1949-1959 in percentage of domestic output to total supply of products in the respective group.

^b - Of domestic and imported products.

Table 4
Monthly Average of Workers Employed
 1949-1959

Industry Group	1949	1959	Absolute increase, 1949/1959 (3)	Increase as % of total increase for all industries (4)	Index 1959/1949 (5)
Mining	32.708	35.432	2.724	0,76	108
Manufacturing Industries:	-	-	-	-	-
Non-metallic minerals	111.269	144.015	32.746	9,19	129
Metallurgy	90.203	151.801	61.598	17,29	168
Machinery (non electrical)	21.798	49.000	27.202	7,64	225
Electric & Communication equipment	13.038	44.364	31.326	8,79	340
Transport equipment	15.121	63.229	48.108	13,50	418
Wood	56.044	74.702	18.658	5,24	133
Furniture	31.672	52.974	21.302	5,98	167
Paper and board	22.305	35.439	13.134	3,69	159
Rubber	9.137	14.741	5.604	1,57	161
Leather, etc.	17.309	21.981	4.672	1,31	127
Chemicals	41.969	61.039	19.070	5,35	145
Pharmaceuticals	12.489	13.539	1.050	0,29	108
Soap & other toilet articles	8.755	10.314	1.559	0,44	118
Plastic products	2.395	7.610	5.215	1,46	318
Textiles	313.845	306.122	(-) 7.723	(-) 2,17	98
Clothing and Footwear	64.140	85.263	21.123	5,93	133
Beverages	32.762	31.155	(-) 1.607	(-) 0,45	95
Tobacco products	14.377	13.008	(-) 1.369	(-) 0,38	90
Printing and Publishing	34.491	44.860	10.369	2,91	130
Food products	211.948	241.801	29.853	8,38	114
Miscellaneous	19.869	31.504	11.635	3,27	159
T o t a l	1.177.644	1.533.893	356.249	100,00	130

Source: Columns (2) and (3): Censo Industrial, 1960 - Aspectos Gerais, p.1