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9. ABSTRACT

The main concern is how inflation interacted with the distribution of income in Brazil through the structure of demand--both as a cause and as a result. In Latin America there is the phenomenon of "locked inflation" in which inflation rates increase, growth diminishes, and distribution of income is such that demand will not sustain the pattern of industrial production already achieved.

The disequilibrium in commodity markets was partly the result of government subsidization of investment in industry which resulted in a transfer of income to the entrepreneurial class. The added spending by this class was primarily for luxury goods and investment goods which are more capital-intensive than wage goods. Thus, the implicit tax of inflation on wage earners was reinforced by a relatively reduced demand for labor services. The inflation could have eventually led to a lock-in whereby further economic growth became impossible with or without inflation, and without continued and increasing foreign aid and/or exports. Since foreign aid has been diminishing, if growth based upon expansion of exports became less feasible over time, the lock-in could become inevitable.

Through the use of budget studies, simulation, production data, factor intensity and input-output we determined that although credit distribution was heavily biased, and worsened income distribution, consumer demand was never sufficiently weak to support a lock-in in Brazil.

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Inflationary Financing, Industrial Expansion
and the Gains from Development in Brazil

by

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Inflationary Financing, Industrial Expansion, and the Gains from Development in Brazil*

1. Introduction

Developing countries have frequently attempted to create modern industrial structures by discriminatory, inflationary financing of chosen sectors of the economy.¹ By heavily subsidizing these sectors via deficit financing, and negative interest rates, along with complementary protective measures, a rapid rate of industrial expansion can be achieved. Yet the costs of such policies can be great. In particular, the gains of such growth may not be widely distributed. Very large firms which predominate in receiving subsidized finance may become dominant in production even though they may be less efficient than the small and medium sized producer. Capital-intensive firms and industries may be favored over those which are more labor-intensive despite unemployment and surplus labor. The pattern of demand which results can reinforce this pattern by channeling finance and, in turn, factor incomes to those whose consumption pattern is toward the more capital-intensive domestic and import-intensive products. Thus, a circle may be completed which results in a form of dualism within the urban-industrial sector itself. A relatively capital intensive-import substituting sector with high factor incomes producing 'luxury' durable and capital-intensive products for final demand, intermediate demand, and capital use.

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¹The more general role of financial intermediation is well covered in R. W. Goldsmith, Financial Structure and Development (New Haven: Yale Univ. Press, 1969), and for several Latin American countries in C. W. Reynolds, "The Use of Flow of Funds in the Study of Latin American Capital Markets," O.A.S. (mimeo) 1973.

Meanwhile, the labor-intensive sector with low factor incomes (producing mainly non-durable consumer goods which are by and large 'necessities' for the masses) may receive little finance and expand little if at all. The end result may be what Georgescu-Roegen has called a structural lock inflation which can produce a profound economic stagnation due to demand deficiencies and excess capacity in favored industries.¹ Alternatively, the economy may continue on its higher growth path without serious interruption, but with serious underemployment and a mal-distribution of income. In either case the outcome is undesirable.

Brazil's experience is used here to examine the alternative models--inflationary credit as an impetus to development and the actual and necessary implications of such growth for income distribution. The questions we want to answer are: 1) How important was inflationary credit to private firms in the Brazilian economy? 2) Were 'efficient' means used in encouraging expansion in chosen sectors? In the first case, the answer appears that credit was important and widely used by the government and that firms were very dependent upon it. Given the rapid growth of GNP in Brazil during the 1954 to 1964 period, the answer to the first and second questions might be presumed to be positive, but not, as we shall see, unqualifiedly so. A third major question deals with welfare and the distribution of income. Here the success of the measures in question are most dubious. According to A. Fishlow and others the very unequal distribution of income in 1950 was little changed by 1960 and as late as 1968. To what extent this was the consequence of the particular incentives

¹This particular theory is developed in N. G-Roegen's "Structural Inflation Lock and Balanced Growth," Economies et Sociétés, Cahiers de L'I.S.E.A., Tome IV--No. 3--March 1970, pp. 557-605.

provided by the government in its credit policy and import substitution policy can be gauged only by looking at alternative policies. On this point others (Langoni) have concluded that the actual pattern of industrialization and the distribution of income emanating from it were necessary and nearly optimal.

The following begins with a discussion of the relationship between credit policy and inflation, pointing out that the federal cash deficit was a primary source of the inflation. The relative unimportance of self-finance and depreciation in Brazil is demonstrated and sources of finance are seen by comparing Brazil with other pertinent countries. The distribution of credit between sectors indicates the favoritism to industry relative to agriculture, commerce, and services. Not only was distribution between such major sectors very unequal; but it was also highly unequal within manufacturing itself. Of 17 sectors in manufacturing, just 6 sectors received over 75% of the total credit. There follows some alternative explanation for the observed distribution, and a sources of investment model is specified and then tested using regression techniques. From the results of the regressions we get some idea of the the 'efficiency' of the loans of the monetary authorities' actions vis-à-vis competing sectors, defining 'efficiency' as the proportion of such funds used for gross fixed capital formation by each industry. Windfall profits from the highly subsidized loans are also estimated and seen to be large. There is also evidence that inventory speculation occurred as the inflation gathered force in the late fifties and early sixties and that speculation was partly financed by public funds.

In the final section an attempt is made to get at the central question: If credit had been allocated differently, could the non-egalitarian distribution of income have been improved greatly? Simulations demonstrate the

results of both a labor-intensive credit allocation criterion and a criterion directly dependent upon improved income distribution itself. That the maldistribution of income was partly a result of credit policies seems indisputable, but the political and social feasibility of adopting one of those alternative strategies is much less clear.

2. Inflation and Credit Policy in Brazil

Brazil has had a history of inflation and the post 1950 period was no exception. Prices rose continuously, but with variation. With the wholesale and cost of living indices rising an average of about 20% between 1950 and 1964, prices rose by over 70% in 1963 and by more than 90% in 1964. The sources of the inflation were multitudinous. Familiar ones were rising minimum wages, an excess of governmental investments over public savings, and budget deficits partly created by excess governmental lending and cash inflation. One can also recount falling foreign investment and lending, rising prices of export products via government manipulation, and bottlenecks in the economy partly due to the ineptness of the Goulart regime.

For present purposes we are mainly interested in the role played by the use of inflationary finance to provide credit for industry. In Table 2, are shown the budget deficits of the government, a source of the major part of the inflation during the period, and annual net credits of the commercial banking system and monetary authorities to industry. As can be seen, loans were at times larger than the entire deficit; though the annual variation was great on average they were well above 60% of the deficit.¹

¹The deficit itself was due to numerous factors beyond public lending and fixed investment however. Large operating deficits were run up by the Rêde Ferrouaria Federal S.A., a federal autarquia that managed over half of the traffic on Brazilian Railways. Its deficits averaged over 30% of the Federal budget deficit between the mid-50's and 1965. Source: Baer, Kerstenetsky, and Simonson, "Transportation and Inflation..." in EDCC (Jan., 1965), pp. 188-202.

TABLE 1: Financing of Investment in Private
Locally Controlled Manufacturing Enterprises,
Selected Latin American Countries
(percentage distribution)

Country	Period	Self-Financing			Sources Outside Firm		
		Total	Undis- tributed profits	Depre- ciation	Total	Equity capital	Other sources
Argentina	1960-1961	40.0	4.0	26.0	60.0	9.0	51.0
Brazil	1959-1962	43.2	36.4	6.8*	56.8	8.2	48.6
Chile	1949-1961	52.3	42.3	10.0	47.7	4.5	43.2
Colombia	1958-1962	51.8	27.8	24.0	48.2	16.4	31.8
Ecuador	1953-1957	56.5	22.7	33.8	43.5	12.6	30.9
Uruguay	1960	42.0	-	-	58.0	16.0	42.0
Venezuela	1961	50.5	21.3	29.2	49.5	10.6	38.9

* This figure is unduly small and probably is explained by the accelerating inflation under which firms could only depreciate at original cost.
SOURCE: United Nations, ECLA, The Process of Industrial Development in Latin America, No. 66.1164 (New York: United Nations, 1966), Table 35.

The importance of 'outside' finance is seen in Table 1. Self financing was a relatively small proportion of the financing of investment in private manufacturing in Brazil,¹ much smaller than in developed countries as well as comparatively low even for Latin America. This is partly explained by the relative instabilities in Brazil vis-à-vis other countries. Self finance will be smaller, cet. par. if inflation rates have been high, for depreciation as a source of self finance will be less where book values must be used and inflation has diminished these greatly, given the typical lags in valuation procedures

¹As indicated in Baasch and Kybal, Capital Markets in Latin America, (New York: Praeger, 1970), self financing in developed countries has been much greater than this, by and large over 70% of gross fixed asset formation.

TABLE 2: Total Government and Net Commercial Loans (Loans-Deposits) to Industry
as a Proportion of the Federal Deposit in Millions of Old Cr. \$

	(1) Net Commercial bank loans	+	(2) Govt. Loans	=	(3) Total Govt. & Net comm. loans	/	(4) Federal Deficit	=	(As Ratio to GNP)	=	(3)/(4) Proportion
1954*	5,837.0		2,734.1		8,571.1		2,711.1		(.005)**		3.1615
1955*	9,152.0		3,167.5		12,319.5		7,616.0		(.011)		1.6176
1956*	15,188.0		4,061.2		19,249.2		32,945.7		(.038)		.5843
1957*	21,248.0		6,481.2		27,729.2		32,923.1		(.031)		.8417
1958	23,306.0		40,377.2		63,683.2		30,662.1		(.024)		2.0769
1959	27,981.0		48,024.5		76,005.5		26,446.1		(.015)		2.8740
1960	40,832.0		63,389.7		104,221.7		31,623.0		(.014)		3.2958
1961	59,494.0		96,995.6		156,489.6		102,460.0		(.044)		1.5273
1962	50,670.0		178,153.8		228,823.8		214,866.0		(.063)		1.0650
1963	79,925.0		250,967.0		330,892.0		324,523.0		(.060)		1.0196
1964	314,012.0		406,491.0		720,503.0		760,090.0		(.061)		.9479
1965	198,602.0		561,265.0		759,867.0		820,999.0		(.047)		.9255

*No general credit (government loan category) information available.

**Federal deficit as a % of GNP.

Source: Relatorios, Banco do Brasil. Various years.

(4) International Monetary Fund, International Financial Statistics, various dates

allowed by the government.¹ Moreover, it is well known that working capital requirements will be magnified under inflationary conditions. Enterprises will find it profitable to accumulate large stocks of raw materials and intermediate products as a hedge against inflation. These tendencies will be magnified where interest rates have been highly subsidized as in Brazil, and where the government had been expanding credit rapidly in response to high credit demand. Thus, Brazilian enterprise was very dependent upon large and expanding credits from the commercial and government banking sectors. Only Argentina depended more on sources outside the firm than Brazil (excluding equity capital).

3. The Distribution of Credit

Credit as a proportion of production was distributed very unevenly as between agriculture, commerce, and industry.² Beginning in 1954 agriculture, with almost half of value added, received only about one-seventh of total credit. Industry and commerce captured almost half of credit. Over time, industry's and commerce's share of credit declined, however, falling to 29.5% of product by 1964 whereas agriculture's share increased to over 13% by 1964. Despite this change, the sectoral discrepancy was still substantial.

Of the total credit allocated to commerce and industry by the monetary authorities, industry received over 16% as of 1954 as compared to about 9%

¹Note as one consequence the small depreciation figure of 6.8% for Brazil in Table 1. The small amount of equity capital is another result of inflation.

²All credit data is taken from official sources in this section, mainly from the Banco do Brasil as reported in the Relatorios for various years.

in commerce. Commerce borrowed heavily from the commercial banking sector, but as time passed, industry gained increasing shares of funds both from the monetary authorities and the commercial banks until by 1964 it had achieved fifty percent more total credit than had commerce. Likewise, bank credit to individuals fell precipitously over time (though it was never a comparatively large borrowing sector). Livestock's position was static over time whereas agriculture's gains came from both the monetary authorities and the commercial lending sectors.

The picture is one of the bulk of the funds going to industry and commerce, with commerce losing out over time. Agriculture, on the other hand, began with a very small share, and then gained dramatically, especially after 1960. Livestock and individuals were slowly losing shares. On the whole, industry became the major recipient of funds and, although its product grew rapidly, its funding exceeded its growth vis-a-vis other sectors. Thus, industry became, and remained, the favored sector during the period under investigation.

4. Distribution of Credit within the Industrial Sector¹

As industry was favored over commerce and agriculture in receipt of investible resources, so were certain sectors of industry favored over other sectors. The picture is one of some surprise. Looking at 1954, we find that textiles dominated the individual industry share followed by

¹There were two sources of data here. First, the Relatorios of the Banco do Brasil. The main sources of industrial credit over the period from the non-private sector was the General Credit Department, the Agricultural and Industrial Department, both of the Bank of Brazil, and the National Bank of Economic Development. Second, the special annual issues of Conjuntura Economica which publishes balance sheets of only incorporated enterprises. The latter data are utilized only later in our study.

foodstuffs, both traditional sectors, and then came steel and metals with no other sector receiving as much as 10% of these three favored sectors. Over time, however, this changed. In Table 3, A is calculated as the percent average distribution of total credit over the entire 1954-64 period, and it was dominated by steel and metals, transport equipment, and plastics and petroleum; only then followed textiles, foodstuffs, chemicals and pharmaceuticals. These sectors alone captured over 75% of total credit.

More enlightening analytically are credits received relative to a sector's sales. Although the same sectors tended to be above average, mining greatly dominated both total credit/sales (B) and government credit/sales (C). As can be seen by comparing the averages for all seventeen industries, the distribution on the basis of credit per cruzeiro of sales was much more equal and less skewed, excepting mining, than was evident from share of credit in (A) above. Moreover, credit allocations were falling per unit of sales quite substantially according to our column averages for both commercial banks and the government. The annual figures indicate that this was accentuated toward the end of the period, suggesting that credit did not keep pace with sales in real terms and the accelerating inflation even though government deficits were increasing in both real and nominal terms. (See Table 2).

5. Allocation of Private Credit and Investible Resources

One might presume that the commercial banking sector was maximizing its profits within the constraint of a maximum nominal loan rate set by the government fiat at 12%. However, this assumption runs contrary to Ness' assertion that ... "credit was granted on the basis of security or personal connections rather than on the commercial or developmental importance of

TABLE 3: The Sectoral Distribution of Credit

	A.	B.		C.	
	Total Credit: %	Total Credit/Sales % (cr.'s)		Govt. Credit/Sales % (cr.'s)	
	1954-1964	1954-57	1961-64	1954-57	1961-64
<u>Above Average:</u>					
Steel & Metals	15.4	21.1	24.5	7.5	8.1
Transport Equip.	15.0	7.3	4.8	2.7	1.8
Plastics & Petroleum	13.9	11.4 ^a	16.1	N/A	N/A
Textiles	12.0	20.6	12.5	12.6	8.1
Foodstuffs	11.2	9.2	6.4	6.7	5.3
Chemicals and Pharmaceuticals	8.9	8.5	6.5	4.1	2.5
<u>Average:</u>					
Equipment & Instrumentation	5.5	17.7	16.4	10.3	5.4
Electrical & Communications	4.4	11.7	5.6	4.4	2.7
<u>Below Average:</u>					
Mining	3.4	42.4	19.2	21.6	12.2
Printing & Publications	2.1	5.8	4.4	2.7	2.2
Rubber	2.1	9.2	6.1	2.0	1.6
Footwear & Clothing	1.8	8.8	8.9	5.9	5.2
Paper & Cardboard	1.5	7.1	5.2	4.6	2.8
Tobacco & Matches	.9	5.0	2.5	2.6	1.4
Lumber	.8	9.6	7.5	7.5	5.6
Furniture & Utensils	.6	5.9	4.8	3.8	3.3
Leather, Hides, etc.	.6	8.5	11.6	6.4	9.0
TOTAL	99.3% ^b				
AVERAGE		12.7%	9.6%	7.1%	4.9%

- a. No classification for these years and data refer to 1959 only.
b. Slight errors due to rounding.

Source: Calculated from data in: (A) Conjuntura Economica, Sociedades Anonimas, Feb., various years. (B) and (C) Relatorio do Brasil, Banco do Brasil, various annual editions.

the financing."¹ One might also think that the government had at best incomplete and weak means of influencing the direction and amount of the commercial banking sector's lending to particular sectors. However, a

¹W. Ness, Jr., "Financial Markets Innovation as a Development Strategy: Initial Results from the Brazilian Experience," New York U. Working Paper Series No. 72-25, p. 14.

contrary position is asserted by N. Leff: "Through the National Development Bank and the Bank of Brazil the government determines the allocation of short and long-term investment funds....¹

If we ask to what extent the government distribution of credit might be in line with the capital coefficients we find that the above average credit group per unit of sales was only about average in capital requirements (1.75 per unit of output) versus a very similar ratio for below average industries (1.54 per unit), hardly a sufficient difference to explain the almost 80% excess of the favored section. This is somewhat contorted by the high capital coefficient of 7.2 for transportation and communications. Excluding this sector, the coefficient would have been 1.03, and the excess would be almost entirely explained via Cline's² capital coefficients and similarly for those of Lopes.³ Thus, excepting transportation and communications most of the difference in the government allocation of credit can be explained via differential capital requirements per unit of output and the much greater expansion of the above average sectors during the period. What remains to be 'explained' is just why these capital intensive sectors were favored for expansion over labor intensive sectors.

The observed allocations of private credit in industry might be explained by a variety of factors: profitability of the borrower, differential borrowers' demand, including stocks of raw materials and inventories

¹N. Leff, Economic Policymaking in Brazil (Cambridge, Mass.: Harvard University Press, 1968).

²cf. William Cline

³F.L. de P. Lopes, "Inequality Planning in the Developing Economy," Ph. D. Thesis, Harvard University, June 1972.

to be carried over, differential finance of purchases, import substitution (including protection of the domestic market from foreign competition) and selection by the government for favorable treatment.

Assuming that the commercial banking sector was attempting to maximize profits, we would expect the firms to which it lent more than on average either were more profitable or had above average working capital requirements or both. However, neither of these explanations by themselves appears to take us very far.¹ The relation between profits to sales and commercial banking credits to sales of each industrial sector yields a rank correlation coefficient of +0.26 for 1954-58 average and -0.82 for 1961-65 average.² Neither does a rank correlation of average growth over the period to average credits have explanatory power. Rapidly expanding sectors were transportation, electrical equipment, non-metallic minerals, and chemicals; and yet none of these were among the chief recipients of credit.

It is difficult to definitively determine working capital requirements per industry. General considerations would indicate that profit maximizing firms will reduce their working capital requirements to a minimum per unit of output should be substantially less than one for all industries since inventories of finished goods, raw materials, and work in progress are only necessary because production is not instantaneous.

¹Though our measures of economic profit are weak and unreliable, they come from the balance sheets of corporations published annually in Conjuntura Economica. Coverage is uneven and one must also remember that in time of high inflation depreciation and measures of profitability are particularly suspect.

²Neither is significant though the negative coefficient is significantly different than the positive. Why such a large shift occurred is not gone into here, but it was apparently just one sign of the inefficient allocations coming after 1958.

We can get some idea of the extent of raw materials in each sector by examining average stocks to sales. However, the rank correlation coefficient between raw materials to sales and commercial bank credit to sales shows no connection. Similarly, there is no association between the inventory to sales ratio by sector to the credit to sales ratio.

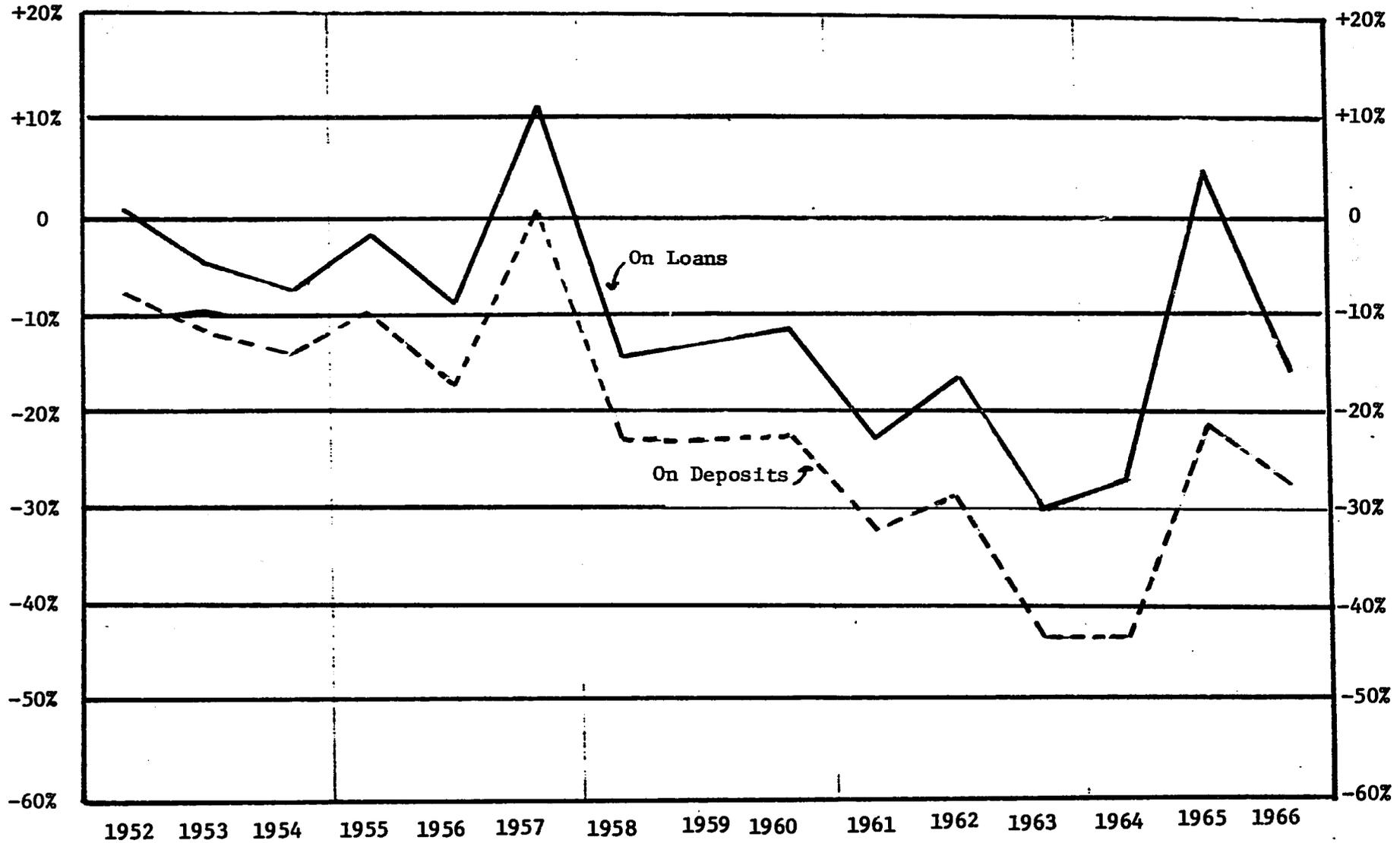
These expected explanations may fail simply because it was profitable per se to borrow from commercial banks. Effective borrowing rates were actually negative over much of the period under discussion so that loans were profitable to obtain even with no additional working capital requirements. The subsidy is actually given by the depositor as he receives a rate of return below the rate of inflation. Real interest rates on loans and deposits are seen in Chart 1 to have been negative in all years excepting brief periods in 1957 and 1965.¹ In 1963 the effective rate for loans reached a minus 30%. On average over the 1954-64 period it was close to a minus 15 to 20 percent. There was, then, virtually unlimited excess demand at the currently negative real price of loans even after commissions, fees, and other service charges had been added.

Thus, the outline of an explanation suggests itself. Banks were profitable because depositors were essentially subsidizing both the banks and their borrowers at the fixed negative rates. Likewise, taxpayers and fixed income recipients were subsidizing borrowers via lending at negative real rates by the monetary authorities as well as by their rediscounting activities. Hence, commercial banks were probably more interested in secure borrowers rather than stretching their charges too far beyond lawful limits,

¹Cf. Leif E. Christoffersen, *Taxas de Juros e a Estrutura de Uma Sístcara de Bancos Comerciais em Condições Inflacionárias - o Caso do Brasil*, *Revista Brasileira de Economia*, pp. 5-35, Juno 1969.

CHART 1: Commercial Banks in Brazil
Estimates of Real Interest Rates

Annual Average Interest Rates Deflated by Wholesale Price Index (Ex. Coffee)



Source: Christoffersen, *op. cit.*

the resulting allocation was likely to be grossly inefficient. The implications of this scenario are returned to later on.

6. Government Allocations of Credit and Investible Resources

The government of Brazil was presumably more concerned with social than with private profitability in its allocation of investible resources to the private sector. There being no direct measure of social profitability, however one expects that rules of thumb were used. Several rules of thumb come to mind as being plausible from knowledge of the government's development strategy. One was that of giving protection to domestic industries which were substituting for imports. Three possible measures might be applied. One is that we might expect a high correlation between government loans and effective protection. Second, we might expect a high correlation between government loans and the actual measured import substitution industrialization of any particular sector. Third is the possibility that the government sought to maximize linkage in the economy by promoting so-called 'basic' industries.

The first two explanations are measured by the rank correlation coefficient. Both coefficients were low, positive, and insignificant.

The rank correlation between government loans and linkages fares better. Using a combination of backward and forward linkages calculated from the 1959 Brazilian input-output table, the association is found to be +.369 which is significant at the 7 percent level.¹ Thus, the government's 'basic industry' strategy was apparently consistently followed, with only several important exceptions, via its lending policies. However, the basic

¹Using Kendall's coefficient P with N of 17, T was computed as 1.96 which was significant at the 7% level.

industrial strategy was incompletely successful since neither government lending nor the linkages were strongly associated with the actual growth pattern in industry (though the extent of association to be expected is somewhat doubtful inasmuch as basic industries partly stressing social overhead are facilitating rather than being necessarily leading sectors).

Though disappointing, these results point to several alternative hypotheses. First, in toto, our very simple measures no doubt fail to capture the complexity of the actual situation; with certain adjustments, a good deal of 'true' intercorrelation could exist. Second, though the government did have the motives we ascribe, and attempted to behave in like fashion, the results of the process may have been different. The government was, in short, perhaps a bad predictor of events and did not understand the ongoing process. Third, it is possible that the government was not at all seeking to maximize social gains and that some other unknown combination was being sought. Government efforts themselves may have been relatively confused, of multiple, and even conflicting objectives so that no pattern exists, though to get at some of these matters would require a case by case explanation which must await more detailed future research.

7. Investment Behavior in Brazil

The typical conception of the decade 1954 to 1964 in Brazil is one in which excess demand predominated. Money consumption demand and investment demand ex ante exceeded domestic savings and part of the discrepancy was filled in by foreign loans and investments under Instruction 113 which gave strong incentives for foreign participation in the Brazilian economy after 1955.¹ Excess demand was propagated via the federal cash deficit and the

¹Cf. W. Baer, op. cit., pp. 56-57 for a description of Instruction 113.

latter was the most important factor in the continuing bank credit fed to favored sectors in the economy. Also important was the Bank of Brazil's rediscount policy, the coffee account, and the growth elasticity of tax collections.

These formulations, along with the quantity theory, are oversimplified and do not adequately explain the events of the period. Yet with supplementation, each adds in gaining some insights into the inflationary process, its source, and its propagation. For one thing, as we will show, credit was a key factor in investment which itself largely determined the sectoral rate of expansion.

In point of fact, orthodox models have not predicted very well in Brazil.¹ For instance, price and quantity changes by sector in the periods 1955-1958 and 1962-1965 reveal a negative rank correlation in each, $-.44$ and $-.21$, respectively. Those industries growing most rapidly raised prices least. Had capacity constraints and excess demand been the major sources of price increases, a positive relationship would have been anticipated. Excess demand in itself could be beneficial in a phase of import substitution and the introduction of new products and processes, but this relationship seemed to prevail only when working capital was in ample supply so that firms could make production plans, acquire inventories, and extend credit to buyers. Thus, fixed capital and working capital were highly complementary especially in the short run and, as has been emphasized by Morley, a lack of working capital may explain much of the puzzling phenomena of high profits and stagnation during the early 60's in Brazil.²

¹Samuel Morley, "Inflation and Stagnation in Brazil," Economic Development and Cultural Change (1972) was the source of Fishlow's observation.

²Fishlow, ibid.

A second complementary model therefore seems appropriate to the present inquiry, one which is fairly general and yet eclectic and adapted to Brazilian circumstances. An attempt is made here to make such a characterization though without specification or tests at this time. We begin with the notion that growth in the capital stock is the one factor most important in developing countries; certainly in Brazil the allocation of investible resources seems to have been the most critical factor in its pattern of development. Therefore, in (1) we have set out the major determinants of investment in manufacturing industry:

$$(1): I = s.\pi + s'wH + s''G + L.r + u$$

where in (1): s is the marginal savings rate (MRS) for industry, π is the rate of profit, s' is the MSR for industrial labor, w is its wage rate, H are hours worked; s'' is the government savings rate and G government revenue; L is loans to industry and r the loan rate. Profit (π) is given as the excess of total revenue over total cost with revenues dependent upon mark up over cost by firms in an imperfectly competitive market averaging empirically between 14 to 24% on net worth, a rate of return reflecting the predetermined cost and current market conditions.¹ We take s and s' as given by the current institutional arrangements of the system, w and s'' are determined by government decision, and L by profit expectations and government fiat by the commercial and government lending sectors respectively. By assumption, r is determined by usury laws and inflation rates. No price expectation term is included inasmuch as real levels of the variables are indicated.

¹These were the actual reported ranges for all 17 industries between 1954 and 1964 for the corporate sector. Conjuntura Economica (v.d.)

Fishlow assumes that the negative correlation observed in the Morley data mentioned earlier vitiates the standard conceptions of the causes of the inflation by Brazilian policymakers whether it be basically driven by wage push, cash deficits, and monetary excesses or inflationary expectations. Instead, he outlines an alternative full cost markup model.¹ According to this model firms expanding capacity ahead of demand via high rates of investment were most probably operating at high cost close to capacity with poor expectations for expanding demand. Similarly, ample credits and high subsidies could lower costs per se and reduce price increases even in an inflationary environment. Unfortunately, no rank correlations could be found between prices and credits or subsidies, nor with exchange rate treatment.

Sectoral investment and expansion differed greatly in manufacturing and such differences may be explained within the framework of Equation (1) if we interpret s to be the firms' retention of earnings out of profits, L to be the loans extended by the commercial banks, monetary authorities, and other external sources (primarily foreign loans, investment banks, and lettres de cambio), and r to be the loan rate charged. Both s' and s'' are not relevant to firm investment whereas L , π , and s varied widely as between firms. But it does appear that together they largely 'explain' annual investments in the corporate sector in the following regression equation:²

$$(2) \quad I = a + b(s.\pi) + c(L) + u$$

¹cf. A. Fishlow, "Some Reflections on Post-1964 Brazilian Economic Policy," in A. Stepan (ed.) Authoritarian Brazil (New Haven, Conn.: Yale University Press, 1973).

²The corporate sector is the only sector required to publish its balance sheets annually. There are no comparable data for individual proprietorships, partnerships, government owned firms, or firms with limited responsibility.

where I is gross fixed investment, a is the intercept, $s.\pi$ is retained earnings, L is loans during the period, both domestic and foreign, and u is the error term, all in constant cruzeiros.

Regression results are shown in Tables 4 and 5 by all industries in the aggregate, and for each individual industry. In Table 4 total credits to the corporate sector from commercial banks and all other sources are included as an independent variable along with retained earnings, lagged and averaged, over a three year period.¹ In the cross section across the 17 sectors, the results are very good with an R of .97 and with low standard errors and with the coefficients in logarithmic form adding up to almost 1. Credit was evidently a much more important factor as a source of funds for investment than were retained earnings. Similarly in the time series for all seventeen manufacturing sectors taken together, R was almost .9; but retained earnings were insignificant whereas the credit coefficient was .62 (with a large standard error). The low coefficient of retained earnings is surprising, since in the typical explanation given of investment mentioned earlier half of gross fixed capital formation was said to be financed in this way. Looking at individual industries only six--textiles, paper, food, printing, furniture, and leather--were insignificant at the 90 percent level and above. Moreover, in only six cases were retained earnings more important than credit as a source of investment.

In Table 5 only noncommercial bank credits were included in the regression. There were several notable improvements. First, the time series regression for the aggregate of seventeen sectors is much better with a higher R and a lower standard error relative to the credit

¹Lagged over 3 years to better approximate investments requiring time and a gestation period.

TABLE 4: Total Commercial Bank and Non-Bank Credit and Retained Earnings as Determinants of Industry Gross Fixed Capital Formation: 1954-64
(N = 10, df = 7, time series)
Logarithmic

Sector	Constant	Retained earnings (Std. Error)	Credit (Std. Error)	R (F Ratio)
Cross Section (N = 170)	1.92084	0.23201 (0.03406)***	0.72506 (0.03608)***	.9702 (1562.588)**
Total	5.48846	-0.02250 (0.48075)	0.62256 (0.60232)	.8937 (15.879)*
Textiles	3.01416	0.15972 (0.23973)	0.65632 (0.48944)*	.5109 (1.413)
Paper	6.10369	0.26005 (0.56373)	0.12327 (0.26791)	.2639 (0.299)
Food	2.52303	1.08038 (0.88495)*	-0.01932 (0.99956)	.7862 (6.476)**
Tobacco	5.50280	0.10302 (0.08368)	0.32043 (0.18681)*	.9542 (40.668)***
Lumber	5.26405	0.05234 (0.22448)	0.32116 (0.45033)	.6617 (3.115)*
Chemicals	5.88576	0.33524 (0.25618)*	0.18979 (0.21923)	.6957 (3.753)*
Clothing	6.69479	1.19493 (0.28957)***	-0.68047 (0.32140)**	.8967 (16.419)***
Rubber	2.77099	0.19918 (0.21761)	0.62565 (0.37088)*	.7075 (4.009)*
Printing	7.69295	0.52195 (0.22718)**	-0.25200 (0.40304)	.6392 (2.763)
Furniture	5.04543	0.52532 (0.34821)*	-0.02810 (0.36172)	.6565 (3.030)
Metals	4.97685	-0.24943 (0.18911)*	0.78949 (0.17191)***	.9302 (25.674)***
Mining	4.13253	0.14812 (0.05764)***	0.50884 (0.16706)***	.9747 (76.097)***
Electric	5.02241	0.33038 (0.26052)	0.23866 (0.29285)	.7446 (4.978)**
Plastics	2.23610	-0.25239 (0.11352)**	1.08975 (0.12672)***	.9948 (384.894)***
Machinery	1.75913	0.37622 (0.17535)**	0.61009 (0.11722)***	.9474 (35.073)***
Leather	2.55421	0.08782 (0.44117)	0.64945 (0.34279)*	.6387 (2.756)
Transport	1.27892	-0.02159 (0.08413)	0.93982 (0.23883)***	.8601 (11.371)***

*significant at the 90% level.
**significant at the 95% level.
***significant at the 99% level.

TABLE 5: Government: Credit and Retained Earnings as Determinants
of Industry Gross Fixed Capital Formation:
1954-1964 (N = 10, df = 7, time series)
Logarithmic

Industry	Constant	Retained earnings (Std. Errors)	Credit (Std. Errors)	R (f Value)
Cross Section (N = 170)	1.92084	0.23201 (0.03406) ***	0.72506 (0.03608) ***	.9702 (1562.58) ***
Total Time Series	5.70883	-0.30064 (0.45056)	0.85242 (0.49325) *	.9132 (20.084) ***
Textiles	3.84342	0.11405 (0.24912)	0.62662 (0.46155) *	.5142 (1.438)
Paper	6.06044	0.27322 (0.55309)	0.12264 (0.24968)	.2702 (0.315)
Food	2.22915	1.20866 (0.62185) *	-0.08937 (0.33897)	.7883 (6.566) **
Tobacco	5.49699	0.10846 (0.07475) *	0.31915 (0.17116) *	.9564 (42.850) ***
Lumber	5.53544	0.04599 (0.24529)	0.24529 (0.44508)	.6588 (3.067)
Chemicals	5.36304	0.15462 (0.28807)	0.40089 (0.27695) *	.7435 (4.945) **
Clothing	6.52811	1.15857 (0.32642) ***	-0.65489 (0.37709) *	.8821 (14.020) ***
Rubber	5.14485	0.31133 (0.22499)	0.23002 (0.25282)	.6216 (2.519)
Printing	7.10019	0.49893 (0.23132) **	-0.16211 (0.41128)	.6257 (2.573)
Furniture	2.51123	-0.11141 (0.34143)	0.82789 (0.40213) **	.7923 (6.747) **
Metals	6.89364	-0.32568 (0.23785)	0.69397 (0.17819) ***	.9114 (19.632) ***
Mining	5.90862	0.16937 (0.09148) *	0.28251 (0.17731) *	.9582 (44.859) ***
Electric	5.05719	0.31436 (0.25391)	0.25194 (0.27212)	.7511 (5.178) **
Plastics	2.25170	-0.26898 (0.11198) **	1.10457 (0.12462) ***	.9951 (406.76) ***
Machinery	3.06675	0.50683 (0.27497) *	0.37330 (0.14839) **	.8656 (11.956) **
Leather	.01308	0.46849 (0.33060)	0.79588 (0.29836) **	.7389 (4.811) **
Transport	1.72585	-0.01869 (0.08019)	0.90286 (0.21738) ***	.8706 (12.527) ***

* Significant at the 90% level.

** Significant at the 95% level.

*** Significant at the 99% level.

coefficient than before. Also, furniture and food industry F values become significant (though lumber does not). In ten sectors, credit has a significantly larger coefficient than does retained earnings.

The results vary substantially from sector to sector. Several questions and plausible hypotheses are:

a) The rumored heavy investments in real estate and speculative land investments are given some credence by the low value and overall lack of significance of the retained earnings coefficient.¹ Retained earnings may have been employed for working capital requirements, but it would not be expected that all retained earnings would be utilized for such purposes.

b) The better fits of the regression equations utilizing only non-commercial bank credit suggest that commercial banks may have supplied short term capital in the form of discounting of bills which could not be rolled over easily by industry.

¹ Elsewhere it has been claimed that corporations maintained substantial savings rates through self-finance and new corporate securities placements. Cf. W. Ness, p. 249. At the same time, we know that inflationary savings were often used in low output ways. For instance, Ness observes that..."Much savings went into real estate, but primarily into office buildings and luxury housing. There were no means established for channeling significant savings into low and middle class housing. The staffing of both banking and non-banking financial institutions which lent to business was weak with credit granted on the basis of security or personal connections rather than on the commercial or developmental importance of the object of the financing. The number of banks had grown so that there were many small, inefficient banks able to live on the inflationary interest rates which could be charged on loans. The finance companies which grew up to borrow and lend funds at market rates of interest made no improvement over commercial banks in the allocation of funds to productive investment. Only the lending of government tax resources and foreign aid funds by the National Economic Development Bank was based on project appraisal." Ness, p. 14. This unproductive use of funds was also reiterated to me by Davis Noguero, former head of the Central Bank, who helped innovate the industrial hospital which helped financially ailing industries which were locked into these unproductive speculations during the credit crunch in 1964-65.

c) The negative coefficients should not be taken too seriously because in every such instance the standard error term was very large, usually larger than the coefficient itself so that the anomaly of either credit or retained earnings as being negatively related to investment was not really demonstrated, except perhaps in the cases of clothing (credit), metals (retained earnings), and plastics (retained earnings).

d) If the credit coefficient was indicative of how many currently borrowed funds went to investment, and to retained earnings from profits in the following period, we can estimate the total windfalls accruing to the shareholders or owners in these industries.¹ From a calculation of windfall interest subsidies we know that subsidies from commercial banks and the monetary authorities to manufacturing industry totaled about \$cr. 144.58 billion. Of this, at the average rate, over 60 percent were invested in gross fixed capital formation. After utilizing the funds for investment, profits were earned on gross investments of approximately 18 percent on average in liquid assets and bank balances as well as inventories. One would expect that cash and liquid assets would diminish as a proportion of sales with a rising inflation. Our data show this to be true between 1954 and 1960.² After 1960; however, the ratio again rises to close to 1954 levels (between 1961 and 1965). The explanation for such behavior is consistent with the frequently told story in Brazil that commercial banks would only lend if borrowers kept larger balances with them, an important means of increasing the effective interest rate on loans. Conversely, one would expect inventories to rise relative to sales as inflation rates increased.

¹The peak was 44%, reached in 1963 and then fell in 1964. Source: Conjuntura Economica, annual series, op. cit. Sociedade Anonimas.

²The cash and liquid asset to sales ratio for all manufacturing industry--corporate sector--fell from .04 in 1955 to .035 in 1956 and then to .028 and .025 in 1960 and 1951 respectively before rising to .033 in 1961 and to .035 in 1964.

This expectation is consistent with the data: the ratio more than doubled between 1955-56 and 1963-64.¹

The use of the subsidies was primarily for gross fixed capital formation, presumably a partly desired outcome given the objectives of the government. However, funds are fungible and can be transferred within the corporate sector. These profits were apparently not utilized in gross fixed investment in the form of retained earnings.

e) The alternative uses of funds not invested in gross fixed capital formation is indeterminate. On average about 82 percent of profit was reported as retained in the corporate sector and the remainder went to owners and shareholders. Remaining amounts were presumably used either for working capital or for investment in real estate and other speculative adventures.² Data from the corporate sectors indicate that two important components of total working capital--cash deposits in banks and inventories--averaged about one-third of total credit and retained earnings over the 1954-64 period, rising from about 30 percent in 1955-56 to about 38 percent in 1962-64. Since total bank credits were on average 5 to 6 times larger than retained earnings, the unimportance of retained earnings in explaining gross fixed capital formation can be understood. Working capital requirements absorbed retained earnings and most of the commercial bank credits, whereas

¹From .041 to .10. Source: Conjuntura Economica, op. cit., corporate data.

²Other observers have commented upon the inefficiency of the inflationary induced growth process: "A critical feature of the most rapid inflationary period in Brazil was that the savings obtained were frequently allocated to uses leading to low increases in output. Inflationary savings, i.e. accumulation of currency and demand deposits, were frequently utilized to cover Federal government current account deficits or invested in infrastructure projects with little immediate return, such as construction of the new national capital in Braxilia." See note 1, page 23, for additional comments from Ness, ibid., p. 14.

loans from the monetary authorities financed on average more than 85 percent of gross fixed capital formation.

f) Working capital requirements were comprised of cash and inventories plus goods in process and funds could be shifted. Thus, speculative inventory investment was financed by subsidized credit. Profits were swelled from such funds as a transfer of public funds and those of bank depositors to owners and shareholders of subsidized industries.¹

Distributionally this subsidy-transfer of wealth was undesirable despite any positive savings effects of unknown quantities. If windfalls were saved and invested rather than immediately conserved the social benefits might be greater, but so would be the private wealth effect ultimately increasing inequality.

In immediate income terms the distribution effects were not quite so substantial. Aside from the inefficiencies connected with inventories and working capital, income was only received as a return on profit after investment and expanded operations of the firm. Only in subsequent periods were the returns expanding after recycling through the firm.

Whether the particular constellation of firms and industries chosen for favoritism was socially desirable depends upon externalities and industrialization strategies of the government. The following section attempts to get at several of the more important questions involved in actual credit policies in Brazil by setting up explicit counterfactuals in the form of simulations.

¹These profits are only 'illusory' in the Baer-Simonsen sense after banks' loans stopped expanding more rapidly than working capital (in about 1964, essentially the end of our period). See their: "Profit Illusion and Policy Making in an Inflationary Economy," Oxford Economic Papers (1965), pp. 279-290.

8. Simulations of Growth and Employment under Altered Distribution of Investable Resources

If the Brazilian government had valued the objectives of high employment and equal income distribution as primary goals along with rapid economic growth, to what extent were these goals compatible?¹ Usually they are assumed to be largely incompatible. For instance, more equal distribution since the days of Ricardo has been presumed to lower the savings rate which, though the evidence is presumptive, would reduce the growth rate and over the long run lead to even the poor being worse off.

Morley and Smith argue that this was indeed the case for Brazilian manufacturing industry. They concluded..."that the more progressive the income distribution, the slower the increase in the share of labor..."² In a similar simulation using the 1959 input-output table for Brazilian manufacturing, my findings are perfectly compatible with theirs.³ Within manufacturing, the labor-capital vectors are very similar for industries with high income elasticities of demand at both low and high income levels. This is a source of pessimism in that highly labor-intensive goods (furniture, food, leather, textiles) are not income elastic under even very egalitarian redistribution schemes.⁴ It is a source of optimism to Morley and Smith in

¹Leff mentions what may have been an important goal: "Aside from the desire to emulate the advanced countries, pressures to demonstrate competence in modern technology have been also a central motif. In these respects, the ideology has often focused more on national achievement and economic modernization than on raising per capital income." op. cit., p. 132.

²Morley and Smith, "The Effects of Changes in the Distribution of Income on Labor, Foreign Investment and Growth in Brazil," in A. Stepan.(ed.), op. cit.

³I used slightly different growth rates than did they, but got a similar result of slow employment growth at a progressive redistribution.

⁴This is partly a result of the way in which income elasticities were derived. The linear piece-wise fits are more favorable. Cf. Lopes, op. cit., p. 84, Table 3-7.

that even capital-intensive investments have not much worsened the employment situation in Brazil per se.

The major weakness of the Morley-Smith exercise is that it excludes consideration of non-industrial sectors. In what follows several simulations are run which do include the agricultural sector. Simulation one restricts itself to industry. However, it allocates credit solely on the basis of the relative labor intensity of the sector. If industry X hired Z proportion of labor in base year n, it receives Z proportion of credit. Then application of the actual 1954-64 capital-output and capital-labor ratios show the increase in employment resulting from the redistribution of credit in Tables 6 and 7.¹ Since the final bill of goods is assumed to be unchanged, exports and imports absorb all output changes. The results indicate substantial increases in employment deriving from both direct and indirect employment multipliers. Exports and imports also change dramatically. Though the unchanged bill of goods, the lack of any backward and forward linkages via input-output coefficients to agriculture, services, and other sectors make the results dubious, the employment vector generated by the credit redistribution yields a Gini coefficient of .22, one substantially lower than the then current Gini in manufacturing.

A second simulation attempts to more closely approximate feasibility. As before, credit reallocation is used as the instrument of change, but in this case a linear piece-wise consumption function is used which more closely

¹Though a massive redistribution of credit might seem totally unrealistic, at least one observer sees the power of the government here as preeminent. Cf. op. cit. N. Leff. "Through the National Development Bank and the Banco do Brasil the government determines the allocation of short and long-term investment funds, and has all the power, subtle and crude, which in Washington is attributed to 'Wall Street.'"

TABLE 6: Results of Simulation I

Simulated 1964 Production and Employment
Cr \$ in Deflated Old Cr \$ Millions

	(1) Number of Persons engaged - 1964	(2) Deflated Value of production 1964 - Cr. mil.	(3) Ratio [(1)/(2)]	(4) Simulated Value of production 1964 - deflated Cr mil.	Simulated Employment [(3) x (4)] - 1964
Textiles	342,364	57,758	5.928	92,662	549,300
Paper & Cardboard	49,981	12,067	4.142	22,405	92,802
Foodstuff	267,818	105,148	2.547	184,041	468,752
Tobacco & Matches	15,451	5,191	2.976	5,158	15,350
Lumber	76,339	9,954	7.669	154,321	1,183,488
Chemicals & Pharm.	136,957	69,557	1.969	54,576	107,460
Footwear & Clothing	94,110	14,640	6.428	62,804	403,704
Rubber	26,379	10,041	2.627	7,523	19,762
Printing & Pub.	63,693	8,137	7.828	17,723	138,736
Furniture & Utensils	50,189	6,988	7.182	419,551	3,013,215
Steel & Metal	250,578	53,398	4.693	29,794	139,823
Mining	48,791* (37,830) ^a	9,676* (7,503) ^b	5.042	6,686	33,711
Electrical & Comm.	84,911	26,476	3.207	20,099	64,457
Plastics & Petrol.	24,458	6,244	3.917	2,720	10,654
Equip. & Inst.	77,707	13,958	5.567	10,462	58,242
Leather, Hides, etc.	23,493	3,986	5.894	8,632	50,877
Transport Equip.	141,098	45,241	3.119	8,100	25,264
Total	1,763,356 ^c	456,287 ^c		1,107,257	6,375,597

*1966 data (1964 N.A.)

^a Estimated 1964 employment

^b Estimated 1964 deflated production at actual growth rates

^c 1964 Estimates Used in Totals

Source: Anuario Estatística do Brasil, 1967, p. 132, 1970, p. 162 (Employment). Production data from other working papers.

TABLE 7: Results of Simulation I

1964 Net Changes by Simulation of Sector Imports and Exports (All Credits) in Millions of Old Cr \$ Deflated

	Net Actual foreign trade (+ Exports, - imports)	-	Net Simulated foreign trade (+ Exports, - Imports)	=	Simulated Change in imports	+ Simulated Net Change in imports and exports (2) Minus (3)
Textiles	+ 8,711		+ 43,615		+ 1,612	+ 42,003
Paper & Cardboard	- 700		+ 9,638		0	+ 9,638
Foodstuff	+ 11,212		+ 90,105		+ 1,270	+ 88,835
Tobacco and Matches	+ 1,360		+ 1,327		+ 018	+ 1,309
Lumber	+ 3,034		+ 147,401		+ 11,497	+ 135,904
Chem. & Pharm.	- 5,436		- 20,417		+ 3,869	- 24,286
Footwear & Clothing	+ 385		+ 48,549		+ 2,242	+ 45,922
Rubber	- 315		- 2,833		+ 537	- 3,370
Printing & Pub.	- 82		+ 9,504		+ 746	+ 8,758
Furniture & Utensils	- 463		+ 412,100		+ 32,342	+ 377,758
Steel & Metal	- 3,855		- 27,459		+ 2,141	- 29,600
Mining	+ 5,347		+ 4,530		+ 279	+ 4,251
Electrical & Comm.	- 2,692		- 9,069		+ 707	- 9,776
Plastics & Petrol.	- 11,995		- 15,519		+ 2,941	- 18,460
Equip. & Inst.	- 6,525		- 10,021		+ 1,845	- 11,866
Leather, Hides, etc.	+ 596		+ 5,242		+ 242	+ 5,000
Transport Equip.	- 3,451		- 40,592		+ 3,167	- 43,758
Total	- 4,866		+ 646,011		+ 65,455	+ 580,546

approximates the differing income elasticities of demand for products.¹ As compared to the previous (and more typical) approach, the lower income classes' demands are given a more accurate weighting. As a consequence, lower savings rates are more than counterbalanced by the lower capital requirements of products in greater demand by lower income classes to whom income has been redistributed at improved Gini levels.² The consumption vector supports the income vector and the bill of goods shift is altered so that international trade is not dramatically changed. Importantly, these results are achieved by considering all sectors in the economy rather than manufacturing only. This is fundamental, for without the inclusion of agriculture an exactly opposite conclusion is reached regarding distribution and industrialization policy.

Specific results of the simulation are shown in Tables 8 and 9. Our innovation is to add the implied employment vector--direct and indirect--and derive its associated Gini coefficient so as to compare its results with that of the consumption vector. They match fairly closely so that one need not rely on large tax rate changes over time; tax changes need be only slight and gradual.³ Also employment was increased with fewer credits than were

¹This is constructed by F.L. de P. Lopes, "Inequality Planning in the Development Economy," Ph.D. Thesis, Harvard U., June 1972. Lopes' results are, however, not as dramatic as they might have been with a different weighting and more classes in the piece-wise function. Our own analysis of the FGV survey indicates a sharper shift in elasticities between classes.

²Ibid. Lopes for comments on savings and capital requirements.

³Lopes outlines his policy on taxes on taxes on pp. 131-140. This is not to imply that more progressive taxes would not have been in themselves desirable. The employment Gini in our simulation fell from .4928 to .4054 almost matching the consumption Gini of .35 after redistribution, assuming newly employed labor had been unemployed. Under an assumption that newly employed labor had already been employed, the employment Gini only falls from .43 to .40.

TABLE 8: Results of Simulation II
 Required Capital: Calculations in Millions Deflated \$ 1954 = 1.00, Gini = .35, .20

	Gini = .35 simulated 1964 prod.	Gini = .20 simulated 1964 prod.	Actual production 1954	Δ Production 1954-64 Gini = .35	Δ Production 1954-64 Gini = .20	Capital/ output co- efficients	Required capital 1954-64 Gini = .35	Required capital 1954-64 Gini = .20	Ave. B.I required cap. Gini = .35
Agriculture	247,701	259,253	123,014	124,687	136,239	.985	122,817	134,195	280,047
Electric Energy	9,130	8,664	4,564	4,566	4,100	3.429	15,657	14,059	35,683
Commerce	133,299	134,299	67,826	65,473	66,473	.839	54,932	55,771	125,184
Construction	83,623	71,345	41,452	42,171	29,893	.199	8,392	5,949	19,188
Services	207,998	209,359	103,008	104,990	106,351	1.724	181,003	183,349	420,364
Non-Metallic Min.	21,122	18,891	10,519	10,603	8,372	.754	7,995	6,312	18,227
Textiles	81,544	84,461	38,122	43,422	46,339	.730	31,698	33,827	72,254
Paper	12,173	12,253	6,252	5,921	6,001	.878	5,199	5,269	11,854**
Food	93,933	98,544	51,715	42,218	46,829	.626	26,428	29,315	60,287
Tobacco	5,246	5,472	2,792	2,454	2,680	.237	582	635	1,325
Wood	14,148	14,789	6,541	7,607	8,248	.878	6,679	7,242	15,229
Chemicals & Pharm.	46,381	44,182	22,927	23,454	21,255	.642	15,057	13,646	34,313
Clothing	19,143	20,419	8,753	10,390	11,666	.687	7,138	7,490	16,260
Rubber	8,306	7,217	4,302	4,005	2,915	.474	1,898	1,382	4,329
Printing	9,651	8,656	4,811	4,840	3,845	1.239	5,997	4,764	13,668
Furniture	8,905	9,308	4,117	4,788	5,191	.878	4,204	4,558	9,586
Metal	36,297	31,344	20,772	15,525	10,572	1.150	17,854	12,158	40,691
Mining	4,431	4,155	2,162	2,269	1,993	1.884	4,275	3,755	9,745
Electrical	10,811	8,516	6,014	4,797	2,502	.397	1,904	993	4,346
Plastics/Petroleum	3,639	3,392	1,885	1,754	3,204	.474	831	1,519	1,896
Machinery	9,485	6,606	4,378	5,107	2,228	.966	4,933	2,152	11,251
Leather	6,972	7,437	3,188	3,784	4,249	.687	2,600	2,919	5,922
Transport Equip.	6,701	5,184	4,778	1,923	406	.744	1,431	302	3,261
Total	1,078,639	1,073,746	190,887	887,752	882,859		529,504	530,042	1,214,910

TABLE 9: Results of Simulation II

Employment and Output Effects of Gini = .35, .20 For 1964 Cr \$ in Millions Deflated 1953 = 1.00

			(1)		(2)	(3)	(1) X (3)	(2) X (3)	1964	1964
	1954	Gini=.35	Simulated	Gini=.20	Simulated	1964 Actual	Gini=.35	Gini=.20	Actual	Actual
	Actual	growth	1964 prod.	growth	1964 prod.	labor/output	simulated	simulated	prod.	labor
	prod.	rate	Gini=.35	rate	Gini=.20	Ratios	labor 1964	labor 1964		
						(workers/mil				
						Cr \$)				
Agriculture	123,014	.0725	247,701	.0774	259,253	66.953	16,584,325	17,357,766	185,438	12,415,600
Elec. Energy	4,564	.0718	9,130	.0662	8,664	9.477*	86,525	82,109	9,933	94,135
Commerce	67,826	.0699	133,299	.0707	134,299	12.943*	1,725,289	1,738,232	117,441	1,520,039
Construction	41,452	.0727	83,623	.0558	71,345	13.899*	1,162,276	991,624	64,576	897,542
Services	103,008	.0728	207,998	.0735	209,359	46.765	9,727,026	9,790,673	188,431	8,812,000
Non.Met.Min.	10,519	.0722	21,122	.0603	18,891	6.087	128,570	114,990	23,969	145,895
Textiles	38,122	.0790	81,544	.0828	84,461	5.928	483,393	500,685	57,758	342,364
Paper	6,252	.0689	12,173	.0696	12,253	4.142	50,420	50,752	12,067	49,981
Food	51,715	.0615	93,933	.0666	98,544	2.547	239,427	250,992	105,148	267,818
Tobacco	2,792	.0651	5,246	.0696	5,472	2.697	15,565	16,235	5,191	15,451
Wood	6,541	.0802	14,148	.0850	14,789	7.669	108,884	113,417	9,954	76,339
Chem.&Pharm.	22,927	.0730	46,381	.0678	44,182	1.469	91,324	86,994	69,557	136,957
Clothing	8,753	.0814	19,143	.0884	20,419	6.428	123,051	131,253	14,640	94,110
Rubber	4,302	.0680	8,306	.0531	7,217	2.627	21,877	18,959	10,041	26,379
Printing	4,811	.0721	9,651	.0605	8,656	7.828	75,548	67,759	8,137	63,693
Furniture	4,117	.0802	8,905	.0850	9,308	7.182	63,956	66,850	6,988	50,189
Metal	20,772	.0574	36,297	.0420	31,344	4.693	170,342	147,097	53,398	250,578
Mining	2,162	.0744	4,431	.0675	4,155	5.042	22,341	20,950	7,503	37,830
Electrical	6,014	.0604	10,811	.0354	8,516	3.207	34,671	27,310	26,467	84,791
Plas./Pet.	1,885**	.0680	3,639	.0531	3,392	3.917	14,254	13,286	6,244	24,458
Machinery	4,378	.0551	7,485	.0420	6,606	5.567	41,669	36,776	13,958	77,707
Leather	3,188	.0814	6,972	.0884	7,437	5.894	41,093	43,834	3,986	23,493
Trans.Equip.	4,778	.0344	6,701	.0882	5,184	3.119	20,900	16,169	45,241	141,098
Total	541,270		1,078,639		1,073,746		31,032,489	31,684,712	1,046,075	25,648,567

*1960 L/O ratio

**Estimate

'actually' distributed during the 1954-64 decade. Two further implications are: First, the element of windfall subsidy to owners and shareholders in our simulation was much less than the 'actual' which would have further improved the distribution of wealth and income. Second, employment and improved income distribution could have been achieved with a far lesser expansion of both credit and the government's real deficit. Hence, the inflation rate could have been lower which would, in turn, lower the subsidy and recycle through profit and distribution. The deficit and inflation could have been perhaps reduced by as much as 25 percent each (Tables 10, 11).

The data and parameters imply that there was no inherent contradiction in employment growth, much greater equality of income, rapid GNP growth, and consistency between sectors implied by input-output relations. The government's misconceived notions which regarded such changes as impossible to achieve must be viewed with skepticism. This does not mean that even if policymakers were convinced of its feasibility, however, that such changes would be adopted. The penchant for the modern, capital-intensive ideology has already been mentioned as opposed to per capita income growth. Moreover, we should not glibly accept the notion that powerful pressure groups in the favored sectors could have assured the same historical result. One student of policy making in Brazil states:

Private sector interest groups were unable to prevent the vast expansion in the public sector's economic role. They also exercised very little influence in the way the government allocated the resources it brought under its control. Most of these went to the public sector itself. In instances where private firms did benefit, these were 'basic industries' within the private sector, e.g., metallurgy, cement, chemicals--which fit in with the government's own priorities. The older, well-established industries such as textiles and food processing, which might have

TABLE 10: Returned Earnings and Credits Available for Capital Formation Calculation and Needed Credit Calculations and Excess Credit Calculations (In Millions of 1953 Cruzeiros) Brazil I Capital/Output

	(1) Total Returned Earnings 1954-1964	(2) % of R.E. used for Fixed Capital Formation (Regres- sion Results)	(A) (1)x(2) R.E. Available for Capital Formation	(3) Total Credits 1954-1964	(4) % of Credits used for Fixed Capital Formation (Regres- sion Results)	(B) (3)x(4) Credits Available for Capital Formation	(5) Required Capital Gini = .35	(6) Required Capital Gini = .20	(5) - (A) Needed Credits Gini = .35	(6) - (A) Needed Credits Gini = .20
1. Agriculture	98832	.232 ¹	22929	83824	.725 ¹	60772	122817	134195	99888	111266
2. Electric Energy	3955	.232 ¹	918	5174	.725 ¹	3751	15657	14059	14739	13141
3. Commerce	272084	.232 ¹	63123	110450	.725 ¹	80076	54932	55771	-8191	-7352
4. Construction	4288	.232 ¹	995	167786	.725 ¹	121645	8392	5949	7397	4954
5. Services	204979	.232 ¹	47555	271518	.725 ¹	196850	342057	346492	294502	298937
6. Non-Metallic Minerals	3092	.232 ¹	717	4807	.725 ¹	3485	7995	6312	7278	5595
7. Textiles	22574	.160	3612	44677	.636	29308	31698	33827	28086	30215
8. Paper	3023	.280	786	6176	.123	760	5199	5269	4413	4483
9. Food	27619	1.00	27619	63801	-0-	-0-	26428	29315	-1191	1696
10. Tobacco	5364	-.103	552	4062	-.320	1300	582	635	30	83
11. Wood	4743	.052	247	6474	-.321	2078	6679	7242	6432	6995
12. Chemicals and Pharmaceuticals	14065	.335	4712	13868	.190	6435	15057	13646	10345	8934
13. Clothing	8250	1.00	8250	11000	-0-	-0-	7138	7490	-1112	-760
14. Rubber	4886	.199	977	7648	.625	4780	1898	1382	926	410
15. Printing	2740	.322	1430	12805	-0-	-0-	5997	4764	4567	3334
16. Furniture	1643	.525	862	3568	-0-	-0-	4204	4558	3342	3696
17. Metal	2929 ¹	-0-	-7-	46200	.789	36452	17854	12158	17854	12158
18. Mining	14851	.146	2198	15578	.509	7929	4275	3755	2077	1557
19. Electrical	7017	.330	2315	19206	.239	4590	1904	993	-412	-1323
20. Plastics and Petroleum	43778	-0-	-0-	70194	1.00	70194	831	1519	831	1519
21. Machinery	9114	.374	3427	26189	.61	15975	4933	2152	1506	1275
22. Leather	1852	.088	163	3324	.609	2290	2600	2919	2437	2756
23. Transport Equipment	14265	-0-	-0-	66808	.940	62500	1431	302	1431	302
Total	802311		193393	1131703		711470	690558	693185	497141	499802

Actual Credits minus Needed Credits:
Total Excess Credits
Gini = 3.5 Gini = .20
Cr. 214,329 billion Cr. 202,233 billion
As % of Total: (30.12) (29.82)

Excess credits as % of Federal Deficit:
(99%) (97.7%)

¹Total cross section 2's are used since individual sector data was not available.

Source: Computed from data in *Contuntura Economica*, Relatorios, and Census Data of 1960. Lopes, op. cit. was the source of capital co-efficients

**TABLE 11: Needed Credit and Excess Credits Available Calculations,
Brazil II Capital/Output Ratios
(in millions of 1953 cr.)**

	(A) Change in production 1954-1964 Gini=.35	(B) Change in production 1954-1964 Gini=.20	(C) Brazil II capital output ratio	Actual added capital required	(1) (A)x(C) Required capital 1954-1964 Gini=.35	(2) (B)x(C) Required capital 1954-1964 Gini=.20	(3) Retained earnings available for capital formation	(1)-(3) needed credits Gini=.33	(2)-(3) needed credits Gini=.20	Actual credits available for capital formation (using reg.coef.)	
1. Agriculture	124687	136239	1.127	184537	140522	153541	+13	22929	117593	130612	60772
2. Electric Energy	4566	4100	3.921	23515	17903	16076	- 2	918	16985	15158	3751
3. Commerce	65473	66473	.959	82496	62789	63748	+ 1	63123	- 334	625	80076
4. Construction	42171	29893	.228	12651	9615	6816	- 3	995	8620	5821	121645
5. Services	104990	106351	3.358*	438333*	352556	357127	+ .5	47555	305001	309572	196850
6. Non-Metallic Minerals	10603	8372	1.233	17177	13073	10323	- 3	717	12356	9606	3485
7. Textiles	43422	46339	.890	50804	34394	41242	+ 7	3612	30782	37630	29308
8. Paper	5921	6001	.875	6809	5181	5251	+ .7	786	4395	4465	760
9. Food	42218	46829	.639	35463	26977	29924	+ 3	27619	- 642	2305	- 0 -
10. Tobacco	2454	2680	.472	1521	1158	1265	+ 1	552	606	713	1300
11. Wood	7607	8248	.875	8748	6656	7217	+ 6	242	6409	6970	2078
12. Chemicals and Pharmaceutics	23454	21255	.852	26268	19983	18109	- 2	4712	15271	13397	6435
13. Clothing	10390	11666	.495	6754	5143	5775	+ 6	8250	-3107	-2475	- 0 -
14. Rubber	4005	2915	.449	2363	1798	1309	- 5	972	826	337	4780
15. Printing	4840	3845	1.043	6631	5048	4010	- 1	1430	3618	2580	- 0 -
16. Furniture	4788	5191	.875	5506	4190	4542	+ 4	862	3328	3680	- 0 -
17. Metal	15525	10572	.967	19717	15013	10223	- 5	- 0 -	15013	10223	36452
18. Mining	2269	1993	2.154	0421	4887	4293	- .6	2198	2689	2095	7929
19. Electrical	4797	2502	.807	5085	3871	2019	- 2	2316	1555	- 297	4590
20. Plastics and Petroleum	1754	3204	.449	1035	788	1438	+ .7	- 0 -	788	1438	70194
21. Machinery	5107	2228	1.401	9397	7155	3121	- 4	3427	3728	- 306	15975
22. Leather	3784	4249	.495	2460	1873	2103	+ 3	163	1710	1940	2290
23. Transport Equipment	1923	406	1.264	3152	2431	513	- 2	- 0 -	2431	513	62800
TOTAL	887,752	882,859		93,137*	743,004	749,985		193,383	549,621	556,602	711,470

Excess Credits Equal: ACTUAL CREDITS minus NEEDED CREDITS:

C Gini = .35 Gini = .20
Cr 161.859 bil. Cr. 154.868

As % of total: (22.7%) (21.3%)
As % of Federal Deficit (72.7%) (70.2%)

Note: Services coefficient must be at least 3.848 for Actual Credits= Needed Credits at Gini=.35.
Total 621,542 using Services c/o ratio 1.15, Needed Credits = 428,154.

* From Services and Transport and Communications Ratios/2 since Conjuntural Data include both.

SOURCE: Ibid., Table 10 and Lopes, op. cit.

been expected to constitute 'vested industries,' received almost nothing.¹

There are, of course, other potentially valid arguments for the capital-intensive, import-substituting, basic industries strategy such as externalities, economies of scale, and technological change. Yet by eliminating or weakening the possibly spurious arguments against achieving more equality, a greater burden is clearly thrown upon remaining obstacles which may prove to be unable to carry the burden placed upon them.

9. Conclusion

Some important characterizations of the inflationary financing of the Brazilian industrialization have been empirically verified. Others were not. Subsidies were very large. A few industries dominated the credit market. Contrary to previous observers these were not all basic industries. Factor incomes were twisted toward upper income groups via higher returns on investment, windfall subsidies, and high wage-skill components in production. As production was biased toward the capital-intensive, so was consumption biased similarly (higher income recipients had higher income elasticities for such products). Import substitution was capital-intensive. Capital was substantially underpriced, whereas labor was seriously overpriced resulting in the mal-apportionment of both factors.

¹Leff, op. cit., p. 53 (mimeo). Note that Leff is mistaken in stating that traditional industries got nothing. Textiles, as we have seen, had very ample financing though it was a stagnant sector. Apparently it did carry weight in policy circles. Moreover, public sectors were exclusively basic social overhead with B.N.D.E. resources going to transportation (29%), steel (36%), and electricity (32%), totaling 98% of total B.N.D.E. resources between 1952 and 1962. As well, foreign commercial credits were mainly reserved for basic industry: electricity (16%), steel (16%), autos (23%), chemicals and metals (31%), railways, petroleum, and airlines (13%), for a total of U.S. \$2.18 bil., though these were not exclusively social overhead capital industries.

Credit was one of the prime instruments in obtaining the rapid growth during the period. Interest rates rendered negative by increasing rates of inflation led to huge transfers of income from the hands of the public via the monetary authorities to favored industries. Similarly, funds were transferred to firms from commercial banks at the expense of general depositors and the public. Output expansion was encouraged, including the capital-intensive and basic industries. Yet, other traditional industries--textiles--received disproportionate shares and yet remained stagnant, as did mining, equipment, and instrumentation.

There were other inefficiencies as well. Liquid working capital was subsidized as was inventory speculation. And given the fungibility of credit, so were speculative investments in land and urban building. Yet the regression results surprisingly show credit of the monetary authorities were fully used for fixed capital investments.

The simulations indicated that dramatic changes in employment and income distribution were consistent with the income elasticities and savings rates at even higher growth rates. However, real shifts toward less capital-intensive, less durable, and less luxury goods production were required. And also toward less modern industry. This would undoubtedly not be seen as ultimately beneficial by the policymaking elites. Yet a compromise between the two strategies would have seemed far preferable to what did occur. Both economic and political stabilities might have been greatly enhanced by a strategy for greater employment and income equality.

Neither the structure-lock model nor the high growth with increasing inequality model yields a completely accurate portrayal of the period prior to 1964. The structure lock explanation overemphasized lack of effective demand to the exclusion of other factors while also incorrectly stressing

capital-labor differences and industry which do not exist when both direct and indirect labor is included. But the alternative model ignores the substantial gains which could be forthcoming from credit and investment reallocation to the non-industrial sectors.

APPENDIX I

METHODOLOGY FOR CREDIT SIMULATIONS

PURPOSE:

The purpose is to allocate non-bank credit to the 23 sectors under observation according to the gross fixed capital requirements generated by simulated sector growth rates determined by the Gini coefficients for consumption at Gini = .35 and .20. The period under study is 1954 to 1964. The required capital for the simulations is assumed to be the capital needed to account for the difference in output of the simulated 1964 production and the initial 1954 actual production. It is assumed that the required capital can come from either retained earnings or non-bank credit. All commercial bank credit data is in millions of 1953 cruzeiros.

Step 1.

Production data for the 23 sectors was obtained for 1954. Most of the output data was obtained directly from the Anuario Estatístico do Brasil or estimated from indices of production calculated by the Fundação Getúlio Vargas and published in Revista Brasileira de Economia, Contas Nacionais do Brasil, March, various years.

Step 2.

The sector growth rates for Gini consumption coefficients .35 and .20 were applied to the base 1954 production and compounded through 1964. Two simulated 1964 production figures were obtained, one for Gini = .35 and one for Gini = .20.

METHODOLOGY P. 2

Step 3.

The increase in production from 1954 to the simulated 1964 output for both Ginis was obtained.

Step 4.

The capital required for the increase in production is then estimated for each sector for both Ginis by use of capital/output ratios.

Step 5.

The actual amounts of retained earnings and non-bank credits for the period 1954 through 1964 were obtained from various issues of Conjuntura Economica. Credit to the agricultural sector was obtained from "Agricultural Credit in Brazil," Judith Tendler, A.I.D., Oct. 1969. Since no retained earnings data was available for the agricultural sector, this was estimated by finding the actual capital required for agriculture (at actual 1964 production), and subtracting the total available credit from the required agricultural capital.

Step 6.

Since the retained earnings and non-bank credit data in Conjuntura only includes the corporate sector, an estimation of non-corporate sector retained earnings and non-bank credits was made as follows:

First, the ratio of corporate firms/total firms was found. This was done using average data computed from the 1960 Industrial Census and the 1959 Census of Commerce and Services for 7 cities. Then, corporate sector retained earnings and non-bank credit were divided by the corporate/total firms ratio for each sector to obtain a total retained earnings and non-bank credit estimate.

METHODOLOGY P. 3

Second, it was assumed that the non-corporate sector was not as successful as the corporate firms in obtaining non-bank credits. In the services and commerce sectors, where almost all the firms were non-corporate and presumably small, the assumption was made that the non-corporate sector obtained 10% of the credits proportionate to the corporate sector (e.g., if the corporate sector = 50% of all firms and 100 mil cr. total credits, then the non-corporate sector = 50% firms and 10 mil cr. total credits). For the remaining 21 sectors it was assumed that the non-corporate sector obtained 50% of the corporate sector credits.

Third, depreciation of capital for the 10 year span must be accounted for. Assuming 10 year straight line depreciation, this reduces the credits available by approximately 50%. Since retained earnings are calculated after taking depreciation into account, this adjustment was not necessary for the retained earnings. However, retained earnings for the non-corporate sector were estimated in the same manner as non-bank credits, except that no special adjustment was made for the commerce and services sectors.

Step 7.

The sectoral regression coefficients of retained earnings and non-bank credits as of fixed capital formation in Table V were then used. The available retained earnings and non-bank credits were adjusted to their actual utilization in contributing towards fixed capital formation. Negative coefficients were assumed to be zero in the several such anomalous cases.

Step 8.

For each sector, the retained earnings available for fixed capital formation were subtracted from the required capital necessary for both Gini = .35 and Gini = .20. The resulting figure was the needed credit for each sector for the simulated change in production from 1954-1964 necessary for producing consumption at the respective Gini levels.

PROGRAM OF DEVELOPMENT STUDIES
Discussion Papers

43. "Income Distribution Consequences of Agricultural Price Supports in Colombia" (1973), 32 pp., Wayne R. Thirsk.
44. "Factor Intensity of Consumption Patterns, Income Distribution and Employment Growth in Pakistan" (1973), 34 pp., Ronald Soligo.
45. "Industrialization in Malaysia: A Penang Micro-Study" (1973), 42 pp., Fred R. von der Mehden.
46. "Short-run Effects of Income Distribution on Some Macro-economic Variables: The Case of Turkey" (1973), 33 pp., Tuncay M. Sunman.
47. "The Inequity of Taxing Iniquity: A Plea for Reduced Sumptuary Taxes in Developing Countries" (1973), 51 pp., C.E. McLure, Jr. & W.R. Thirsk.
48. "A Numerical Exposition of the Harberger Model of Tax and Expenditure Incidence" (1973), 51 pp., C.E. McLure, Jr. and W.R. Thirsk.
49. "Public Goods and Income Distribution: An Explanatory Comment" (1974), 17 pp., C.E. McLure, Jr.
50. "Education and Modernization in Zaire: A Case Study" (1974), 29 pp., Gaston V. Rimlinger.
51. "Rural Credit and Income Distribution in Colombia" (1974), 26 pp., Wayne R. Thirsk.
52. "The Short-run Burden of Taxes on the Turkish Agriculture in the Sixties, (1974), 41 pp., Marian Krzyzaniak and Süleyman Ozmucur.
53. "Some Aspects of Efficiency and Income Distribution in Colombian Land Reform" (1974), 25 pp., Wayne R. Thirsk.
54. "Income Distribution and Colombian Rural Education" (1974), 22 pp., Wayne R. Thirsk.
55. "The Within-Nation Distribution of Public Expenditures and Services: A Two-Nation Analysis" (1974), 19 pp., Kim Q. Hill.
56. "Managerial Discretion and the Choice of Technology by Multinational Firms in Brazil" (1974), 37 pp., Samuel A. Morley & Gordon W. Smith.
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60. "Inflationary Financing, Industrial Expansion and the Gains from Development in Brazil" (1975), 43 pp., Donald L. Huddle.

NOTE: Discussion Papers are available upon request to individual scholars and researchers and libraries of educational institutions.