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EFFECTS OF INDEXATION ON THE  
BRAZILIAN CAPITAL MARKET

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## EFFECTS OF INDEXATION ON THE BRAZILIAN CAPITAL MARKET

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### I. INTRODUCTION

This paper outlines some issues on indexation of financial instruments in the Brazilian capital market. Today inflation is clearly a worldwide phenomenon, plaguing, not only Latin America, but also Western European countries and the United States. Brazil is one of the countries--as has been publicized--that has learned "to live with inflation". Her inflationary process is probably one of the longest one we know, with periods of unstable inflation, few periods with stable prices, and still fewer with declining prices <sup>1/</sup>. After 1964, several changes have been introduced in the Brazilian economy. Monetary correction or "indexation" was one of the principal changes and has been widely applied; rents, wages, mortgage and real estate financing, working and fixed capital, interest rates, prices of public services, personal income taxes, and exchange rate have their nominal values periodically "corrected" for inflation. On this occasion, we shall restrict our attention to the role, effects and implications of indexation on the credit and capital markets in Brazil.

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<sup>\*/</sup> Research Institute of IPEA, Brazil. The views expressed in this paper are those of the author and may not represent the opinions of INPES/IPEA, nor of the Brazilian Government. I am grateful to Maria C Tavares Negreiros for expertise assistance.

<sup>1/</sup> Tentative accounts of the behavior of Brazilian prices are in Mircea Buescu, 300 Anos de Inflação (Rio de Janeiro, APEC, 1973) and C.R. Contador and C.L. Haddad, "Real Income, Money and Prices: The Brazilian Experience; 1861-1970", presented at the Latin America Workshop, University of Chicago, mimeo, 1972.

Several aspects will be discussed, and although I do not expect to have final answers to such a controversial issue, it may be useful to lay out problems, and hope that further discussions will help us to shed more lights. I believe that most of the questions focused here will be familiar to other countries. Although different answers or different points of view may exist I suppose that other countries either facing long or recent inflationary pressures may learn from the Brazilian experience on inflation and indexation.

In the discussion we shall not bother ourselves with questions such as the causes of inflation--whatever they may be--although there seems to be no question as to the primacy of excess of money expansion as the single most important determinate of inflation in Brazil. Of course, I do not claim that other factors cannot affect the rate of increase in prices. Bad wheather conditions, for instance, clearly lower agricultural output and thus raise consumer and industrial prices. But the difference between the two sources of inflation mentioned below, excess supply of money or droughts, lays mostly on the predictive aspect. The effects of an excess supply of money are more or less predicted and distributed for several years, while climate effects on agricultural output are unforeseen, and mostly last just one year. Nonetheless both contribute to the rising of prices. Sometimes is pointed out that indexation favors "cost-push inflation" and as such may be inconsistent with anti-inflationary policies. For keeping the paper on reasonable bounds we shall deal only briefly with such questions.

The paper's basic organization may be outlined as follows. Next section summarizes briefly the general effects of inflation on the economy and particularly on the capital and credit markets. The section deals mostly with the direct and indirect effects of inflation prior to the indexation mechanism setting up, and along it several questions will emerge: if indexation is to be viewed as a substitute for free market mechanisms how could the negative

/interest rates

interest rates persist for so long time in Brazil? if a premium for inflation expectations is a natural market response why have nominal rates failed to keep pace with inflation? and several others.

Section III concentrates on the impacts of indexation on voluntary savings, on inflation, on management of monetary policy, and in particular on financial instruments and on the credit market. The main financial instruments in the Brazilian capital market will be roughly classified into three groups from the point of view of "indexation", (a) ex-ante indexed, such as Time Deposits; and private bills of exchange ("Letras de Cambio"); (b) ex-post indexed, such as Government Bonds ("Obrigações Reajustáveis do Tesouro Nacional") and Savings Deposits ("Cadernetas de Poupança"), and (c) non-indexed instruments, such as currency, demand deposits, stocks and shares of mutual funds. We shall analyse the empirical response of each group to inflation and other variables, whether "indexing" can be a good substitute for inflation expectations; and the response of the composition of financial assets to inflation. The supply of short- and long-term credit and the credit to the private and public sectors are said to be very sensitive to inflation expectations. Thus the ratio of credit to private and public sector and of short- to long-term credit may reflect the major changes on market behavior introduced by the indexation scheme. Several hypotheses will be tested.

Section IV summarizes the conclusions and discusses briefly some aspects for implementing indexation in other inflationary economies.

## II. THE GENERAL EFFECTS OF INFLATION

Let us assume an inflationary economy, with the usual distortions of price and interest rate controls, government deficits, fixed exchange rate and a relatively small capital market. Most of Latin American countries fulfill these conditions, and the first three characteristics are currently becoming quite popular even in industrialized economies. Therefore, although the my remarks are directed to a developing economy, the discussion may also be appropriated for developed ones. As a starting point, we assume that there is no indexation created or guaranteed by government. Later on we shall introduce indexing into our reasoning and discuss its effects.

The longer one lives with inflation, the more one tends to learn about it. If we have to live with inflation and cannot eliminate it, the best thing to do is to adapt ourselves to the inflationary environment. This is the lesson the Latin American countries, in particular Brazil have learned. Besides the longer one lives with inflation, the more one tends to learn about it. However, as with old acquaintance, those economies accustomed to inflation tend to forgive its defects and pervasive effects. The main effects of inflation are three-fold; (i) the so-called "cash-balance-cost-of inflation" effect; (ii) the wealth and income redistributitional effects; and (iii) the allocative effects. We shall discuss each of them and try to assess their importance. This discussion may help to understand the importance and effectiveness of indexation in Latin American context.

The "cash-balance-cost-of inflation" was popularized by Bailey <sup>1/</sup> and Friedman <sup>2/</sup>. They measure the welfare loss of inflation by the

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<sup>1/</sup> Martin Bailey, "The Welfare Cost of Inflationary Finance", Journal of Political Economy, vol. 64, April 1956, pp. 93-110.

<sup>2/</sup> Milton Friedman, "The Optimum Quantity of Money", in The Optimum Quantity of Money and Other Essays, (Chicago, Aldine Publishing Co., 1969).

area change under the demand for money function. Indexation cannot avoid such a welfare cost of inflation, unless the definition of money includes only non-fiat money and indexed deposits. This welfare cost of inflation is the most abstract, and besides the method of measuring it suggested by Bailey and Friedman has been criticized. So we may remove it from our concerns.

In considering the redistributational effects of inflation, before obtaining definite answers we need be able to decompose the rate of inflation into its anticipated and unanticipated elements and to analyse other issues such as lags in wages, rents, and interest rate adjustments. The distinction between anticipated and unanticipated inflation is important because most of the redistributational effects lay on the unanticipated inflation. Further, it is necessary to consider how expectations are differently formed in the economy. Some individuals may expect inflation to fall, others may expect it to rise, such that the average expectations of the economy as a whole may be different from those of every person in the economy <sup>1/</sup>. The task is complex and we shall focus very briefly some aspects of redistributational effects related to indexation.

The redistributational effects of inflation work mainly through two channels. First, if interest rate expectations are imperfect and debts are stated in fixed monetary terms, there is a redistribution of income from "net" creditors to "net" debtors. We shall return to this point later on when discussing the impact of inflation and indexation on firms and on the stock market. Second, real purchasing

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<sup>1/</sup> See Reuben A. Kessel and Armen A. Alchian, "Effects of Inflation", Journal of Political Economy, vol. 70, December 1962, pp. 521-537; G.L. Bach and Albert Ando, "The Redistributational Effects on Inflation", The Review of Economics and Statistics, vol. 49, February 1967; E.D. Budd and David F. Seiders, "The Impact of Inflation on the Distribution of Income and Wealth", American Economic Review, vol. 51, May 1961.

power is redistributed from those whose incomes lag behind the prices they pay to those whose incomes rise more rapidly relative to the price they pay. In general, wages lag behind prices and so inflation is said to hurt workers and to favor entrepreneurs and "capitalists" <sup>1/</sup>. However, before a definite answer we need know whether wage readjustments include inflation expectations and if the unemployment rate is (temporarily) lowered with inflation, as suggested by the Phillip curve hypothesis.

The third and most important impact of inflation upon the economy comes from the misallocation of resources. It is likely that both the level and the rate of growth of real output be lower under inflationary conditions than under stable prices, and still lower under unstable inflationary pressures. Indeed, the possibility of inflation lowering the level of real output has been seeing mainly in the realm of the academic world. If the demand for real cash balances is negative dependent on inflation expectations, and if money is indeed unlike the conventional factors of production, one is forced to accept, at least at a theoretical level, that real output decreases with inflation expectations <sup>2/</sup>. This reasoning is still controversial, and most economists agree that the negative effect of lower real cash balances on the level of real output is negligible if not nil. Besides, there are theoretical difficulties in identifying real balances as a factor of production.

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<sup>1/</sup> For criticisms of the effects of the Brazilian indexation policy upon income redistribution see Albert Fishlow, "Indexing Brazilian Style: Inflation without Tears?" Brooking Papers on Economics Activity, 1974, n<sup>o</sup> 1, pp. 261-282.

<sup>2/</sup> See, for instance, D. Levhari & D. Patinkin, "The Role of Money in a Simple Growth Model", American Economic Review, vol. 60, March 1970, pp. 44-63; J.R. Moroney, "The Current State of Money and Production Theory", American Economic Review, Papers and Proceedings, vol. 62, May 1972, pp. 335-343; M.M. Miller and D. Orr, "A Model of the Demand for Money by Firms", Quarterly Journal of Economics, vol. 80, August 1966, pp. 413-435; Stanley Fischer, "Money and the Production Function", Economic Inquiry, vol. 12, December 1974, pp. 517-533.

/However, there

However, there is no need to resort to this kind of reasoning. During inflationary periods, the functioning of the price system is severely distorted in several ways with the imposition of price controls, interest rate ceiling, rationing, quotas, fixed exchange rates, subsidies, and so on. The measures designed to suppress the effects of inflation by controlling prices and supply of key goods and services tend ultimately to disincentive the activity in the affected markets. Thus, the level of real output is certainly lower with inflation because of the misallocation of resources <sup>1/</sup>.

Although one may find lines of reasoning such as the "forced saving school", most of the academic talks about inflation have relatively little to do with economic growth. Nevertheless Latin American experience seems to point some possible channels of influence of inflation on growth. The effects of inflation upon the rate of growth of real product would fall into two quite separate channels; the effects on the rate of technical innovations and the effects on the capital and credit market. A simple neoclassical growth model shows that the rate of growth of real income depends upon the growth of labor force, the share of savings to income, technological progress, and so on. There is no reason to believe that inflation affects the growth of labor force. But, inflation can certainly decrease the ratio of investment to income, and the rate of technological progress. We shall deal with these two possibilities.

In inflationary environments, in particular if inflation is very unstable itself, individuals and managers have a much harder time

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<sup>1/</sup> For accounts of effects of inflation in Latin America, see the following papers by Arnold C. Harberger, "The Inflation Problem in Latin America", mimeo, University of Chicago, February 1966; and "Some Note on Inflation", in W. Baer and L. Kerstenetzky (eds.) Inflation and Growth in Latin America, (New Haven, Yale University Press, 1964).



trying to form satisfactory expectations about future relative prices than in one of a stable price level or even a stable and low rate of inflation. Prices do not adjust at the same pace. Some will adjust somewhat slower than others, and uncertainty about future prices leads economic decisions-makers to avoid some project with relatively high social returns. Hence, a decision to introduce a cost-saving innovation which, let say, could reduce costs by 5 per cent, cannot have the same appeal for a profit maximizing manager when inflation is 40 per cent or 50 per cent per year than it would have if prices were stable. Besides, the higher the rate of inflation, higher the uncertainty. At current high rates of inflation, for instance 30 per cent per year, the inflation next year may be either 10 per cent or over 50 per cent. Past or present may not be relevant for forming expectations of inflation when it is very high. In almost all cases, expectations of relative prices turn out to be frustrated, and the risk introduced into economic decision-making is bound to make individuals, managers and policy-makers disdain or be less willing to undertake cost-saving innovations. As a consequence the rate of economic progress declines and with it the growth rate of real income. For a given period the contribution of economic progress to the economic growth may be very small, but the accumulated foregone contribution of economic progress may prove to be substantial after several years.

Another effect of uncertainty introduced by unstable inflation is that portfolio decisions are likely to be quite different than if a steady rate of inflation were anticipated. The Latin American experience shows that it is when the rate of inflation fluctuates considerably that individuals and firms are encouraged to inventory investment and real estate speculation, and not only the existence of inflation per se. When people face steady inflation, even without indexation schemes, investment choices are distorted against liquid assets such as currency holdings and bank deposits, but other assets such as stocks may be favoured.

/The second

The second and most important way of inflation affecting economic growth is through the capital and credit markets. Inflationary processes cause disincentives on voluntary savings by individuals and firms. Empirical works tend to support the hypothesis that private savings are quite inelastic to interest rates. However, when inflation reaches high levels such that real interest rates become negative, voluntary private savings tend to become less inelastic. This results from the fact that at positive real interest rates, no matter how low they are, any savings held from this year to next end up rising or at most keeping constant their real value. Evidence shows that at positive real interest rates--which means that inflation cannot be higher than 4 or 6 per cent per year--the savings function is very inelastic to return, and its determinants must be found elsewhere such as real income and wealth. On the other hand when the rate of inflation is higher than, let us say 6 per cent, real interest rates become negative. Any amount saved and held from this year to next will end up having less purchasing power than it had when it was saved. Therefore it should not be surprising that voluntary savings decline very quickly during inflationary periods. If private savings are lower, government must increase its savings for keeping constant the rate of total savings to real income. But in most cases aggregated savings decline in real terms at very high rates of inflation, and a lower savings ratio means a lower rate of growth of real income. Of course if there were any kind of protection against loss in value due to inflation the story might be different, since indexation would tend to raise real interest rates to positive values.

Besides total savings the Credit market also suffers from inflation. The effects of inflation upon credit are two-fold; in the level and in the allocation between short- and long-term credit. The Brazilian experience is an excellent example of both effects. Figure 1 displays the movements of total credit in real terms and the annual rate of inflation, measured by the wholesale

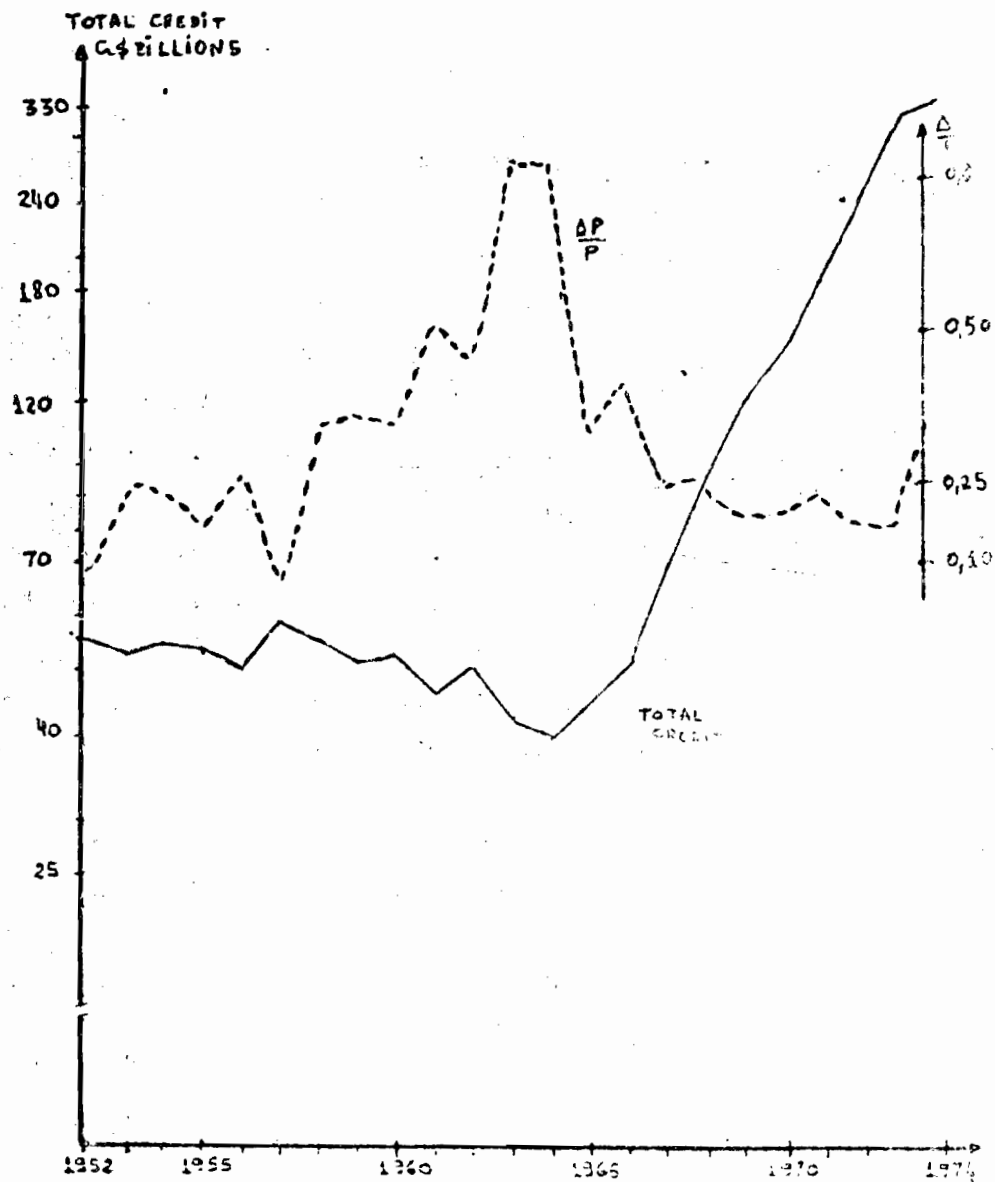


Figure 1  
Inflation and Credit in Brazil  
Cr\$ Billions at 1974 Prices

price index. Table 1 summarizes the distribution of credit into short- and long-terms and their allocation into private and public sector. Although inflation alone cannot explain all the fluctuations in real credit, the figure shows that rising rates of inflation tends to be associated with declining real credit. The average rate of inflation in the period 1952-1955 was approximately 19 per cent, while total credit averaged Cr\$ 52 billions at 1974 prices. Ten years later, in 1962-65, the average rate of inflation reached more than 60 per cent, and total real credit declined to less than Cr\$ 50 billions, despite the fact that real income nearly doubled. As a result rationing of credit had become quite familiar, with serious consequences on the allocation of resources.

Figures 2, 3 and 4 summarize the effect of inflation upon the distribution of credit into short- and long-terms. For our purposes short-term credit is restrict to loans not exceeding one year. Clearly, the figures show that the Brazilian Credit market is characterized by short-term operations. More than 70 per cent of total credit is concentrated upon short-term loans, directed mostly to the private sector. As we mentioned before, rising inflation increases uncertainty about future rates. If both potential lenders and borrowers are uncertain about future inflation and if there is no indexation, short-term loans are preferred to long-term loans. Therefore, the ratio of short- to long-term credit will tend to rise when inflation rises and to fall when inflation declines. Figure 2 confirms this reasoning in Brazil.

A second piece of evidence of inflation effects against the long-term capital market is provided by the stock market fluctuations. Movements of stock prices reflect relative pressures of supply and demand in the "secondary" market. Additional long-term corporate capital is obtained at the "primary market", a market which deals with new issues for financing equity investments. However, it is the existence and the investors' confidence upon the "secondary market", where the stock of existing shares are traded, that

/Table 1

However, one should expect that in the absence of the usury law restrictions nominal interest rates and inflation would move together. After 1933, nominal interest rates were not completely free to move upwards, and so they could not reflect inflation expectations. Hence the data after the usury law are not appropriate for testing inflation expectations effects upon nominal rates. But before 1933 market interest rates should reflect the average level of inflation. Table 2 lists the maximum and minimum levels of nominal interest rates on government bonds and inflation. If the capital market were competitive we should expect that the returns on treasury bonds reflect the over-all movements of interest rates. Surprisingly, nominal interest rates range from 6.5 per cent to 9.2 per cent for treasury bonds issued in 1921, and from 5.3 per cent to 8.3 per cent for other bonds, while inflation reached up to 17 per cent before 1933 and almost 40 per cent after 1933! Figure 5 compares the maximum rate of interest on government bonds issued in 1921, the rate of inflation and the interest rate ceiling imposed by the usury laws of 1933. Except during periods with relatively low rates of inflation, such as 1925-1933, and, after the usury law, in 1935, 1938, 1940, and 1948-49, real interest rates were negative. Summing up, the usury law alone cannot explain negative interest rates in Brazil, because even before its imposition they were common when inflation pressures were high. The puzzle is why asset-holders did not realize their loss in purchase power and demand higher nominal interest rates!

Since during the whole period the market interest rates on treasury bonds were well below the 12 per cent ceiling it may appear that the usury law was unnecessary. However, one of the problems of interest rate ceiling is that it does not discriminate among risky activities. The risk free interest rate was probably equal or nearly the government bond interest rate, but it is quite possible that lenders would charge rates higher than 12 per cent for loans to risky projects or risky borrowers. If so, the usury law had the effect of distorting credit against risky projects, since it did not allow any risk premium component.

/Table 2

TABLE 2

## INFLATION AND NOMINAL INTEREST RATES ON GOVERNMENT BONDS

PERIOD	GOVERNMENT BONDS		SEVERAL GOVERNMENT BILLS		INFLATION
	Minimum Rate	Maximum Rate	Minimum Rate	Maximum Rate	
1920	-	-	5.83	5.99	10.0
1921	-	-	5.92	6.76	2.6
1922	7.00	7.33	6.27	6.94	9.5
1923	7.18	7.47	6.58	6.99	10.2
1924	7.26	7.73	7.04	7.73	16.6
1925	7.61	8.43	7.70	8.12	6.9
1926	7.73	8.25	7.70	8.16	2.7
1927	7.62	8.31	7.52	8.28	2.7
1928	7.01	7.65	6.31	7.18	- 1.3
1929	6.84	7.29	6.69	7.72	- 8.4
1930	7.09	7.28	6.85	7.18	- 1.8
1931	6.97	7.45	6.51	7.36	- 3.2
1932	6.97	7.18	6.22	7.19	0
1933	6.86	7.07	5.64	6.17	0
1934	6.83	7.00	5.79	6.15	7.3
1935	6.80	6.93	6.05	6.18	5.5
1936	6.92	7.11	6.44	6.91	14.2
1937	6.54	7.03	5.96	6.53	7.9
1938	6.69	6.98	6.05	6.31	4.0
1939	6.70	6.93	6.08	6.28	1.5
1940	6.81	6.97	6.02	6.22	6.3
1941	6.69	6.99	6.08	6.23	10.9
1942	6.69	6.93	5.92	6.40	12.5
1943	6.53	6.76	5.32	5.73	14.3
1944	6.60	6.85	5.48	6.26	27.4
1945	6.67	6.96	5.79	6.44	16.6
1946	...	...	...	...	16.8
1947	7.07	8.14	6.90	7.44	21.6
1948	7.82	8.73	7.53	7.85	3.3
1949	7.96	8.59	7.29	7.79	4.5
1950	...	...	...	...	6.1
1951	8.00	8.31	6.78	7.36	12.2
1952	8.19	9.15	6.05	6.93	17.3
1953	...	...	...	...	14.0
1954	8.14	8.75	5.88	6.54	22.4
1955	8.10	8.75	5.78	6.49	23.3
1956	...	...	...	...	20.7
1957	8.70	9.31	5.98	6.52	16.4
1958	...	...	...	...	14.7
1959	8.75	9.09	6.23	7.03	39.1

SOURCES: Interest rates; Claudio R. Contador, Mercado de Ativos Financeiros no Brasil (Rio de Janeiro, IBMEC, 1974), pp. 26-28. Inflation measured by the Cost-of Living Index - GB; before 1944 C. R. Contador and C. L. Haddad, "Real Income, Money and Prices. The Brazilian Experience, 1861-1970", presented at the Latin American Workshop, University of Chicago, 1972; after 1944, Fundação Getúlio Vargas.

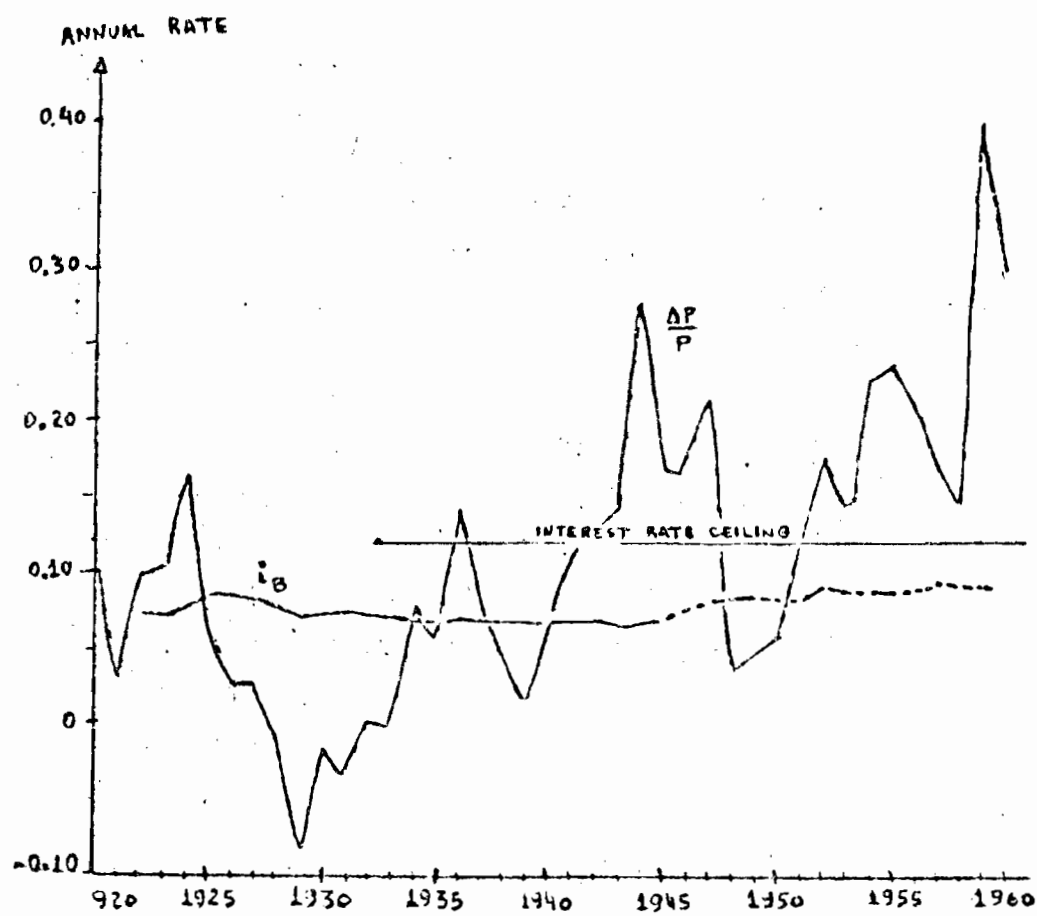


Figure 5  
Inflation and Nominal Interest  
Rates on Government Bonds

### III. INDEXATION EFFECTS AND INFLATION EXPECTATIONS

#### (a) The Credit Market After Interest Rate Ceilings and Before Indexing

The most common devices developed by the banking system to get around the 1933 laws were the illegal side-payments of interest, "banking commissions", "tied accounts" (the borrower were forced to take out a loan larger than he needed, used only a part, but had to pay interest on the whole loan), and so on <sup>1/</sup>. These devices were intended to clear the short and medium-term credit market, but since they were prohibited by law the market equilibrium was precarious and costly from the social point of view.

The development of the durable consumer-goods industry in the 1950's created a quite intense demand for medium-term loans. The economy reacted to its needs by developing the so-called "credit-and-finance companies", which sold shares of their net worth to suppliers of capital; the share accounts earned dividends or profits <sup>2/</sup>. The share accounts have the same role as deposits and loans, but since their remuneration was considered profits or dividends, not interest, they were not affected by the usury laws. The heavy income taxes on share account returns, the difficulties of regulating the credit-and-finance companies, and other problems led to a gradual extinction of share accounts during the first years of the 1960's. A new and much more convenient instrument of short and medium-term credit was eventually developed; the private bills of exchange (Letras de Câmbio).

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<sup>1/</sup> Simonsen, op. cit., p. 143.

<sup>2/</sup> Baer and Beckerman, op. cit., p. 3.



The bills of exchange were obtained by the borrower from the credit and finance company in exchange for promissories. The bills were sold at a discount and could be negotiated on the stock exchange. The finance companies charged acceptance commissions, not interest, from the borrower and offered discounts, again not interest, to the buyers of the bills.

Since the finance companies charged acceptance commissions and sold bills at a discount, the cost of credit to the borrower and the return to the lender could move freely. Commissions charges and discounts were ex-ante fixed and thus could reflect inflation expectations. In a certain sense, we may say that bills of exchange, provided a ex-ante indexation according to expectations of inflation, not actual inflation. Bills of Exchange were the first mechanism of protection against inflation and became quite popular.

Figure 6 compares the cost of bills of exchange to the borrower, the return to the lender (buyer of the bill), and the rate of inflation, measured by the wholesale price index <sup>1/</sup>. The principal features of the figure are twofold. First it seems that both the cost and the return on bills of exchange are loosely associated with the rate of inflation. The higher the rate of inflation, the higher the cost of credit and the return on the bills, and vice-versa. This conclusion was expected. However, the movements of the rates also show that nominal rates do not reflect inflation expectations as we should expect. During the periods of high rates of inflation such as the first quarter of 1968 and from September 1973-July 1974 the real rates of returns on bills of exchange became negative, while the real cost to the borrower remained positive, except in part of later period.

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<sup>1/</sup> Column 12, Conjuntura Econômica, Fundação Getúlio Vargas.

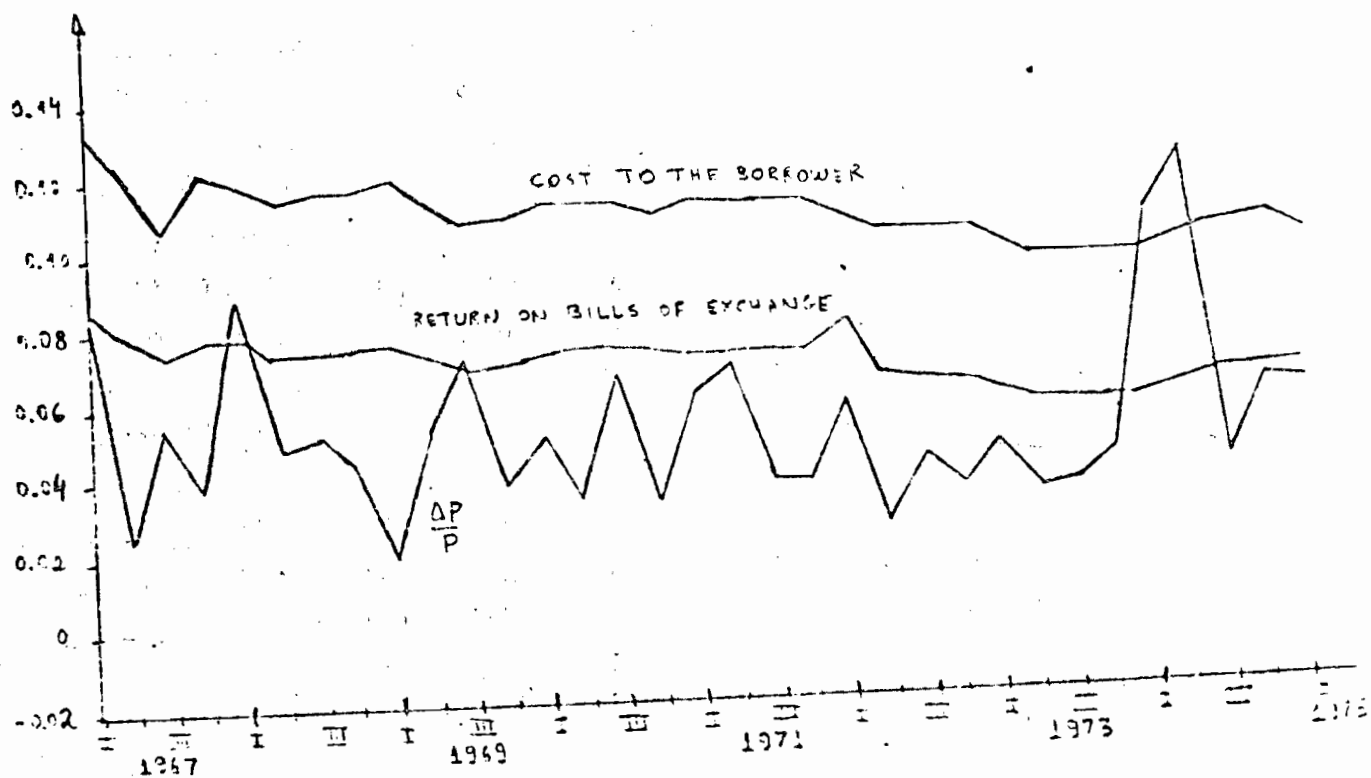


Figure 6  
Quarterly Interest Rates Paid by Borrowers  
and Received by Buyers of Bills of Exchange

TABLE 3

QUARTELY INTEREST RATES PAID BY BORROWERS AND  
RECEIVED BY BUYERS OF BILLS OF EXCHANGE

YEAR AND QUARTER	COST TO THE BORROWER <sup>a</sup>	RETURN TO THE LENDER	RATE OF INFLATION <sup>b</sup>	
			Seasonally Adjusted	Not-Seasonal ly Adjusted
1967 - I	13.2	8.5	6.1	8.0
II	12.1	7.7	4.5	2.5
III	10.6	7.3	5.6	5.6
IV	12.1	7.7	3.7	3.8
1968 - I	11.8	7.7	6.8	8.7
II	11.3	7.2	6.7	4.7
III	11.4	7.3	5.0	5.1
IV	11.6	7.4	3.4	4.3
1969 - I	11.7	7.4	1.4	1.7
II	11.2	7.3	6.5	5.1
III	10.6	6.8	8.0	7.1
IV	10.7	7.0	3.7	3.6
1970 - I	11.0	7.1	3.4	4.9
II	11.1	7.2	5.5	3.3
III	11.0	7.2	6.0	6.4
IV	10.8	7.2	2.3	3.0
1971 - I	11.1	7.0	3.5	5.8
II	11.0	7.0	7.4	6.7
III	11.0	7.0	4.5	3.7
IV	10.9	7.0	2.7	3.6
1972 - I	10.5	7.8	5.3	5.5
II	10.1	6.4	4.4	2.3
III	10.1	6.1	4.0	4.1
IV	10.1	6.1	3.9	3.3
1973 - I	9.7	5.7	7.9	4.4
II	9.4	5.6	5.3	3.1
III	9.3	5.6	3.4	3.3
IV	9.4	5.6	-2.0	4.0
1974 - I	9.4	5.5	13.3	10.2
II	9.7	5.8	13.6	11.8
III	9.9	6.1	3.8	3.7
IV	10.1	6.1	0.0	5.8
1975 - I	9.8 <sup>c</sup>	6.0 <sup>c</sup>	9.0	5.7

<sup>a</sup>six-month term

<sup>b</sup>Wholesale price index - column 12 - Conjuntura Econômica.

<sup>c</sup>First estimates.

The second feature is the relatively stable and high margin for intermediation measured by the difference between the cost of credit and the return on the bills. On the average the margin is 60 percent of the interest paid to buyers of bills and higher than 40 percent of cost of credit. In some periods the margin seems to decline, to rise again in other periods. Thus, the average cost of credit in the first quarter of 1967 was 4.42 percent per month while the return to the buyer of the bill was 2.84 percent, that is a difference of 1.58 percent. By the end of 1972, the cost of credit has declined to 3.38 percent per month and the nominal interest rate to 2.02 percent per month, which means a difference of 1.36 percentage points. Although in the last months of 1974 the cost of credit has risen to 3.46 percent and the interest rate fallen to nearly 2.00 percent, it can be explained by the rising inflationary expectations in 1974 and 1975 and the slower response of nominal returns on bills of exchange.

If the rate of return on bills of exchange does not fully reflect inflation expectations neither the cost of credit paid by the borrower, the question it poses is what is the importance of these elements to the explanation of the nominal rate of return. The regression with monthly data for the period January 1967 to April 1975 gives the following result:

$$i_L = 0.0148 + \frac{0.254}{(0.04)} \frac{\Delta p^*}{P} + \frac{0.089}{(0.03)} i_B + u$$

10.531                      10.241

$$R^2 = 0.225$$

$$SE = 0.0024$$

$$DW = 1.301$$

/where  $i_L$

where  $i_L$  is the rate of return on bills of exchange;  $\frac{\Delta P^e}{P}$ , the expected rate of inflation <sup>1/</sup>;  $i_B$ , the cost of credit to the borrower; and  $u$ , the residuals. The numbers below the regression coefficients are their standard deviations, in parentheses, and the "beta" coefficients, between bars. Both estimates are significant at 5 percent level. The estimates show that for each percentage point increase in inflation expectations, the nominal rate of interest on bills of exchange rises by only one quarter percent. Thus, the response of the market to inflation expectations is clearly incomplete and imperfect. Later on we shall discuss this conclusion with more details.

The second result is really unpredicted! We should expect that an increase in the cost of credit would be split into two parts; one part going to the credit-and-finance company and the other part to the buyer of the bill. A priori there is no way of suggesting who gets the bigger share. The regression shows that for each percentage point increase in the cost of credit, the nominal rate of return rises by less than 0.09. That is, the buyer of the bill gets 0.09 while the finance company gets the "lion's" share of 0.9, in marginal terms!

(b) The Adoption of Monetary Correction in Brazil

Indexation, or index-linking, was introduced gradually in Brazil after 1964. Before 1964, the attempts to link the payments on a contract to changes in some price index have encountered less

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<sup>1/</sup> The expected rate of inflation was obtained using the autoregressive-integrated-moving-average model, developed by G.E.P. Box and G.M. Jenkins, Time Series Analysis, Forecasting and Control, (San Francisco, Holden-Day, 1970). The Brazilian rate of inflation, measured on monthly basis by the wholesale price index, follows a second-order moving average process and first-order consecutive differencing. For details see Contador, "Money, Inflation and The Stock Market ...", op. cit., pp. 27-33.

than enthusiastic receptions from individuals and firms. Law 3470 of November 1958 permitted monetary correction on physical capital, but also taxed the monetary change by 10 percent. Working capital received no attention. Later on, in 1961, the personal income tax were fixed in units of minimum wage. In 1962 real estate loans were timidly linked to minimum wages.

By 1964 inflation had reached the highest levels of last decades and the distortions faced by the Brazilian economy became almost unbearable. The government which took power in March 1964 adopted severe stabilization measures and proposed to reduce the allocative and redistributive distortions caused by inflation. Also the laws and regulations after 1964 recognized that monetary correction merely updates nominal values, and thus the change in nominal values due to indexation could not constitute taxable income. Monetary correction was introduced by Law 4357 of June 1964 on fiscal debts and fixed and working capital. The same law permitted the Treasury to issue readjustable obligations to help financing the public debt. The so-called "Obrigações Reajustáveis do Tesouro Nacional" (ORTN) were created by the same law <sup>1/</sup>. Law 4380 of August 1964 created the National Housing Bank (Banco Nacional da Habitação) and real estate bills (Letras Imobiliárias). Both the real estate bills issued by Housing Bank for financing and long-terms loans for construction and mortgage were indexed. Law 4728 of July 1965 extended monetary correction to several financial instruments; bills of exchange, time and savings deposits, debentures, and so on. After 1965 several additional laws have been added to cover residential and non-residential rents, fiscal debts, insurance, and contracts in general.

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<sup>1/</sup> See Simonsen, op. cit., pp. 156-157, and more recently "Correção Monetária; A Experiência Brasileira", Conjuntura Econômica, vol. 29, July 1975, pp. 65-69. A Summary of Laws and regulation about indexation in Brazil can be found in "Survey of Indexation Mechanisms in Brazil; Laws and Regulations", prepared by IPE Staff, for the Seminar on Indexation, sponsored by IPE--Instituto de Pesquisas Econômicas--University of São Paulo and National Bureau of Economic Research, February 1975.

The first legislations in 1964 stated that indexing should be "post-fixed". Thus contracts, interest rates, and credit instruments were corrected for inflation that had already occurred. The indexing provisions included in the laws of 1964 were intended to restore the long-term debt market, and as much monetary correction should be "post-fixed". However, the "post-fixed" indexation was difficult to be applied in the short-term credit market. For this purpose, the regulations passed from 1965 to 1967 introduced the concept of "pre-fixed" indexing; a component of anticipated inflation was added into the real interest rates on short-term instruments, in particular private bills of exchange and time deposits. The difference between anticipated and actual inflation posed some problems to the fiscal policy. Thus, the taxable returns on short-term instruments were the real interest rate plus the difference between anticipated and actual inflation occurred during the term of the instrument. Thus if inflation anticipations were perfect, the holder of a short-term asset would pay taxes only relative to the real interest rate. If anticipated inflation proved to be smaller (higher) than the actual one, the taxable return would be smaller (larger) than the real interest rate. In 1970 the Treasury introduced pre-fixed indexed bills (Letras do Tesouro Nacional) designed to be used in "open-market" operations.

For analytical purposes we may classify the financial instruments into three groups;

- (a) non-indexed instruments, which can be decomposed into two sub groups;
  - (a.1) currency and demand deposits, that is, the conventional concept of money supply  $M_1$ ;
  - (a.2) profit shares which as non-contractual items are determined residually and thus cannot be indexed. Stocks are the best example;
- (b) "pre-indexed" short-term assets, such as private bills of exchange, treasury bills, and certificates of deposits;
- (c) "post-indexed" medium and long-term instruments, such as saving deposits, treasury bonds, real estate bills and debentures.

/The distinction

The distinction of indexing treatment among assets is important for several reasons. We will mention two reasons. First, because Brazilian Fiscal legislation taxes monetary correction on different basis; "post-indexing" is treated as capital gains and as such is not taxed; "pre-indexing", on the other hand, is treated as interest income and as such is taxed <sup>1/</sup>. Second, the difference between post- and pre-indexation tends to be substantial when the rate of inflation is not constant. Thus, when the rate of inflation is declining post-indexing--based on past inflation--has the effect of rising the nominal interest (real rate plus indexation) above the level which would occur with pre-indexation (assuming the same real interest rate), since it brings a higher rate of inflation forward in time to revalue credit instruments, and vice-versa. Further, it has been argued that post-indexation has the effect of impeding the acceleration of inflation <sup>2/</sup>.

As a consequence if inflation expectations are perfect we should expect that when rate of inflation rises, those financial assets with pre-indexation tend to be preferred relatively to those post-indexed assets. On the other hand, when inflation declines, asset holders' preferences bend toward post-indexed financial assets. However in July 1973 the criterion of indexing the Treasury bonds (ORTN) changed from ex-post basis to a new indexing scheme half way between pre-and-post indexing <sup>3/</sup>. Since 1973, the indexing coefficients have been calculated on a five-month basis; the moving average of actual inflation in the last three months plus the government expectation of inflation for the next two months. This modification was designed to avoid introducing the full impact of past inflation into current inflation. Later on this "mixed" criterion of post-indexation was extended to other financial instruments. The pre-indexing criterion remained the same as before, that is inflation expectations were merely added to the real rate of interest.

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<sup>1/</sup> Baer and Beckerman, op. cit., p. 8.

<sup>2/</sup> Baer and Beckerman, op. cit., p. 9.

<sup>3/</sup> See Conjuntura Econômica, vol. 28, May 1974, pp. 110-114.



(c) Effects of Indexing

Economists agree that indexing has positive effects, for it may prevent the emergence of inflation-induced distributional and misallocation effects. But it seems that there is less agreement about the list of effects. In the first flush of enthusiasm some economists may tend to attribute almost "miracle powers" to monetary correction <sup>1/</sup>. On the other hand, the opinion about some indexing effects tends to swing to the other extreme for other economists <sup>2/</sup>, even among monetarists <sup>3/</sup>.

My comments shall be directed to five effects of indexation. The list does not intend to be exhaustive, but I believe that the main effects are mentioned. This discussion will be policy oriented to point out what indexing can and can't do. When possible, empirical evidence of the Brazilian experience will be mentioned.

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- <sup>1/</sup> Note, for instance, the support by illustrious economists such as Alfred Marshall, "Remedies for Fluctuations of General Prices", in Arthur C. Pilon (ed.) Memorials of Alfred Marshall (New York; Kelly and Millman, Inc., 1956), pp. 188-21; Irving Fisher, The Purchasing Power of Money, 2nd ed. rev. (New York, Augustus M. Kelley, 1963), and Stabilizing the Dollar (New York; Macmillan, 1920), and more recently Milton Friedman, "Using Escalators to Help Fight Inflation", Fortune, July 1974, pp. 94-97, 174-176; "More on Living with Inflation"; Newsweek, October 23, 1973, p. 96; and "Economic Miracles", Newsweek, January 21, 1974, p. 80.
- <sup>2/</sup> See Albert Fishlow, op. cit., and "Some Reflections on Post-1964 Brazilian Economic Policy", in Alfred Stepan (ed.), Authoritarian Brazil; Origins, Policies, and Future, (Yale University Press, 1973); Murray L. Weidenbaum, "The Case Against Indexing", Dun's, July 1974, p. 11. For a good account of the case for and against indexation, see Jai-Hoon Yang, "The Case For and Against Indexation; An Attempt at Perspective", Federal Reserve Bank of St. Louis Review, vol. 56, October 1974, pp. 2-11.
- <sup>3/</sup> The arguments used against indexation by monetarists stem from the believe that indexation weakens support for anti-inflation policies and exacerbates inflation.

/(i) Indexing has

(i) Indexing has been said to raise voluntary savings, since it permits interest rates to rise and to approach equilibrium levels. This statement has already been discussed and it was pointed out that the effect of indexing on voluntary savings depends on the level of real interest rate and on the elasticity of the savings function. At negative levels of real interest rate the savings function tends to be less inelastic and as real interest rates increase to positive values the savings function becomes less and less elastic. Therefore the answer to the issue whether indexing can raise total voluntary savings, depends on how perfect the response of nominal interest rates is to expectations of inflation. Negative interest rates have been a quite common phenomenon in Latin American inflationary economies and becoming common in Western Europe, United States and Canada. This means that or the interest rate ceilings really keep interest below the equilibrium level or that inflation expectations are very imperfect.

If it is possible to eliminate the interest rates ceilings and doing that nominal interest rates respond and incorporate inflation expectations indexing would be unnecessary. But, as I believe to happen, even without interest rate ceilings nominal interest rates do not respond or respond very slowly. Indexing the credit market would prevent undesirable redistributive effects from creditors to debtors, rationing and its misallocation effects, and eventually a sharp fall in voluntary savings.

(ii) Voluntary demand for government and private long-term bond and debentures tends to disappear in inflationary environments, for no one ventures to hold voluntarily fixed-income financial assets. This fact has happened in Brazil. Figure 5 showed that nominal interest rates were well below inflation even before the implementation of the usury laws in 1933. Positive real interest rates would reappear again only after 1966, as shown by Figure 7. As a consequence of the high rates of inflation in the first years of 1960's, the markets for government bonds and private debentures ceased to exist on voluntary basis.

/The creation

The creation of Treasury bonds and real estate bills with monetary correction clause in 1964 had an important impact on the Brazilian capital market. Not for the total value of government issues; it could account only for a very tiny part of capital market. But, through the sale of Treasury bonds the government believed that could finance part of the public debt.

Moreover, the inclusion of monetary correction on time and savings deposits, private bills of exchange, and so on had the effect of multiplying the number and stock of financial instruments. Although beneficial from the point of view of the asset holders and government financing, the creation and the eager receptivity of new indexed-assets tend to pose problems to the monetary authorities. The definition of money supply in Brazil has been the traditional concept  $M_1$ , that is currency held by the public plus demand deposits. In an inflationary environment savings and time deposits tend to be unimportant, and, thus, the concept  $M_1$  is convenient as the main indicator of monetary policy. However the indexing revived time and savings deposits and caused the creation of several financial assets. All these assets are more or less substitute for money <sup>1/</sup>. Considering the period 1968/73, the supply of money  $M_1$  in real terms increased, on the average, 9 percent per year. In the same period the average annual rate of growth, in real terms, of time deposits was 25 percent; bills of exchange, 22 percent; Treasury bonds and Real Estate bills, 30 percent; savings deposits, 54 percent; and

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<sup>1/</sup> If the elasticity of substitution is not zero, indexation tends to induce a larger holding of indexed assets and a reduction in currency and demand deposits (non-indexed assets). For an interesting discussion see Roberto Fendt, Jr., "The Optimum Rate of Indexation of Bank Deposits", presented at the Seminar on Indexation, February 1975.

/mutual funds,

mutual funds, 41 percent. At the same time, the monetary authorities have been trying to decrease the rate of growth of money supply  $M_1$  for decreasing the rate of inflation. Since the Central Bank has been using an inappropriate indicator the relative failure of decreasing inflation should not be surprising!

A recent study has shown that the elasticities of substitution between money  $M_1$  and time and savings deposits, and real estate bills are very high<sup>1/</sup>. Thus, the lesson is clear: for keeping the liquidity on the desired bounds monetary authorities ought to revise their concept of money supply<sup>2/</sup>.

It is not fair to hold the adoption of indexing responsible for the likely mistakes in the management of the monetary policy caused by the unappropriated indicator. Indeed, such an effect may not even exist in developed countries, where the role and effectiveness of monetary policy are already known for the several works by academic economists and laymen. However the picture is less clear in Latin America and other developing regions. There is a tendency to financial institutions that issue nearmoney instruments develop quite rapidly, as soon as monetary correction is introduced. Thus, the

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1/ Claudio R. Contador, "Desenvolvimento Financeiro, Liquidez e Substituição entre Ativos no Brasil: A Experiência Recente", Pesquisa e Planejamento Econômico, vol. 4, June 1974, pp. 245-284; "Desenvolvimento Financeiro Não-Bancário - Efeitos na Política Monetária", Conjuntura Econômica, vol. 28, November 1974, pp. 58-61; "Desarrollo de Las Instituciones Financieras No Bancarias: ¿Ayuda o Impasse para La Política Monetaria?" Cuadernos de Economía, vol. 11, August 1974, pp. 25-40.

2/ The definition of money supply is not the mere summation the stocks of the several financial instruments. Rather the "moneyiness" content of each asset is the relevant aspect to be considered. In the papers mentioned above the substitution of money  $M_1$  and other assets and the appropriate concept of money were analyzed using a methodology similar to that used by V. Karuppan Chetty, "On Measuring the Nearness of Near-Money", American Economic Review, vol. 59, June 1969, pp. 270-281. Although the substitution between money  $M_1$  time and savings deposits, and real estate bills is infinite, the "moneyiness" contents of these assets are less than perfect.

monetary authorities of these countries should be aware of the effects of indexation upon the creation of nearmoney financial instruments and their impact upon the effectiveness and control of monetary policy.

(iii) There are three different opinions about the effect of indexing upon the rate of inflation. One group of economists believes that indexing has a feedback effect on the rate of inflation <sup>1/</sup>. For a second group indexing is a very powerful instrument to reduce the rate of inflation without hampering the country's economic growth <sup>2/</sup>. Still another group advocates that indexing had little or no influence at all in reducing the Brazilian inflation <sup>3/</sup>.

Although it is difficult to obtain general agreement about the final impact of indexing on inflation, we may discuss the possible ways in which indexing works in an inflationary process. The reasoning behind the discussion is more or less similar to that behind the role of wage increases or exchange rate devaluations on inflation <sup>4/</sup>. Let us assume the impact of expost indexing in a declining inflationary environment. Under these circumstances, there may be two channels of influence of indexing upon inflation. The first is through the effect of indexation and readjustments of interest rates, wages, exchange rate and other variables on costs of production, and then

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<sup>1/</sup> See, for instance, Mario Henrique Simonsen, Inflação: Gradualismo Versus Tratamento de Choque (Rio de Janeiro, APEC, 1970), p. 191.

<sup>2/</sup> Indexation increases real interest rates and as such can restrain investment and reduce aggregate demand. For other reasoning see Friedman's discussions of monetary correction in Newsweek, op. cit.

<sup>3/</sup> Fishlow, "Indexing Brazilian Style ...", op. cit., p. 270.

<sup>4/</sup> See A.C. Harberger, "The Dynamics of Inflation in Chile", in C. Christ (ed.), Measurement in Economics (Stanford University Press, 1963), pp. 219-250, and "Some Notes on Inflation", op. cit.

on the rate of inflation. The question is whether indexation simply responds passively to past rates of inflation or whether it plays a more active role in the inflationary process. The way indexing is built based more-or-less rigidly on moving averaging of past rates of inflation may exert an "autonomous" impact.

If indexing raises debts and costs of production in general it may have an active role in the inflationary process even in the absence of increases in the money supply. In the absence of money growth, there would be readjustments in the economy, with a real output temporarily slackened. In such a case indexing may contribute to additional inflationary pressures. However, if monetary authorities fearing the readjustments and the temporarily decreases in activity decide to "finance" the increase in costs caused by the indexing effect on prices and interest rates, the ultimate cause of inflation would be the rise in the money supply, not the indexing per se.

The second channel of influence of indexation is through its effect on inflation expectation, and the role played by expectations of inflation upon the inflationary process. Economists and econometricians have designed several models and techniques for simulating expectations. However, the issue is still open to discussion for people do form expectations in an unknown way. Thus all depends the way people see indexation. Although important acceleration of expectation is not the most important variable explaining the rate of inflation. Lagged increases in the money supply and in real output are the main causes of main determinants of inflation. My opinion is that the impact of indexing upon inflation expectation may be neglected.

(iv) There are very strong reasons to believe that indexation can increase the real amount of credit, and its distributions into short-and long-terms. Since indexing allows interest rates to raise, it tends to increase the level of real credit, and to restore the market functioning. Besides, an inflationary environment without monetary correction tends to shift the preferences of lenders and asset

/holders in

holders in favor of short-term operations and against long-term credit. This reasoning has happened in Brazil and is probably a common place in other economies. The demand and supply of short- and long-term credit responds differently to inflations, indexing and other variables, such as real income. Let us assume a very simple model where the amount of real credit is explained by inflation and real income. Although the credit variables represent equilibrium positions between supply and demand for credit, it will be easier to interpret the empirical estimates if we qualify the regressions as demand equations.

The data are in annual basis and are listed in Table 1. Inflation will be measured by the growth of wholesale price index (Column 12 of Conjuntura Econômica). We should use expectations of inflation but some experiments have proved that actual annual inflation works better. Further, we also tried a model with lagged response but the results were uninteresting.

Indexation was implemented in 1964/65 in Brazil. However there is a wide agreement that its effects on credit market have started in 1967/68. So, we shall identify the impact of indexing on credit through a "dummy" variable which assumes value zero for the period before 1967, and value one afterwards. The dummy variables is multiplied by inflation.

Three models will be tested:

$$\text{Log } I_{SR} = a_0 + (a_1 + a_2 D) \frac{\Delta P}{P} + a_3 \text{Log } Y + u \quad (1)$$

$$\text{Log } I_{LR} = b_0 + (b_1 + b_2 D) \frac{\Delta P}{P} + b_3 \text{Log } Y + u \quad (2)$$

$$\frac{I_{SR}}{I_{LR}} = c_0 + (c_1 + c_2 D) \frac{\Delta P}{P} + c_3 \text{Log } Y + u \quad (3)$$

/Real credit

Real credit and real income are measured in natural logs such that coefficients  $a_3$  and  $b_3$  represent the income elasticity. The income elasticity of the ratio between short- and long-term credit in model (3) cannot be measured directly and the average elasticity corresponds to  $c_3/\bar{Y}$ , where  $\bar{Y}$  is the mean income.

The impact of inflation is decomposed into two coefficients;  $a_1$ ,  $b_1$  or  $c_1$  are intended to capture its impact on credit in the absence of monetary correction. The second coefficient,  $a_2$ ,  $b_2$  or  $c_2$ , multiplied by the "dummy" variable  $D$  shows the effect of indexing. We shall test that  $a_1$  and  $b_1$  are negative and  $c_1$ , positive. If we expect that indexation corrects the distortion in the level and the allocation into short- and long-term credit the coefficients  $a_2$  and  $b_2$  have to prove to be positive.

Private and public sector are not supposed to respond same way to inflation and real income. Thus, the demand for credit by the Government tends to be less sensitive to real income than the demand by individuals and private firms. The government response to indexing may also be different from the private sector. For avoiding lumping together different behaviors, we shall provide different regressions to the public and the private sector.

Table 4 displays the empirical results. The coefficients of determination are satisfactory and the serial correlation does not seem to be important, except in regressions 3 and 4. Very few regression coefficients are not significant at 5 percent level, and in general the estimates are consistent with what we have predicted. Real income has a positive effect on credit and its elasticity ranges from nearly zero (not significant of zero at 5 percent level) for total credit to the public sector (regression 4) to around 2.1 for long-term credit to the private sector (regression 9). As expected, the demand for credit by the public sector seems to be less elastic to real income than that of the private sector. Further, comparing regressions 7 vs. 9, 8 vs. 10, 11 vs. 13 and 12 vs. 14, we may conclude the long-term demand for credit have higher income elasticities than the short-term demand.

/The estimates



The estimates for coefficients  $a_1$  and  $b_1$  are negative and they show that inflation has a negative effect upon real amount of short- and long-term credit for both the private and the public sector. The elasticity of credit with respect to inflation corresponds to the product of estimates  $a_1$  and  $b_1$  by the rate of inflation. Assuming a hypothetical inflation of 10 percent per year, we have inflation elasticities ranging from -0.12 (regression 11) for total short-term credit to -0.2 (regression 13) for total long-term credit, excluding indexing effects. Thus long-term credit is more affected by inflation than short-term credit. This conclusion is reinforced by regressions 21 and 22, in which the estimates for  $c_2$  are positive and significantly different of zero at 5 percent level.

Finally the effect of indexing captured by the estimates of parameter  $a_2$  and  $b_2$  proves to be positive and significant. In general, the point estimates in absolute values for  $a_2$  and  $b_2$  are larger than those for  $a_1$  and  $b_1$ , which could suggest that the effect of indexation in rising real credit more than offsets the negative impact of inflation. However we cannot reject the hypothesis that  $a_1$  and  $b_1$  are equal in absolute values to  $a_2$  and  $b_2$ , respectively.

The importance of indexing to the explanation of the level and the term structure of credit may also be seen through the "beta" coefficients. In most cases the "indexing effect" has the major single contribution to the explanation of the variance of the dependent variable.

The remarks above have not discussed the different methods of indexation. Now we shall analyze the effects of different methods of indexing upon the combination of financial instruments. As we have seen financial assets can be classified as ex-ante indexed, ex-post indexed, and non-indexed. The hypothesis is that the difference between actual inflation and indexation coefficients causes a shift in the asset holders' preference when inflation suddenly

TABLE 4  
THE EFFECT OF INFLATION AND INDEXING ON  
SHORT AND LONG-TERM CREDIT IN BRAZIL  
ANNUAL DATA-PERIOD 1951-1974

REGRES SION	DEPENDENT VARIABLE	CONSTANT	REAL INCOME <sup>a</sup>	INFLA- TION	INDEX- ING EFFECT <sup>b</sup>	R <sup>2</sup>	S.E.	D.W.
1	Private Sector <sup>a</sup>	3.312	1.304 (0.18) [0.79]	-1.395 (0.39) [-0.39]	-	0.757	0.372	2.32
2		7.300	0.616 (0.24) [0.37]	-0.901 (0.34) [-0.25]	3.830 (1.11) [0.53]	0.851	0.299	2.44
3	Public Sector <sup>a</sup>	6.510	0.442 (0.12) [0.43]	-1.644 (0.26) [-0.75]	-	0.722	0.246	0.17
4		9.622	-0.095 <sup>c</sup> (0.14) [-0.09]	-1.258 (0.19) [-0.57]	2.990 (0.64) [0.67]	0.871	0.172	0.29
5	Total Credit <sup>a</sup>	3.838	1.230 (0.17) [0.78]	-1.428 (0.37) [-0.42]	-	0.756	0.357	1.68
6		7.818	0.552 (0.23) [0.35]	-0.841 (0.32) [-0.28]	3.774 (1.04) [0.55]	0.856	0.281	1.79
7	Short-Term Credit <sup>a</sup> to Private Sector	4.317	1.102 (0.20) [0.73]	-1.234 (0.42) [-0.38]	-	0.660	0.403	1.65
8		8.499	0.380 (0.17) [0.25]	-0.716 (0.32) [-0.22]	4.016 (1.22) [0.61]	0.782	0.331	1.85
9	Long-Term Credit <sup>a</sup> to Private Sector	-3.254	2.099 (0.14) [0.90]	-1.959 (0.30) [-0.39]	-	0.928	0.287	1.52
10		-0.097	1.555 (0.19) [0.66]	-1.568 (0.26) [-0.31]	3.032 (0.84) [0.30]	0.958	0.227	1.73
11	Total Short-Term <sup>a</sup> Credit	4.412	1.092 (0.18) [0.74]	-1.233 (0.40) [-0.39]	-	0.682	0.380	1.57

Table 4 - continuation

4/  
23.

REGRES SION	DEPENDENT VARIABLE	CONSTANT	REAL INCOME <sup>a</sup>	INFLA- TION	INDEX- ING EFFECT <sup>b</sup>	R <sup>2</sup>	S.E.	D.W.
12		8.459	0.393 (0.15)  0.27	-0.731 (0.35)  -0.23	3.887 (1.13)  0.60	0.804	0.306	2.04
13	Total Long-Term <sup>a</sup> Credit	0.314	1.605 (0.16)  0.82	-2.038 (0.34)  -0.48	-	0.873	0.320	1.36
14		4.002	0.968 (0.20)  0.49	-1.580 (0.28)  -0.37	3.542 (0.90)  0.41	0.929	0.245	1.40
15	Ratio Private to Public Sectors	-5.659	10.055 (1.14)  0.89	1.042 <sup>c</sup> (2.46)  0.04	-	0.796	2.338	2.02
16		-39.782	7.832 (1.88)  0.69	2.639 <sup>c</sup> (2.63)  0.10	12.368 <sup>c</sup> (8.42)  0.25	0.817	2.274	2.24
17	Ratio Short-Term Private to Public Sectors	-19.054	39.747 (10.53)  0.64	-20.562 <sup>c</sup> (22.73)  -0.15	-	0.425	21.604	1.29
18		-116.479	26.700 <sup>c</sup> (17.92)  0.42	-11.195 <sup>c</sup> (25.08)  -0.08	72.586 <sup>c</sup> (80.42)  0.27	0.449	21.705	1.31
19	Ratio Long-Term Private to Public Sectors	-27.401	4.915 (0.37)  0.94	-2.062 (0.80)  -0.18	-	0.899	0.766	1.17
20		-25.162	4.529 (0.64)  0.86	-1.785 (0.89)  -0.16	2.149 <sup>c</sup> (2.87)  0.09	0.901	0.775	1.18
21	Ratio Private Short to Long-Term Credit	31.227	-4.209 (0.40)  -0.90	2.652 (0.86)  0.26	-	0.859	0.819	1.59
22		36.598	-5.216 (0.64)  -1.09	3.318 (0.90)  0.32	5.159 <sup>c</sup> (2.88)  0.24	0.880	0.777	1.66

Below the regression coefficients are the standard-errors, between parentheses, and the "beta" coefficients, between bars.

<sup>a</sup>Variable in natural logs.

<sup>b</sup>Dummy variable (assuming value zero before 1968, and one afterwards) times de rate of inflation. It corresponds to coefficients  $a_2$ ,  $b_2$ , or  $c_2$ .

<sup>c</sup>Not Significant at 5% level.

becomes unstable. There are two effects in response to inflation. First there is the evidence that when inflation rises asset holders decrease their stocks of financial assets towards holdings of real assets, such as inventories and real estate <sup>1/</sup>. Hence the aggregate stock of financial assets tend to decrease during inflationary processes.

The second effect of inflation is in the relative preferences. Even with indexing this argument is valid, although with some differences. If inflation expectations were instantaneous and fully reflected in the nominal interest rate, then the method of ex-ante indexation may be said to be "efficient". Hence in such a case, an increase in the rate of inflation causes a relative shift in asset holders' preference toward ex-ante indexed financial instruments, and vice-versa.

However, the answer may be different if inflation expectation are not efficient and/or the indexation scheme does not fully reflect them. The evidence presented for the explanation of nominal rate of return on bills of exchange has suggested that inflations expectations were less than perfect. The coefficient for expectations of inflation was estimated in 0.25<sup>4</sup> for monthly data in the period January 1967 to April 1975.

A previous work <sup>2/</sup> covered the issue with more details and the response of nominal interest rates of other assets. For all assets analysed the impact of expectations of inflation upon nominal rates were less than one. The model attempted to explain nominal rates of return as a function of money supply and inflation

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<sup>1/</sup> The inflation effect upon the demand for financial asset is so strong that this reasoning can be generalized for any financial asset. For estimates of inflation elasticities of demand for financial assets in Brazil, see C.R. Contador, O Mercado de Ativos Financeiros no Brasil, op. cit., pp. 159-176.

<sup>2/</sup> Contador, "A Inflação e o Mercado de Ações ...", op. cit., pp. 916-919.

expectations, following the approach used by Sargent, Yohe and Karnosky, Gibson, and others <sup>1/</sup>. The response of nominal returns on bills of exchange was 0.29 for the period 1962-1971; on Treasury bonds, 0.71, for the period 1965-1971; and 0.45 on Real Estate bills for the period 1962-1971. Real Estate bills and Treasury bond --both ex-post indexed financial assets-- seem to have a higher response to inflation than bills of exchange--an ex-ante indexed instrument. Therefore we may reject the hypothesis that inflation expectations are complete in the Brazilian capital market.

Before presenting the model to be tested it will be convenient to classify the financial assets into two groups: ex-ante indexed such as Certificates of Deposits and bills of exchange, and ex-post indexed, such as savings deposits, Treasury bonds, and real estate bills. Preliminary experiments have shown that lagged response is important with the monthly data. So the Nerlovian distributed lag mechanism may be useful to identify short- and long-run responses.

The explanatory variables are the actual, not expected, rate of inflation, a "proxy" for real income <sup>2/</sup> and the dependent variable with a lag.

$$\text{Log } F_P = a_0 \tilde{\pi}_P + a_1 \tilde{\pi}_P \frac{\Delta P}{P} + a_2 \tilde{\pi}_P \text{Log } Y + (1 - \tilde{\pi}_P) \text{Log } F_{P-1} + u \quad (4)$$

1/ Thomas Sargent, "Commodity Price Expectations and the Interest Rate", Quarterly Journal of Economics, vol. 83, February 1969, pp. 127-140; W.P. Yohe and D. Karnosky, "Interest Rates and Price Level Changes", Federal Reserve Bank of St. Louis Review, vol. 51, December 1969, pp. 19-36; W.E. Gibson, "Price-Expectation Effects on Interest Rates", Journal of Finance, vol. 25, March 1970, pp. 19-34, and also "Interest Rate and Monetary Policy", Journal of Political Economy, vol. 78, May-June 1970, pp. 431-455.

2/ The "proxy" was obtained with the principal component analysis of several variables. For details see Contador, "Money, Inflation, and the Stock Market...", op. cit., pp. 16-17.

$$\text{Log } F_A = b_0 \tilde{\pi}_A + b_1 \tilde{\pi}_A \frac{\Delta P}{P} + b_1 \tilde{\pi}_A \text{Log } Y + (1 - \tilde{\pi}_A) \text{Log } F_{A-1} + u \quad (5)$$

$$\frac{F_P}{F_A} = c_0 \tilde{\pi} + c_1 \tilde{\pi} \frac{\Delta P}{P} + c_2 \tilde{\pi} \text{Log } Y + (1 - \tilde{\pi}) \left( \frac{F_P}{F_A} \right)_{-1} + u \quad (6)$$

Where  $F_P$  stands for the aggregate stock of ex-post indexed assets, and  $F_A$ , the aggregate stock of ex-ante indexed assets. The subscript -1 represents the dependent variable with a lag. The coefficient  $\tilde{\pi}$  is the elasticity of adjustment obtained from the Nerlovian model, such that the a's, b's and c's represent the long-run responses, and the products  $\tilde{\pi}$  a's,  $\tilde{\pi}$  b's, and  $\tilde{\pi}$  c's the short-run responses.

Table 5 lists the stock of some financial assets in Brazil, both in nominal (table 5-A) and real prices of 1974 (table 5-b). Table 6 summarizes the estimates of models (4), (5) and (6). The coefficients of determination are satisfactory, significant at 5 per cent and assume the expected sign. Serial correlation is high only in the regressions without the lagged variable. The coefficients of determination are satisfactory, and the estimates for the regression coefficients are, in general, significant at 5 per cent and assume the expected sign. Serial correlation is high only in the regressions without the lagged variable.

Income elasticities of demand for the aggregate stocks are positive, high and significant. The elasticities are very close to each other such that the income elasticity for the ratio of the two stocks does not differ significantly of zero.

As predicted inflation tends to decrease the real stock of financial assets no matter the form of indexing. However the response is clearly different, "pre-indexed" assets tend to be more sensitive to inflation than "post-indexed" assets. This means that when inflation is rising people tend to move out of "pre-indexed" faster than of post-indexed assets. Therefore, this result is consistent with the hypothesis that nominal interest rates do not respond instantaneous and completely to inflation expectations in Brazil. The estimates with the last model with the ratio of the two stocks confirm that inflation distort the economy's preferences relatively towards post-indexed assets and against pre-indexed instruments.

TABLE 5-A

STOCK OF SOME FINANCIAL ASSETS IN BRAZILCr\$ MILLIONS, AT CURRENT PRICES

PERIOD	BILLS OF EXCHANGE	SAVINGS DEPOSITS	TREASURY BONDS	REAL ESTATE BILLS	WHOLESALE PRICE INDEX 1974=1.00
1966 - I	995	-	999	-	0.2090
II	906	169	1,401	60	0.2378
1967 - I	1,217	319	2,021	383	0.2631
II	2,105	791	2,482	1,406	0.2884
1968 - I	3,086	1,740	2,741	2,690	0.3284
II	4,558	3,309	3,491	4,609	0.3600
1969 - I	5,247	5,300	4,663	7,102	0.3852
II	6,172	8,881	5,881	9,478	0.4273
1970 - I	6,933	14,481	8,676	12,816	0.4631
II	9,756	20,905	10,112	17,224	0.5073
1971 - I	11,442	28,240	12,496	19,260	0.5726
II	15,118	37,840	15,445	27,620	0.6147
1972 - I	17,909	54,340	18,605	35,570	0.6631
II	22,305	77,990	26,179	45,660	0.7136
1973 - I	28,358	104,650	32,971	52,580	0.7684
II	37,129	141,220	38,334	62,910	0.8252
1974 - I	40,953	184,810	45,246	66,220	1.0168
II	46,257	289,250	47,769	79,050	1.1157
1975 - I <sup>a</sup>	47,892	372,890	60,349	82,760	1.1979

SOURCE: Central Bank and Conjuntura Econômica.<sup>a</sup>April, 1975.

TABLE 5-B  
STOCK OF SOME FINANCIAL ASSETS IN BRAZIL  
Cr\$ MILLIONS, AT 1974 PRICES

PERIOD	BILLS OF EXCHANGE	SAVINGS DEPOSITS	TREASURY BONDS	REAL ESTATE BILLS
1966 - I	4,761	-	4,780	-
II	3,810	711	5,892	252
1967 - I	4,626	1,212	7,681	1,456
II	7,299	2,743	8,606	4,875
1968 - I	9,397	5,298	8,347	8,191
II	12,661	9,192	9,697	12,803
1969 - I	13,621	13,759	12,105	18,437
II	14,444	20,784	13,763	22,181
1970 - I	14,997	31,270	18,735	27,674
II	19,231	41,208	19,933	33,952
1971 - I	19,983	49,319	21,823	33,636
II	24,594	61,558	25,126	44,932
1972 - I	27,008	81,948	28,058	53,642
II	31,257	109,291	36,686	63,985
1973 - I	36,905	136,192	42,909	68,428
II	44,994	171,134	46,454	76,236
1974 - I	40,276	181,756	44,498	65,126
II	41,460	259,254	42,815	70,852
1975 - I <sup>a</sup>	39,980	311,286	50,379	69,088

See notes to Table 5-A.



**TABLE 6**  
**THE EFFECT OF INFLATION UPON "EX-ANTE" AND "EX-POST"**  
**INDEXED FINANCIAL ASSETS**

MONTHLY DATA: PERIOD SEPTEMBER 1966 - APRIL 1975

REGRES- SION	DEPENDENT VARIABLE	CONSTANT	REAL <sup>a</sup> INCOME	INFLA- TION	LAGGED VARIA- BLE	R <sup>2</sup>	S.E.	D.W.
1	Total stock of <sup>a,b</sup> Pre-indexed Assets	-7.145	3.129 (0.15)  0.86	-31.930 (6.65)  -0.20	-	0.835	0.387	1.36
2		2.441	1.560 (0.31)  0.43	-16.567 (6.45)  -0.10	0.492 <sup>a</sup> (0.09)  0.50	0.874	0.340	2.15
3	Total stock of <sup>a,c</sup> Pre-indexed Assets	-1.954	1.069 (0.12)  0.89	-12.212 (2.25)  -0.11	-	0.851	0.344	1.40
		1.334	1.516 (0.30)  0.44	-8.555 <sup>a</sup> (5.42)  -0.06	0.498 <sup>a</sup> (0.09)  0.50	0.886	0.302	2.11
	Ratio Post to Pre-indexed Assets	0.05	0.001 (0.001)  0.001	0.006 (0.001)  0.001	-	0.000	0.143	0.11
		0.07	0.0026 (0.001)  0.001	0.007 (0.001)  0.001	0.014 (0.003)  0.001	0.001	0.001	0.00

<sup>a</sup>Variable in natural logs.

<sup>b</sup>Summation of Certificates or Deposits and Bills of Exchange.

<sup>c</sup>Summation of Savings Deposits, Treasury Bonds, Real Estate Bills

<sup>d</sup>Not significant at 5% level

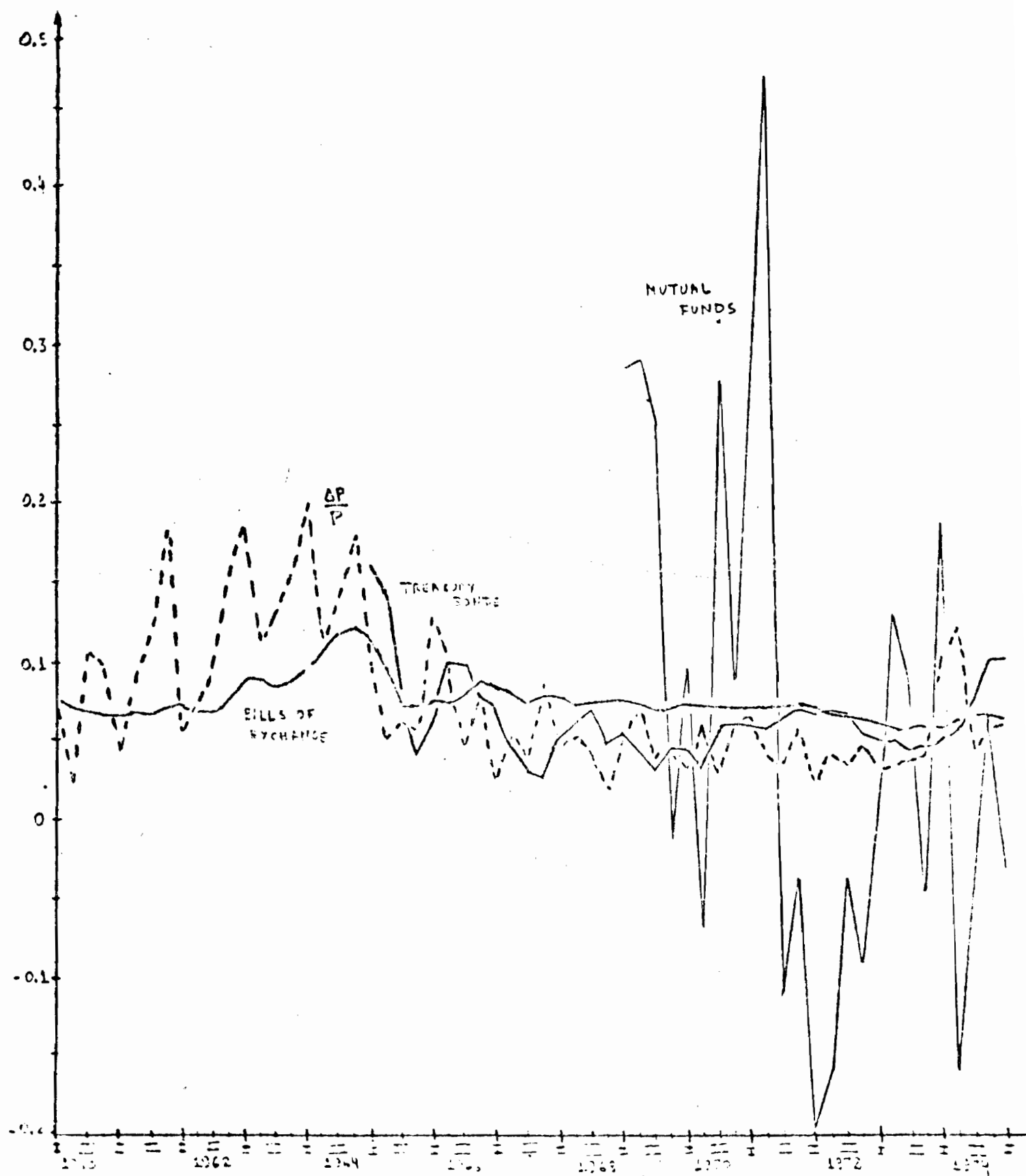


Figure 7  
Nominal Quarterly Rates of Return  
on Several Financial Assets

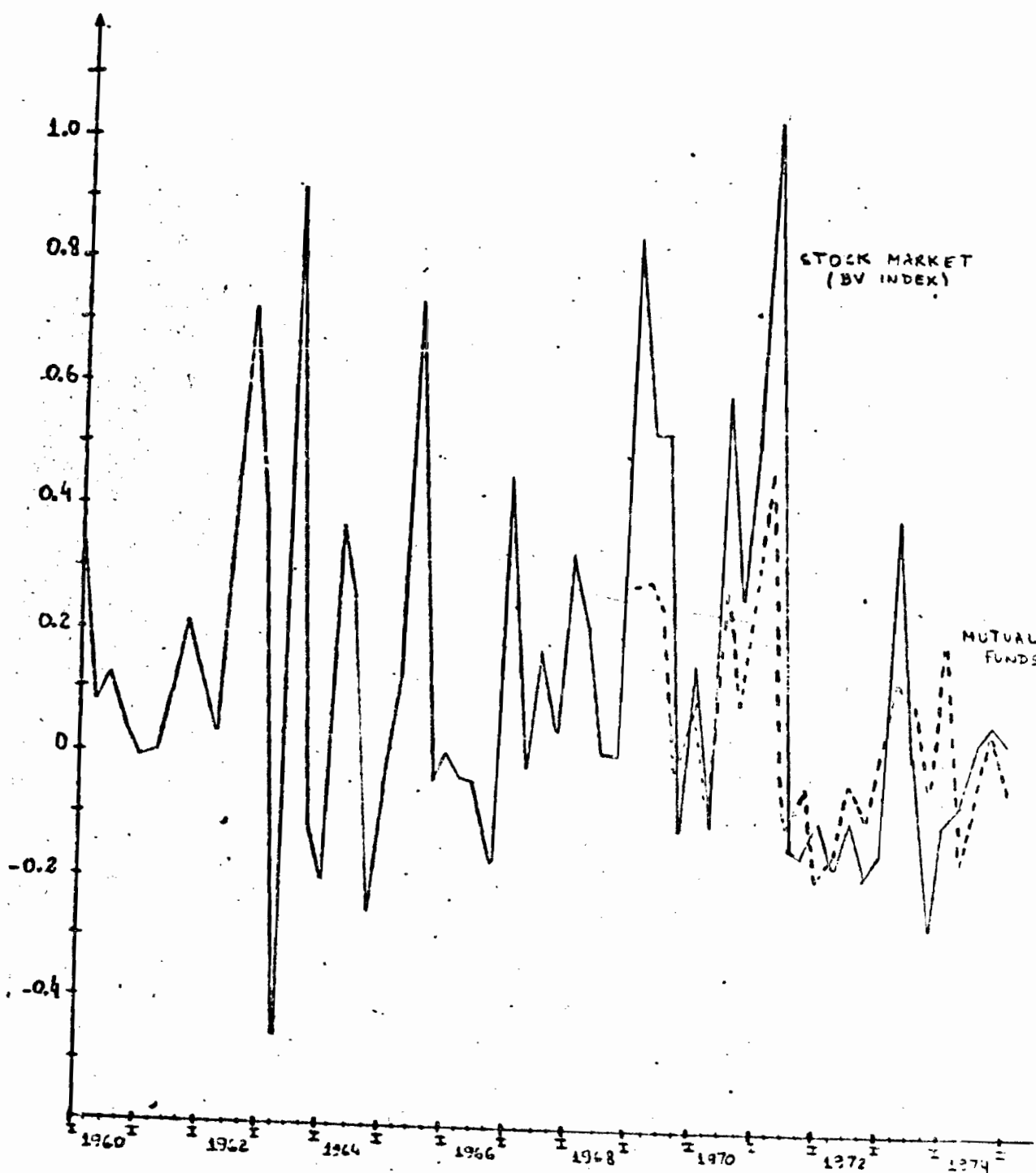


Figure 8  
Nominal Quarterly Returns on the  
Stock Market and Mutual Funds  
Period: Jan 1960 - March 1975

APPENDIX A-1CREDIT PROVIDED BY COMMERCIAL BANKS IN BRAZILCr\$ MILLIONS, AT CURRENT PRICES

PERIOD	SHORT-TERM	LONG-TERM	TOTAL
1952	58.8 <sup>a</sup>	5.4 <sup>b</sup>	74.3
1953	81.2	6.4	87.6
1954	96.1	6.6	102.7
1955	107.7	6.4	114.2
1956	132.1	6.2	138.3
1957	164.8	7.7	172.5
1958	198.7	17.1	215.8
1959	270.4	25.2	295.6
1960	380.5	29.6	419.2
1961	512.7	32.8	545.6
1962	789.8	65.9	855.7
1963	1 231.6	92.5	1 324.2
1964	2 377.7	81.6	2 339.3
1965	3 939.0	125.3	4 074.3
1966	4 891.0 <sup>c</sup>	518.0 <sup>d</sup>	5 413.0
1967	8 050.0	1 105.0	9 155.0
1968	13 031.0	1 329.0	14 360.0
1969	18 114.0	2 113.0	20 227.0
1970	24 287.0	2 902.0	27 189.0
1971	35 135.0	4 196.0	39 331.0
1972	51 283.0	6 073.0	57 356.0
1973	73 902.0	8 246.0	82 148.0
1974	109 020.0	11 915.0	120 935.0

SOURCE: Central Bank of Brazil.<sup>a</sup>Credit to the Public through, deposits, discounts, bills, and so on.<sup>b</sup>Including mortgages.<sup>c</sup>Including to Commerce and Production.<sup>d</sup>Including loan to public sector, government and "mixed" enterprises, stocks of government and private bonds.

## APPENDIX A-2

## MONETARY AUTHORITIES

Cr\$ MILLIONS, AT CURRENT PRICES

PERIOD	SHORT-TERM	LONG-TERM	TOTAL
1952	45.3 <sup>a</sup>	4.2 <sup>b</sup>	49.6
1953	54.9	5.7	60.6
1954	73.5	12.2	85.8
1955	81.8	14.7	96.5
1956	92.7	16.0	108.7
1957	109.8	14.5	124.4
1958	147.8	13.9	161.7
1959	161.1	13.3	174.4
1960	231.0	14.6	245.6
1961	341.7	15.2	356.9
1962	560.1	15.5	575.7
1963	861.0	15.3	876.4
1964	1 576.4	15.6	1 592.1
1965	2 141.5	15.9	2 157.4
1966	3 117.0 <sup>c</sup>	15.0	3 132.0
1967	4 372.0	15.0	4 387.0
1968	7 619.0	22.0	7 641.0
1969	11 126.0	20.0	11 146.0
1970	14 214.0	21.0	14 935.0
1971	21 890.0	27.0	21 917.0
1972	30 440.0	263.0	30 703.0
1973	46 278.0	410.0	46 688.0
1974	83 598.0	832.0	84 430.0

<sup>a</sup>Rediscounts, Agriculture and Industry credit (CREAI and CREGE), public and "mixed" enterprises.

<sup>b</sup>Loans to state and Municipal Governments; government bonds.

<sup>c</sup>Including Financial Institutions.

APPENDIX A-3INVESTMENT BANKSCr\$ MILLIONS, AT CURRENT PRICES

PERIOD	SHORT-TERM	LONG-TERM	TOTAL
1966	118.0 <sup>a</sup>	31.0 <sup>b</sup>	149.0
1967	697.0	133.0	830.0
1968	1 313.0	566.0	1 879.0
1969	2 834.0	1 115.0	3 949.0
1970	4 591.0	1 991.0	6 582.0
1971	7 851.0	3 933.0	11 784.0
1972	12 080.0	9 642.0	21 722.0
1973	20 170.0	13 734.0	33 904.0
1974	26 146.0	19 238.0	45 384.0

<sup>a</sup>Including acceptance loans, working capital, consumer credit.

<sup>b</sup>FINAME, FIPEME, BNH, PIS, EXIMBANK, Res./63, Fixed Capital, stocks and debentures, real estate bills, treasury bonds, and so on.

## APPENDIX A-4

## FEDERAL SAVINGS BANK

(Caixa Economica Federal)

Cr\$ MILLIONS AT CURRENT PRICES

PERIOD	SHORT-TERM <sup>a</sup>	LONG-TERM <sup>b</sup>	TOTAL
1952	3.3 <sup>a</sup>	5.7	9.1
1953	4.0	6.6	10.6
1954	4.7	7.6	12.3
1955	6.2	9.1	15.3
1956	7.9	10.5	18.4
1957	8.8	12.6	21.4
1958	10.4	15.1	25.6
1959	11.1	17.1	28.2
1960	11.8	21.3	33.2
1961	12.1	27.8	39.9
1962	24.4	38.5	62.9
1963	34.6	58.5	93.1
1964	53.2	75.9	129.2
1965	112.9	165.7	278.6
1966	173.8	306.9	480.7
1967	244.1	500.5	744.6
1968	400.0	1 067.0	1 467.0
1969	405.0	1 555.0	1 960.0
1970	2 066.0	2 651.0	4 717.0
1971	3 105.0	4 171.0	7 276.0
1972	5 160.0	6 093.0	11 253.0
1973	5 170.0	9 327.0	14 497.0
1974	8 924.0	17 963.0	26 887.0

<sup>a</sup>Durable consumer goods, consignments, personal credit.

<sup>b</sup>State and Municipal Bonds, stocks and debentures, Housing, Mortgage, real state sales advances.

## APPENDIX A-5

STATE SAVINGS BANKS<sup>a</sup>

Cr\$ MILLIONS AT CURRENT PRICES

PERIOD	SHORT-TERM <sup>b</sup>	LONG-TERM <sup>c</sup>	TOTAL
1952	0.08	4.0	4.0
1953	0.09	4.6	4.6
1954	0.11	5.5	5.6
1955	0.57	6.7	7.3
1956	0.49	7.7	8.2
1957	0.46	9.4	9.8
1958	0.32	11.6	11.9
1959	0.16	14.9	15.1
1960	0.38	18.4	18.8
1961	0.25	26.7	27.0
1962	0.58	36.4	37.0
1963	1.8	44.6	46.4
1964	3.9	76.6	80.5
1965	16.2	137.8	154.0
1966	65.0	145.0	210.0
1967	94.0	269.0	363.0
1968	180.0	442.0	622.0
1969	292.0	667.0	959.0
1970	269.0	1 775.0	2 044.0
1971	346.0	1 836.0	2 182.0
1972	604.0	2 946.0	3 550.0
1973	1 100.0	4 658.0	5 758.0
1974	1 422.0	7 980.0	9 402.0

<sup>a</sup>Includes "Caixas Econômicas Estaduais" of Minas Gerais, Rio Grande do Sul, São Paulo, Goiás and Santa Catarina.

<sup>b</sup>Personal Credit, durable consumer's goods.

<sup>c</sup>State and Municipal Governments; Housing, Mortgage, Government bonds, stocks and debentures.



## APPENDIX B-1

## LONG-TERM CREDIT IN BRAZIL

Cr\$ MILLIONS, AT CURRENT PRICES

PERIOD	FEDERAL DEVELOPMENT BANKS	HOUSING CREDIT COMPANIES	SOCIAL <sup>a</sup> / PROGRAMS
1952	0.8	-	-
1953	1.5	-	-
1954	3.1	-	-
1955	6.7	-	-
1956	10.9	-	-
1957	19.2	-	-
1958	28.0	-	-
1959	41.7	-	-
1960	58.9	-	-
1961	77.2	-	-
1962	154.1	-	-
1963	251.6	-	-
1964	445.9	-	-
1965	561.1	-	-
1966	1 425.0	4.0	-
1967	2 351.0	200.0	-
1968	3 573.0	765.0	-
1969	5 308.0	1 391.0	-
1970	7 503.0	2 351.0	-
1971	9 817.0	4 090.0	181.0
1972	14 496.0	8 657.0	915.0
1973	21 338.0	14 831.0	2 811.0
1974	... <sup>b</sup>	23 080.0	5 353.0

<sup>a</sup>Programa de Integração Social.<sup>b</sup>Not-available.

## APPENDIX B-2

## LONG-TERM CREDIT IN BRAZIL

Cr\$ MILLIONS, AT CURRENT PRICES

PERIOD	SAVINGS AND LOANS ASSOCIATIONS	INSURANCE COMPANIES	STATE DEVELOPMENT BANKS <sup>a</sup>	SOCIAL SECURITY INSTITUTES <sup>b</sup>
1952	...	3.3	-	7.8
1953	...	3.4	-	8.6
1954	...	3.6	-	9.2
1955	...	3.9	-	9.4
1956	...	4.4	-	10.1
1957	...	5.2	-	11.7
1958	...	6.2	-	12.7
1959	...	7.3	-	12.5
1960	...	8.6	-	13.9
1961	...	10.6	-	15.1
1962	...	13.8	-	19.5
1963	...	20.0	-	30.8
1964	...	42.3	-	38.1
1965	...	59.3	-	46.3
1966	...	83.0	-	60.0
1967	...	127.0	-	72.0
1968	34.0	213.0	-	102.0
1969	179.0	302.0	529.0	174.0
1970	354.0	454.0	919.0	191.0
1971	589.0	782.0	1 434.0	215.0
1972	1 512.0	1 147.0	2 776.0	269.0
1973	2 811.0	1 588.0	4 666.0	417.0
1974	4 539.0 <sup>c</sup>	2 103.0 <sup>d</sup>	8 896.0	523.0

<sup>a</sup>Including Banco de Desenvolvimento do Estado do Rio de Janeiro, Banco Regional de Desenvolvimento do Extremo Sul, Banco de Desenvolvimento de Minas, Banco de Des. do Paraná, Banco de Des. do Estado da Bahia, Banco de Des. do Estado do Maranhão, Banco de Des. do Estado do Espírito Santo, Banco de Desenvolvimento do Ceará, e Banco de Desenvolvimento do Estado de São Paulo.

<sup>b</sup>INPS and IPASE.

<sup>c</sup>November 1974.

<sup>d</sup>September 1974.

APPENDIX C-1

QUARTERLY RATES OF RETURN  
IN PERCENTAGE POINTS

PERIOD	PRIVATE BILLS OF EXCHANGE	GOVERNMENT BONDS	REAL ESTATE BILLS	MUTUAL FUNDS	STOCK MARKET	INFLATION (SEASONALLY ADJUSTED)
1960 - I	7.37	-	-	-	39.9	5.4
II	7.05	-	-	-	8.0	3.7
III	6.79	-	-	-	12.8	10.6
IV	6.71	-	-	-	4.6	8.2
1961 - I	6.66	-	-	-	-0.5	2.3
II	6.73	-	-	-	0.3	10.5
III	6.70	-	-	-	9.3	11.1
IV	7.10	-	-	-	21.8	16.0
1962 - I	7.34	-	-	-	13.0	7.3
II	6.94	-	-	-	3.5	9.6
III	6.99	-	-	-	32.4	9.6
IV	7.70	-	-	-	73.0	14.6
1963 - I	8.90	-	-	-	40.0	20.0
II	8.97	-	-	-	-46.3	13.1
III	8.54	-	-	-	91.9	12.5
IV	8.79	-	-	-	-12.7	15.5
1964 - I	9.50	-	-	-	-20.5	24.2
II	11.05	-	-	-	37.3	12.5
III	11.72	-	-	-	25.2	13.8
IV	12.17	-	-	-	-25.3	17.0
1965 - I	11.64	16.17	-	-	-4.7	8.7
II	9.63	14.28	-	-	13.0	5.5
III	7.32	7.37	-	-	73.5	6.2
IV	7.24	3.77	-	-	-4.8	4.3

PERIOD	PRIVATE BILLS OF EXCHANGE	GOVERNMENT BONDS	REAL ESTATE BILLS	MUTUAL FUNDS	STOCK MARKET	INFLATION (SEASONALLY ADJUSTED)
1966 - I	7.44	6.02	-	-	0.2	10.1
II	7.46	10.02	-	-	-3.2	11.4
III	7.75	9.75	-	-	-4.7	7.4
IV	8.67	7.80	-	-	-17.1	3.0
1967 - I	8.51	6.85	-	-	45.1	6.1
II	7.74	4.28	-	-	-1.9	4.5
III	7.34	2.96	10.47	-	17.8	5.6
IV	7.75	2.58	9.12	-	4.2	3.7
1968 - I	7.70	5.07	8.04	-	33.9	6.8
II	7.19	6.01	7.65	-	21.1	6.7
III	7.27	6.92	8.04	-	1.0	5.0
IV	7.41	4.55	8.34	-	0.5	3.4
1969 - I	7.43	5.50	8.70	28.3	84.3	1.4
II	7.18	4.20	8.82	28.9	52.7	6.5
III	6.83	2.77	7.77	24.6	52.3	8.0
IV	6.98	4.63	6.78	-1.4	-12.0	3.7
1970 - I	7.11	4.50	7.08	9.6	15.2	3.4
II	7.17	2.98	7.17	-7.1	-10.8	5.5
III	7.23	5.76	6.96	27.4	58.5	6.0
IV	7.17	5.98	7.17	8.5	25.4	2.3
1971 - I	7.03	5.76	7.17	28.9	53.5	3.5
II	7.00	5.64	6.81	46.8	103.5	7.4
III	7.03	6.24	7.14	-11.3	-14.8	4.5
IV	7.04	6.86	8.19	-3.9	-15.5	2.7
1972 - I	6.79	6.42	7.83	-19.8	-9.6	5.3
II	6.37	6.47	7.53	-15.7	-17.7	4.4
III	6.13	6.25	7.44	-3.9	-9.9	4.0
IV	6.05	5.19	6.27	-9.5	-19.3	3.9