Price-Level-Adjusted Mortgages in Brazil

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I. INTRODUCTION

Brazil has adopted price-level indexation of financial contracts to a much greater degree than any other country. Indexation was adopted during the mid-1960s, following a period of extremely high and volatile inflation, in response to virtual stagnation in financial markets and a host of related problems. Although there is considerable controversy over the extent to which indexation has contributed to Brazil's subsequent economic growth and the diminution of inflation, there is little question that, in combination with reductions in the rate of inflation, it has been a major factor in revitalizing financial markets and increasing the volume of funds available for housing.

Virtually all mortgages are price-level adjusted and, in the majority of cases, are financed directly or indirectly by indexed liabilities. Of special interest to this study is the fact that various government-controlled pension funds, whose liabilities (benefits) are price-level indexed, are major suppliers of mortgage credit.

Since mortgage indexation is part of a much more general scheme, we begin with a brief overview of indexation in Brazil.

II. A BRIEF HISTORY AND OVERVIEW OF PRICE-LEVEL INDEXATION IN BRAZIL[1]

Brazil adopted indexation in 1964 as a response to the bleak performance of the economy in the early 1960s. The 1950s had been a time of modest if uneven growth and inflation rates. Under the populist government that ruled from 1959 to 1963, inflation rose from 30 percent to almost 100 percent per annum, and average real wages fell 15 percent in

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[1]This section of the paper draws heavily upon Baer and Beckerman (1974), Campiglia (1974), Fishlow (1974), and Kafka (1974).

spite of a 13 percent gain in labor productivity. The progressive personal income tax had no automatic adjustment for inflation and only *ad hoc* adjustments were made during the 1950s. Housing was stifled by rent control at fixed nominal levels. Corporations were subject to an excess profits tax on illusory inflation profits due to both historical-cost-based depreciation and "inventory profits." Medium and long-term capital markets had disappeared entirely with the exception of Brazilian government development funds and U.S. AID loans.

The military government that came to power in 1964 chose to encourage expanded employment and more rapid growth in GDP rather than attempt a rapid reduction in the rate of inflation. Indexation was instituted as a temporary measure to reduce the costs and distortions from the higher interim rates of inflation; it was not suggested as a permanent solution. Inflation was reduced to under 30 percent per annum by 1967 and to a low of 16 percent in 1973. In 1974, it accelerated to over 30 percent, largely in response to the external shocks of oil and commodity price increases. Over this same period, real GNP growth jumped, reaching an average level of 11 percent from 1970 to 1973.

A. *Indexation in Financial Markets*

The Mechanics of Price-Level Indexation. Before the reforms of 1964, usury and legal tender acts enacted in 1933 had barred nominal interest rates above 12 percent, as well as any price-level adjustment of the principal value of assets. Since 1964, two types of indexation have been allowed in Brazil for selected assets.

The first type is post-indexation, where assets are issued with a fixed interest rate but have periodic adjustment of the nominal principal value to compensate for inflation. The index used for adjustment and the timing of adjustments are legally mandated. The increase in the nominal principal value of the asset is treated as a capital gain and effectively escapes taxation.

A series of laws from 1965 to 1967 led to the second type, a "pre-indexation" scheme for short-term assets. The 12 percent usury ceiling on interest rates had often forced short- and medium-term financing to be done on a "banker's-discount" basis through the sale of promissory notes on the Brazilian stock exchange. Further, the full income from these short-term assets was taxed as current income even though the effective yields, of course, included a substantial inflation premium as compensation for expected declines in the real value of the principal.

With pre-indexation, an implicit inflation forecast is incorporated into the nominal interest rate, just as is the case in the United States. However, that portion of the interest income received by the holder which is merely compensation for the decline in the real value of the asset is exempt from taxes and from usury ceilings. The size of the exemption is determined by applying to the initial nominal principal value of the asset the same "inflation index" used for principal-adjustment of post-indexed assets.

Post-indexation, therefore, may be viewed as providing a fixed *real* rate of interest but a variable *nominal* rate of interest and pre-indexation as providing a fixed *nominal* rate of interest and a variable *real* rate of interest. The investor's choice between the two types of instruments depends upon his expectations of the future level and variance of the rate of inflation.[2] If all investors perfectly anticipated inflation, and short rates reflected that expectation, then the real rates of return on post-indexed and pre-indexed assets would differ only as a reflection of the term structure for the various maturities. Since variance in the *ex ante* rate of inflation presumably increases with the term of the asset, it is understandable that post-indexation has been used for all long-term assets and pre-indexation for short-term assets.

History since 1964. The first indexed financial assets offered in Brazil were one, two, and five-year post-indexed Treasury bonds issued in 1964 at a 6 percent interest rate, with monthly price-level adjustment of principal based upon a three-month moving average of the Vargas Foundation's wholesale price index, lagged three months (five-year bonds were adjusted quarterly).[3] Purchase of the bonds was compulsory for firms subject to taxation.

Favorable market response to indexed federal debt led to the extension of indexation, on the same post-indexed basis, to mortgages in 1964 and 1965, and in July 1965 to long-term corporate debt, most time deposits, and all medium-term debt instruments.[4] Indexation has since been extended to state government bonds, promissory notes, and made compulsory for savings and time deposits of two years' maturity or more. No indexation is permitted on demand deposit accounts.

In 1967 pre-indexing was made available for private assets, and in 1970 the federal Treasury issued new pre-indexed short-term bills to coincide with the beginning of open-market operations by the Central Bank of Brazil (itself a product of the 1964 reforms).

In 1973 concern over acceleration of inflation led to a new inflation-index for medium and long-term debt under both post and pre-indexing: the price-level adjustment of principal was linked to a moving average of *actual* inflation in the wholesale price index for the past three months plus *official forecasts* for the next two months. In July 1974 this index was mandated for short-term pre-indexing as well, and now governs all indexed financial assets in Brazil.

[2]See Fischer (1975) for an extensive analysis of the portfolio effects of indexed assets.

[3]The wholesale price index is based only on commodities, and thus potentially omits differential effects of increased prices of services. Table 1 shows that changes in the wholesale price index and thus the computed monetary correction rates have often been below increases in consumer prices of goods and services.

[4]While the compulsory introduction of indexation partially halted income transfers resulting from inflation, it also restored a positive real rate on loans and helped induce a recession in 1965 and 1966.

Table 1 shows the dramatic increase since 1969 in savings, both voluntary and compulsory, in indexed as compared to non-indexed assets.

Many of the indexed sources, including mortgage bonds, time deposits, and the Seniority Security Fund, channel funds into housing. This is reflected in the rising share of total domestic credit going to housing — from 13.4 percent in 1969 to 22.6 percent in 1973.

B. *Indexation and Wage Adjustments*[5]

Wages in Brazil have been implicitly based upon price increases since the early 1950s. Formal control through a mixture of indexation and income policies was introduced in 1965 for federal employees and minimum wage employees, and extended in 1966 to all workers subject to collective bargaining or labor court awards. The 1966 legislation provided that all labor contracts would be for 12 months and must be calculated according to a government-mandated formula in three parts: the first part allowed for an increase in the nominal wage sufficient to restore the *average* real wage that prevailed during the past 12 months, the second for a nominal increase sufficient to maintain that average real wage during the next 12 months if inflation follows the official government forecast, and the third for a nominal increase to reflect gains in labor productivity. The use of the past actual *average* real wage coupled with over-optimistic government predictions of inflation caused real wages to fall, under formula adjustment, from 1964-1967. Further, the government has consistently awarded only about one-half of productivity gains to labor, explicitly trading off even higher real wages for higher employment.[6]

In 1968 the adjustment formula was changed to use the average real wage that would have prevailed last period if the government forecast of inflation had been correct. The cumulative effects of government underestimation of inflation were thereby halted; over the 1968-1973 period wage adjustments ran about 2 percent more than inflation, but still well below the growth rate of labor productivity or the growth rate of real GDP. In 1974, wage adjustmens were held substantially below the rate of inflation; forecasts of upcoming inflation, which are part of the formula, appear to have been biased downward as a matter of policy. The adjustments for 1975 appear to be aimed at making up some of the discrepancy. Minimum wages and wages of public employees are not calculated by these formulas, and have not kept pace with inflation.[7] From 1964 to

[5]This section draws heavily upon Kafka (1974) and Fishlow (1974).

[6]The new economic policy makers who assumed control in 1968 displayed a definite preference for full employment and rapid growth while relying on indexation to reduce many of the distortions from inflation. From 1967-1971, the average urban real wage rose 12 percent and productivity rose 24 percent; the average industrial real wage rose 11 percent while productivity rose 32 percent.

[7]The 1975-1976 minimum wage adjustments are, for the first time, well above the anticipated rate of inflation.

Table 1

GROWTH OF SELECTED SAVINGS INSTRUMENTS — 1966-1974

End-of-year Levels in Millions of Cruzeiros

	Voluntary Sources							Compulsory Sources	
						Time Deposits			
Year	Treasury Bonds (post-indexed)	Treasury Bills (pre-indexed)	Mortgage Bonds (post-indexed)	Commercial Bills of Exchange pre-indexed)	Savings Deposits (post-indexed)	(pre-indexed)	(non-indexed)	Seniority Security Fund (post-indexed)	Other Funds (post-indexed)
1966	1,401	—	7	906	18	141	127	—	—
1967	2,482	—	140	2,105	86	469	138	597	—
1968	3,491	—	461	4,558	330	1,055	312	1,604	—
1969	5,881	—	922	6,172	893	1,938	74	2,832	—
1970	9,412	700	1,724	9,756	2,081	4,283	75	4,345	—
1971	11,565	3,880	2,762	14,390	3,761	9,319	88	6,332	1,008
1972	15,975	10,204	4,566	22,305	7,713	16,803	133	9,038	2,648
1973	20,944	17,400	6,259	37,129	14,122	26,399	113	12,907	7,559
1974*	23,650	16,650	6,720	41,459	16,554	25,958	118	14,797	8,587

*April, 1974 — Preliminary

Source: Central Bank of Brazil, *Bulletin,* 1974.

1967, real minimum wages fell 16 percent, while average industrial real wages rose 7 percent.

Since 1968 a government policy of reducing geographic wage differentials has meant smaller increases in minimum wages in high wage areas and larger increases in low wage areas. Preliminary comments indicate some success in narrowing wage differentials. The government has also allowed increases in excess of formula adjustments for industries whose productivity gains allow such increases without pressure on prices. The continuance of the boom that began in the 1960s has seen manufacturing employment grow 9.1 percent in 1973 and nearly 9.9 percent in 1974, forcing increased competition for all forms of labor and steady upward market pressure on wage rates.[8]

C. *Indexation and Public Sector Finances*

The advent of indexation in the fiscal sector has sharply reduced the fiscal deficit, which had been as large as 4 percent of GDP in the mid-1960s. Past-due tax liabilities were immediately indexed in 1964, and new corporate and personal income tax laws in 1966 saw the cruzeiro limits for rates, exemptions, and deductions indexed with annual adjustments.[9] The consolidation account of general government has been in surplus consistently since 1970, and the central government cash budget ran a surplus in 1973; predictions are for a small 1974 deficit when final data are available.

Expenditures have been kept at a roughly constant proportion of GDP by freezing employment and indexing government wages below the actual rate of inflation.[10]

Revenues, based principally upon ad valorem commodity taxes, have grown faster than money GDP, in spite of numerous tax reductions for specific policy goals. This is mainly because of a concentration of the taxes in the fastest growing sectors of the economy and the rapid increases in the labor force by social security and the Unemployment Insurance Fund.[11]

[8]Automatic cost-of-living increases have been dropped for employees in the highest income categories. This step apparently was taken to allow a narrowing of wage differentials, which had become extreme due to an acute shortage of high-level managers and other professionals during the early years of the current economic regime.

[9]The question of proper indexation of corporate fixed assets for depreciation is a difficult one. Although Brazil allowed some indexation of assets for the 1951-1966 excess profits tax, indexation for depreciation purposes was not allowed under the regular corporate income tax until 1964. Adjustment of working capital was allowed after 1964.

[10]These expenditures do not include subsidies provided by quasi-governmental semi-autonomous agencies. Although these amounted to nearly 1 percent of GDP in 1973, they were reduced substantially by adjusting domestic oil prices to world levels in April 1974. These figures also exclude capital expenditures of the semi-autonomous agencies.

[11]Substantial revenue also is collected through indexed corporate and personal income taxes.

For housing finance, the seniority security and social integration funds are of great potential importance and will be discussed in the next section. The Seniority Security Fund (Fondo de Garantia do Tempo do Servico-FGTS), which provides lump sum benefits upon termination or retirement, was created in 1966 and is financed by an 8 percent tax on wages and salaries. The fund has grown steadily, and the net proceeds are used to finance the National Housing Plan.[12] Further, workers are permitted to draw upon balances in their FGTS accounts for housing purchases.[13]

Finally, the introduction in 1970 of Central Bank Open Market Operations in Treasury bills, and recent heavy Central Bank sales of bills to absorb inflows of foreign capital, have substantially reduced monetary authority holdings of federal debt. An indexed tax structure, expenditure restraint, and continued sales of federal government debt to the public have been central causes of the reduction of inflation rates in Brazil, and the subsequent partial rebirth of medium-term credit markets.

III. DESCRIPTION OF BRAZILIAN PRICE-LEVEL-ADJUSTED MORTGAGES

Virtually all mortgages in Brazil are price-level adjusted, although a significant proportion have payment streams which are linked to a wage index.

A. *Variations in Mortgage Terms*

Brazilian mortgages differ in terms of maturity, interest rate, and repayment patterns depending upon the size of the loan and the household's income. Loan sizes are expressed in terms of units of constant purchasing power (Unidades de Padrao de Capital - UPC) to automatically correct for price-level changes while income levels are usually expressed in multiples of the minimum wage.[14] Mortgage terms are set by the National Housing Bank (BNH), which regulates institutions that finance housing and is a major supplier of credit to these institutions. Differences in these terms reflect, to a large extent, an effort to redistribute income through the housing finance system.

[12]Such withdrawals have been negligible, but recently regulations have been liberalized to encourage their use.

[13]PIS (Social Integration Fund) and PASEP (Government Employees' Participation Fund) are similar forms of compulsory savings, the former with the proceeds of a gross receipts tax plus 5 percent of corporate income taxes and the latter with a percentage of government revenue. Both funds support industrial development.

[14]The dollar value of the UPC was $12.85 in 1973 and remains fairly constant since Brazil's exchange rate is adjusted periodically to reflect inflation relative to that of the United States. The relation between UPCs and the minimum wage (actually there are various minimum wages for different areas) is not absolutely constant, since they are adjusted according to different formulas. In 1973, 1 minimum wage was equal to approximately 3.75 UPCs.

Low-income borrowers are given relatively favorable treatment as part of the Home Income Housing Finance Program (SIFHAP) which is administered by the National Housing Bank. Through these programs, BNH provides advances at concessionary interest rates against loans for up to 900 UPC (roughly US$11,500) to households with monthly incomes of up to 13.3 UPC minimum wages (roughly US$650) and requires that lenders allocate specified proportions of their loans to specific income groups.[15]

Families whose incomes are above the levels served by the low-income financing program are eligible for mortgages of up to 3500 UPC (roughly US$45,000) from the Housing Finance System, comprised of savings and loan associations, savings banks, and real estate credit companies acting as agents of the BNH which provides advances against eligible mortgages.

Table 2 summarizes interest rates, limits on the ratio of payments to income, maximum loan-to-value ratios, and maximum maturities for loans eligible for either the special financing programs or SFH mortgages.

Larger loans are available from savings and loans, savings banks, and real estate credit companies, but are not eligible for BNH advances. Interest rates on these loans generally are 12 percent, the maximum allowed by law.

B. *The Mechanics of Mortgage Indexation*

The *principal value* of each loan is adjusted each quarter by applying a *monetary correction factor* — usually the percentage change in the value of readjustable treasury bonds which in turn is linked to official price indices — to the outstanding principal. The base interest rate, fixed for the life of the mortgage, is then applied to the adjusted principal.

Payments, in contrast, are adjusted either by the *monetary correction factor* or a *wage index.* For loans up to 1,800 UPC (roughly US$23,000) the borrower may choose to have payments adjusted by either index. Over 1,800 UPC, payments are linked to the monetary correction factor.

In the case of loans with payments linked to the wage index, adjustments are made once a year in proportion to changes in the legal minimum wage. Since the principal obligation is adjusted by price-level changes, actual payments may fall short of or exceed the amount required to fully amortize the loan. At maturity, any shortfall is made up by the Salary Variation Compensation Fund set up by the BNH. Any overpayments go to the Fund.

Two types of *amortization schedules* apply. For mortgages eligible for wage-linkage, scheduled payments involve equal amortization of principal over time (prior to wage or price-level adjustment). Thus, they are scheduled to decline in real terms over the life of the mortgage. For loans over

[15]The program serves three categories of households — "popular" with monthly incomes up to 1.6 minimum wages (US$75); "economic" with incomes up to 4.3 minimum wages (US$200); and "intermediate" with incomes up to 13.3 minimum wages (US$650).

Table 2

MORTGAGE TERMS ACCORDING TO SIZE OF LOAN[1]

Loan Size in UPCs	in US$[2]	Maximum Interest Rate[3]	Maximum Payment-to-Income Ratio[4]	Maximum Loan to Value Ratio	Maximun Maturity
		%	%	%	Year
0-100	0-2,570	1.0	18	90	25
100-300	2,570-3,855	2.6	20	90	25
300-400	3,855-5,140	3.3	25	90	25
400-500	5,140-6,425	6.0	25	90	25
500-600	6,425-7,710	6.6	25	90	25
600-700	7,710-8,995	7.3	25	90	25
700-800	8,995-10,280	7.9	25	90	25
800-900	10,280-11,565	8.6	25	90	25
900-1000	11,565-12,850	9.3	25	90	15-25
1000-3500[5]	12,850-44,975	10.0	25-40	70-90	15-25

[1]These rates went into effect in 1975. Previously a similar but more complex scheme v in force.

[2]For the third quarter of 1974, the UPC had nominal value of CR$ 89.90 or appro mately US$ 12.85.

[3]This is the "real" rate. The nominal cost includes this rate and the rate of inflation.

[4]Initial periodic payment to income with the constant amortization plan described belo

[5]Prior to July 1975, this limit was UPC 2250 (roughly US$ 29,000).

1800 UPC, borrowers may choose either level total payments (prior t monetary correction) or level amortization of principal.

IV. THE BRAZILIAN SYSTEM FOR FINANCING HOUSING[16]

Housing finance in Brazil is provided by four types of institutions: th National Housing Bank (Banco Nacional de Habitaçao-BNH), specialize financial institutions, general purpose financial institutions, and prc motional entities which are engaged primarily in construction but alr perform a financing function.

[16]This section is based on *Sistema Financeiro da Habitaçao*, IBMEC (Brazilian I stitute for Capital Markets).

The National Housing Bank controls and supervises the entire system and supplies credit via other intermediaries.

Specialized financial institutions include savings and loan associations, real estate credit companies and government sponsored savings banks.

General financial institutions which finance housing include state development banks, investment banks and commercial banks. The promotional entities which also perform financing functions are state housing companies and cooperatives.

Table 3 shows the relative importance of the various mortgage lenders.

Overlaying these institutions are various housing programs and housing finance systems administered by BNH. The Housing Finance System (SFH), aimed at middle income groups, encompasses the savings and loans for which the BNH acts as central bank as well as a variety of other institutions which are BNH agents. The Low-Income Housing Finance System (SIFHAP) is a subsystem of the SFH and is based on a set of special BNH lending relationships with the various institutions. It, in turn, is directly related to the Low Income Housing Program (PLANHAP), through which BNH promotes low-income housing.

A. *The National Housing Bank*

The National Housing Bank (BNH), founded as part of the 1964 financial reforms, serves as central bank to the savings and loan associations and supervises the housing finance activities of the other specialized housing finance institutions. It is responsible for all government housing programs comprising the National Housing Plan and serves as an investment banker for the construction and building materials industries. As such, it combines the activities carried out in the United States by HUD, the Federal Home Loan Board, FNMA and GNMA. Nearly 80 percent of its assets are advances against mortgages held by other financial institutions, with most of the remainder being held in Treasury securities.

BNH as currently organized is an autonomous public enterprise which does not depend upon direct public funding. However, nearly 80 percent of its liabilities represent the assets of the Seniority Security Fund funded by an 8 percent payroll tax. Thus, the primary assets of Seniority Security system — whose benefits are adjusted for price-level changes — are advances against price-level-adjusted mortgages. BNH also is empowered to issue mortgage bonds, but these represent less than 1 percent of total liabilities. Most of these have been issued to the Social Security Trust Fund in payment for land owned by the Fund which has been used for public housing projects.

B. *Specialized Financial Institutions*

Savings and loan associations are mutual institutions similar to their U.S. counterparts. Over 90 percent of their assets are price-level-adjusted

Table 3

RELATIVE IMPORTANCE OF MAJOR MORTGAGE LENDERS — 1973

	Total Mortgages	Refinanced by BNH
	Millions of Cruzeiros	
Real Estate Credit Companies	13,924	5,344
Savings Banks	7,386	709
Savings and Loan Associations	2,748	1,550
Commercial, Investment, and Development Banks	N.A.	5,647
Housing Companies	N.A.	2,958
Housing Cooperatives	N.A.	3,462
Other	N.A.	950
Total Refinanced by National Housing Bank		20,620

Source: IBMEC, *Sistema Financeiro da Habitaçao* and *Conjuntura Economica.*

mortgages. Their liabilities include passbook savings deposits, mortgage notes, and BNH advances. Savings deposits are the most important source of funds, followed by BNH advances. Although BNH deposits represented 57 percent of total liabilities in 1973, they provided funding for less than one-fourth of the new loans in that year. Savings deposits accounted for the bulk of the remainder.

Real estate credit companies are private stock companies which engage in real estate finance. Most of their assets, 84 percent in 1973, are mortgages and construction loans. Their prime sources of funds are mortgage bills, which represented as much as 60 percent of total liabilities and net worth in the late 60s but have fallen steadily since then, to 38 percent of total liabilities and net worth in 1973. The difference has been made up by BNH advances, which have increased from 17 percent to more than 34 percent over the same period, and savings deposits, which grew from 5 percent to 16 percent of total liabilities and net worth.

Savings banks are the oldest among the specialized financial institutions, but have changed considerably since the incorporation of their real estate finance activities into the system controlled by the BNH. These banks are sponsored by federal or state governments. Their assets, in contrast to the previous two groups of institutions, include a much higher proportion of government securities. Mortgages account for roughly 30 percent of their total assets. Although eligible for BNH finances, most

savings bank funds are obtained from savings deposits. Two types are offered — regular passbook accounts and accounts linked to future purchases of housing.

Savings Instruments Issued by Specialized Financial Institutions

As noted, specialized financial institutions offer three types of financial instruments to the public: savings deposits, mortgage bills, and mortgage notes. All are price-level adjusted.

Passbook savings accounts are price-level adjusted and bear a fixed rate of interest, currently 6 percent. Price adjustments are made quarterly according to the official price index and are applied to the lowest deposit balance in the previous quarter. Interest payments and "monetary correction" adjustments to principal are tax exempt below specified limits. Savings deposits are available only to individuals, not to corporations.

Mortgage bonds are negotiable securities with a fixed interest rate and price-level adjustment. They are issued with a variety of maturities, from three to ten years. Two basic types are issued: *income bonds* and *savings bonds*. Income bonds pay out both interest and the monetary correction on a quarterly basis. Savings bonds pay out only interest and the monetary correction accumulates until maturity. Interest payments, but not the "monetary corrections," are taxable. However, special exemptions apply to these instruments and serve to reduce the effective tax rate which applies to them.

Mortgage bonds are guaranteed by the BNH, which charges an insurance fee of .125 percent per quarter and controls the amount issued by any institution.

Mortgage notes are similar to mortgage bonds, but are backed by specific mortgages and are repaid according to the same amortization schedule which applies to the mortgage.

Of the three, savings deposits are the most important and also show the fastest growth, rising from 2 percent of all financial assets in the hands of the public in 1967 to 6.6 percent in 1973. From 1970 to 1973, the number of individuals holding savings accounts increased at an annual compound rate of 54 percent. Mortgage bonds, in contrast, accounted for 2.4 percent in 1969, rose to 3.3 in 1972, but fell to 2.9 in 1973.

V. EXPERIENCE WITH PRICE-LEVEL-ADJUSTED MORTGAGES

A. *The Ability of Households to Meet Rising Nominal Payments*

With rates of inflation ranging from 20 to 30 percent, it is clear that "monetary correction" represents a major part of the nominal cost of a loan. Understandably, borrowers complain about this price-level adjustment and in recent years certain groups whose wages did not keep up with general price-level changes found the adjustments very burdensome and delinquency became more frequent. As noted earlier, wage earners who are either civil servants or earn wages linked to the maximum wage

(who account for well over half the urban work force) have seen their real wages fall steadily through 1974.

In response to this situation, the government introduced wage-linked payments coupled with a constant amortization of principal. Wage-linkage provides a form of insurance against further divergence between wages and prices while the constant amortization payment schedule, by forcing real payments to decline through time, provides an extra cushion. The government also has avoided foreclosures wherever possible, and seeks to renegotiate mortgages where necessary.

When the wage-linked option was first offered, it was chosen by three-quarters of the eligible borrowers. By 1975 the proportion had risen to over 95 percent. Most higher income borrowers, who had a choice between level payment and constant-amortization payment plans, elected to remain with the former system.

B. *Indexation and the Success of Government Housing Programs*

Given the much larger proportion of low income households and the paucity of adequate housing in comparison with the other countries reviewed, Brazil faced a substantially different task. Stabilization may have been an issue, but it was overshadowed by the need to increase the total level of housing construction. Since changes in mortgage markets were accompanied by drastic changes throughout the economy, it is impossible to accurately determine the role of the financial system in subsequent developments. However, the Housing Finance System claims to have financed over 1,000,000 houses since its inception in 1964, compared to 120,000 units financed through mortgages during the previous 25 years. It currently accounts for over 70 percent of all units financed.

Housing starts, as measured by permits granted, have shown an enormous growth. In 1974, permits were issued for 122,000 units in major urban centers, compared to 37,000 units in 1968.

In terms of the distributional goals, an accurate evaluation is even more difficult.[17] The government has endeavored to shift financing toward lower income groups via two mechanisms: advances at concessionary rates from the BNH and limits on the proportion of mortgage lending to lower (minimum limit) and upper income (maximum limit) groups for institutions comprising the SFH. While the minimum "spread" between the mortgage rate and the BNH advance rate is 1 percent, it goes as high as 3 percent to loans in the 400-500 UPC category.

These concessionary advance rates to lower income groups are not subsidized by the government budget, but rather from BNH's own operations.[18] Thus the BNH to some extent, serves as a redistributive device.

[17]For an extensive evaluation of the redistributive aspects of the Brazilian housing finance system see Reynolds and Carpenter (1974).

[18]The only element of external subsidy might be the 3 percent earnings rate applied to FGTS funds.

From 1961-1971, two-thirds of the SFH financed housing units were for families of one to six minimum wage incomes, with an average per unit cost of about US$7,500, and one-third of housing units were financed for those over six minimum wages, with a maximum per unit cost of roughly US$29,000. The increased 1973-1974 inflation altered the picture somewhat. For 1974, one-third of housing units were for families of one to eight minimum wage incomes, and two-thirds of units for families of eight or more minimum wage incomes. In addition, rapid cost increases led to an increase on July 1, 1975 in maximum financing under SFH to UPC 3500, and extended the 10 percent interest rate ceiling (and the corresponding right to BNH advances at 9 percent) to the same level.

VI. SUMMARY AND CONCLUSIONS

The volume of mortgage credit in Brazil has risen steadily both in absolute terms and as a share of total domestic credit. Although it is impossible to determine the extent to which this growth can be attributed to the introduction of indexed mortgages and savings instruments, it seems quite clear that indexation had a major impact.

Since this paper involves a very partial analysis of indexation in Brazil, concentrating on housing finance, it should not be taken as a general statement on the desirability of indexation. Further, it should be clear that indexation in Brazil is related to a complex scheme of wage and price controls which may or may not be desirable in some general sense. However, it does suggest that indexation in housing markets can enable them to operate efficiently even in periods of high and uncertain inflation.

An issue that has been raised about PLAMs and similar instruments is that they are hopelessly complex and therefore will not be accepted by borrowers, savers, and financial institutions. The Brazilian experience shows that this is not true.

Another issue with price-level-indexed mortgages is whether household income will keep up with mortgage payments. This has been a problem for lower income groups in Brazil, since contrary to the common view, wages are not automatically adjusted along with prices and the two series have diverged for short periods. However, the Brazilians have alleviated this problem by the use of wage-indexed plans and the adoption of amortization schedules which imply a real decline in payments over time.[19]

Finally, it has been argued that lessons from the experience of Brazil result from a general indexation of prices and wages and therefore are not applicable to the United States. While there may be some merit to this argument, it should be noted that "post-indexed" assets have not driven out all other financial assets and that wages have not been linked directly to prices but have often lagged inflation by a substantial margin.

[19]The rate of decline, however, is much smaller than that of a standard mortgage under similar conditions. Further, it does not depend on the rate of inflation.

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