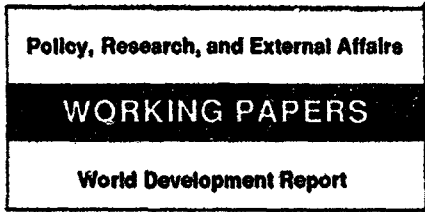


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Who Paid the Bill?

Adjustment and Poverty in Brazil, 1980-95

M. Louise Fox
and
Samuel A. Morley

By choosing an expansionary fiscal path, Brazil traded growth in the middle years of the decade for inflation and a larger debt three years later. Fox and Morley look at the impact of that trade-off on poverty alleviation in Brazil, where in 1987 roughly 45 million people lived in households below the poverty line.

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This paper — a product of the Country Operations Division, Country Department I, Latin America and the Caribbean Regional Office — was prepared as a background paper for the 1990 *World Development Report* on poverty. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact the World Development Report office, room S13-060, extension 31393 (45 pages)

Against a regional record of negative per capita growth after the world recession and debt crisis of 1982, Brazil stands out as a model for a different path. By effectively failing to adjust internal demand to the decline in external funds, Brazil set records in its region in per capita growth and inflation between 1982 and 1988.

By choosing an expansionary fiscal path, Brazil traded growth in the middle years of the decade for inflation and a larger debt three years later. Fox and Morley look at the impact of that trade-off on poverty alleviation in Brazil, where in 1987 roughly 45 million people lived in households below the poverty line. (In Latin America, only Mexico has a total population greater than the number of poor people in Brazil.)

Macroeconomic policy affects few people directly. For most poor households, the labor market is the most important source of income, as they rarely own much capital. So Fox and Morley focus on the effect Brazil's policies had on its labor market.

Their counterfactual simulations suggest that Brazil could have dealt better with rising levels of poverty in the 1980s if it had been able to reach political agreement on a reduced level of consumption in either 1982-83 or 1985 (by reducing government spending or increasing taxes and thereby reducing private consumption).

This was difficult, as the loosening of authoritarian controls gave voice and power to new groups, bringing a rush of pent-up demand for consumption, especially government services. Ironically, the failure to exercise restraint in the early and middle years of the decade comprised growth for the rest of the decade, hurting all groups.

Brazil's wage policies in the 1980s strongly benefited formal sector workers, especially during the recession. In this Brazil's experience differs sharply from many other countries during stabilization.

Moreover, during the recession, private sector firms did not reduce employment as fast as output declined — choosing instead to stockpile labor and sacrifice profits. The indirect effects (the income multiplier effects) appear to have been strong enough to have prevented real incomes in the informal sector (including agriculture) from falling relative to the formal sector. When private formal sector output increased in 1983-86, so did employment. If the government had not tried to protect the wages of lower-skilled private sector workers, firms would probably not have increased employment, but increased profits.

Brazil can stabilize and return to a sustainable growth path in the 1990s, contend Fox and Morley, if all groups (including the poor) suffer a short-run loss. This loss would be short-run *only if the stabilization is effective within a short time* and private investors become confident enough to invest again. The ultimate result should be higher employment and earnings and greater government ability to increase social services to the poor. A repeat of the stabilization failures of 1986-89 offers grim prospects for the poor.

In short, prospects for reducing poverty depend on what mechanism is chosen to expand the private formal sector. In the 1970s and again in 1984-85, output growth in this sector brought both formal sector employment growth (higher paying jobs) and higher incomes in the informal sector — more so in the southern part of the country, where formalization is greater and where the private sector has a greater share of formal sector employment. Successful stabilization, adjustment, and growth should benefit the northeast but will probably do so less than in the south. And stabilization will be especially difficult for major cities in the northeast. Reducing poverty in this area will require policies that make growth more efficient at poverty reduction (improving the rate of trickle-down).

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Introduction

The difficulties most Latin American countries have experienced in returning to sustained growth after the world recession and debt crisis of 1982 have surprised and frustrated many observers. Concern is increasingly expressed about the social costs of this period of recession and adjustment, especially for the poorest sectors of the population, who benefitted significantly from the more rapid income growth of the previous decade. Nowhere is this concern better placed than Brazil, with roughly 45 million people living in households below the poverty line in 1987.¹ Against the regional record of negative per capita growth, Brazil stands out as a model for a different path. By effectively failing to adjust internal demand to the decline in external funds, Brazil set records with respect to its neighbors in per capita growth and inflation between 1982-88 (Table 1). Brazil, by choosing an expansionary fiscal path, traded growth in the middle years of the decade for inflation and a larger debt three years later. This study looks at the impact of that tradeoff on poverty alleviation in Brazil.

Table 1: Income growth and Inflation,
Brazil and Latin America, 1982-88

	Average Growth of GDP, per Capita	Average Yearly Inflation
Brazil	0.9	301.9
Latin America except Brazil	-1.4	149.8

Source: Cardoso and Dantas (1989)

Macroeconomic policy (e.g monetary, aggregate expenditure, and exchange rate policy) affects few people directly. Instead, macroeconomic policy operates through factor and product markets to affect the functional distribution of income, and through the functional distribution affects individual income, depending on the ownership of factor incomes among households. For most poor households, the most important source

¹To put that number in perspective, within Latin America, only Mexico has a total population greater than the number of poor people in Brazil.

of income is the labor market, as poor households rarely own much capital. Our approach to analyzing the question of the impact of Brazil's macroeconomic choices on the poor therefore focuses on the labor market outcomes these policies stimulated. Our framework for analysis is inspired by Modigliani and Paddoa-Schioppa's work on Italy in the 1970s.² First, we divide production into the formal (modern) and informal sectors, as macroeconomic policy will affect each one of these sectors differently. Within the formal sector, the problem to be analyzed is how to achieve consistency among competing claims of the factors of production and other components of cost, all of which have to add up to the total value of the formal sector product. Workers set target wages, businessmen set their markups, and the government makes these claims consistent by the inflation rate that it chooses through monetary and fiscal policy. How the government chooses to finance its deficit--through bond sales or money creation--determines both the inflation and interest rates, the latter having important negative implications on supply through working capital and investment. The formal sector solution consistent with the demands of workers, business, interest and other elements of cost, determines output and employment in the informal sector as a residual. As this sector has very little capital, the issue in the short run is simply how much income is left to be divided among the labor force which is crowded into this sector.³

Using this framework we address two sets of questions in this study. In the first section, we examine the results of Brazil's macropolicies in some depth, looking at the quantitative record in terms of the evolution of macroeconomic variables, output in the formal and informal sectors, labor market outcomes (employment and earnings), and poverty. In the second section, we look at the cost of Brazil's macroeconomic choices of the '80s to prospects for growth and poverty alleviation in the '90s. We accomplish this task by using a set of simulation models to elaborate Brazil's macroeconomic options for the next decade, and derive the income distribution outcomes of these choices.

Backdrop to the Debt Crisis

During the previous decade, Brazilians had become accustomed to both high rates of economic growth and significant improvements in living standards. Between 1970 and 1979, real income in Brazil grew a astonishing 6 percent per annum, per capita, the incidence of poverty fell roughly 50 percent and the severity of poverty (the

²Modigliani and Paddoa-Schioppa, (1978).

³This approach is formalized beginning on page 12.

poverty gap) fell by 25 percent (Fox, 1990).⁴ Although the effects of growth on poverty were not uniform, as the poverty reduction over the decade was roughly two-thirds in urban areas compared with 50 percent in rural areas, and roughly 70 percent in the Southeast compared with just under 50 percent in the Northeast, nevertheless, Brazil's record on poverty alleviation in the 1970s, even in the least affected areas is the envy of many countries. Concentration of income, the perennial black mark of the Brazilian growth and development record, does not seem to have improved over the decade,⁵ and remains an important social issue in Brazil today. However, despite having one of the most unequal income distributions in the world, recent analyses demonstrate that the economic growth of the 1970s was accompanied by significant social mobility (Morley, 1982; Pastore, 1989). These analyses show that the poverty reduction was brought about primarily through an expansion in employment in the urban formal sector, where average wages were close to three times wages in the rest of the economy by the end of the decade. This growth in formal sector employment was heavily concentrated in the Southeast, providing some explanation for the difference in the efficiency of growth in reducing poverty between geographical areas noted above.

An important characteristic of the Brazilian growth performance of the '70s lies in the role of external debt. Before the second oil shock, Brazil's debt was one of the largest in the world, and new lending was increasingly needed just to cover interest obligations. Even if the fall in the price of oil in the early '80s had not ended the supply

⁴Throughout this paper, we measure poverty by household income per capita. Our poverty line, constant in real terms, is 1/4 of the 1980 minimum wage, per capita. The empirical basis for choosing this poverty line is described in Fox (1990). This income level represents a lower bound estimate of the cost of a basic needs basket of goods, and equals roughly \$200 per year (in 1985 dollars). It is roughly equal to the average poverty line used by Fishlow (1972) and Fox (1982) in their analyses of 1960s. Other estimates using more complex methodology and expenditure data from 1974/75 have found poverty lines 50-100 percent higher in metropolitan areas between 1981-86 (Rocha and Tolosa, 1989). Fox (1982) found, using 1970 data, that if the poverty line is raised by 20 percent, the size of the poverty population grows 50 percent, indicating a strong sensitivity of the absolute size of the poverty population to changes in the poverty line, implying a large scope for measurement error. The trends reported in this paper are so strong, however, that even if we have understated the absolute size of the poverty population, we are confident of our estimates of the trends.

⁵According to CEPAL (1986), the Gini index, measuring the distribution of income across households, ended the decade in roughly the same place or slightly higher than it began. Ideally, one would want to measure the distribution of income per capita across households, as this is a better measure of the distribution of welfare. However, we have not seen this calculated. The distribution of income across earners, the most commonly used measure of income distribution even though it does not measure the distribution of economic welfare as it relates to consumption units, appears to have worsened (Bonelli and Sedlacek, 1989).

of petrodollars for recycling while rising real interest rates were increasingly eroding Brazil's debt service capacity, the Brazilian growth machine would have faced serious adjustment problems in the '80s. Thus, the combined external shocks of 1982 which have come to be called the world debt crisis hit Brazil hard, requiring demand to be cut by roughly 4 percent of GDP (the size of the foreign inflows) as well as effect the transfer of the increased interest costs Brazil was now facing.

Despite the severity of the crisis Brazil faced by late 1982, most observers believed that Brazil, with its diverse economy and relatively rich resource base, would eventually return to a growth path less dependent on external savings. In 1983 World Bank projections estimated that if Brazil were to effect the required adjustment, a savings rate of about 20-25 percent of GDP was required over the next five years (a marginal rate of about 30 percent, as the same projections envisaged a return to growth after a brief period of austerity). Compared with the marginal savings rates of 50-60 percent required from Chile over the same period in order to meet the debt service burden, Brazil was viewed then as the country which could be a model for the region in terms of adjustment, growth, and external transfer, with minimal tradeoffs between the three objectives. What these projections could not highlight, which proved critical in Brazil's failure to adjust, was that in the case of Brazil all the adjustment had to take place in the public sector (the owners of the debt, *de facto* or *de jure*), in order to avoid a large public-private transfer problem and significant crowding out. This adjustment in the public sector was to take place at the same time as the country was opening up the political process to groups which had been disenfranchised for 20 years. Politically, the task was to cut the size of the pie by about 25 percent just as the group standing in line to get a piece was increasing dramatically.

The Record of the 1980s

Brazilian macroeconomic policy in the '80s and its outcomes can be divided into three periods: (1) recession, 1981-83; (2) recovery, 1984-85; and (3) boom-bust, 1986-89. We briefly review the macroeconomic policies and outcomes in each period; the quantitative record is summarized in Table 2.⁶ During the first period, Brazil used tight money policies, some fiscal restraint, and an active exchange rate policy to lower

⁶This description of Brazil's macroeconomic policy in the 80s is drawn from various World Bank Economic reports. The most recent report released to the public is World Bank (1987).

demand and squeeze the resources out for the external transfer.⁷ The burden of adjustment fell primarily on the private sector, as government savings began to turn negative over the period with rising interest costs. In an attempt to control inflation and limit the burden of adjustment on the poor, the government also used a (formal sector) wage control policy of "cascading" adjustment, allowing more than 100 percent indexation of wages at lower wage levels, and less than 100 percent indexation at higher wage levels.⁸ The result of these policies was Brazil's deepest recession in 15 years, a 40 percent fall in investment and, by 1983, an annual transfer abroad of 4 percent of GDP.

During the recovery period (1983-85) Brazil began easing up on interest rates, and at the same time returning to the levels of government expenditure on goods and services, wages, and investment that were realized in the '70s, financed by external debt. Unfortunately, this source of financing was unavailable, and interest payments continued to grow unabatedly. So to finance the deficit, the government was forced to (a) sell more government bonds, eventually forcing interest rates back up; and (b) print money, leading to an acceleration of inflation. As the recession left many private sector firms with excess capacity, the decline in investment which had occurred in the previous period was not yet much of a constraint on growth and the Brazilian economy responded well to the fiscal stimulus. The policy of "cascading" wage adjustments was abandoned, and a policy of exchange depreciation kept the trade surplus up even as internal demand began to expand, providing Brazil with the foreign exchange to continue debt service payments. The trick was to get the local currency equivalent of the trade surplus into the hands of the government to meet the fiscal burden of the debt, a feat which was proving increasingly difficult. Nonetheless, Brazil achieved a marginal savings rate well above the requirements of debt service during this period, investment began to recover, and, except for the troubling inflation, Brazil seemed to be emerging from the debt crisis on a "Baker" path.

⁷Throughout this period, imports were tightly controlled by a system of import licensing and quantitative restraints. Thus, the exchange rate was used primarily as a tool of export promotion. Throughout the decade, Brazil was able to generate the trade surpluses required with small changes in the real exchange rate. Unlike other, more open economies, large real depreciations/devaluations were not required in response to the external shocks of the '80s, and exchange rate policy played a relatively minor role in stabilization/adjustment programs.

⁸In practice, the cascading policy was primarily effective in the public sector, as major private sector and joint public-private companies simply corrected for this policy by paying wage supplements of various kinds to their staff at the higher levels. Other types of wage control policies in Brazil over the decade have generated similar results, leading to a plethora of different types of remuneration other than "wages" in the Brazilian formal sector.

TABLE 2: BRAZIL - MACROECONOMIC INDICATORS, 1980 - 1987

	Recession				Recovery		Boom and Bust	
	1980	1981	1982	1983	1984	1985	1986	1987
GDP Growth, Factor Cost	1.00	0.95	0.96	0.90	0.95	1.05	1.20	1.16
Agriculture	1.00	1.08	1.08	1.07	1.11	1.22	1.12	1.28
Private Formal	1.00	0.92	0.92	0.86	0.91	0.97	1.14	1.07
Total Formal	1.00	0.93	0.94	0.87	0.91	0.99	1.16	1.10
Informal	1.00	0.92	0.99	0.95	1.15	1.32	1.62	1.51
GDP Growth, Market Prices	1.00	0.97	0.98	0.95	1.01	1.09	1.18	1.21
Fiscal Policy Indicators								
(percent of GDP)								
Revenue	23.3	23.5	24.9	23.2	20.8	21.1	22.7	22.7
Interest	1.9	2.3	3.4	4.2	6.2	10.8	10.2	9.0
Government Saving	1.1	1.9	-0.4	-1.4	-2.8	-8.0	-6.8	-6.1
Debt	n.a.	15.5	19.8	28.4	34.3	36.1	22.7	40.0
Inflation (annual rate)*	91	101	97	151	210	235	149	225
Real Exchange Rate**	1.00	0.92	0.92	1.18	1.21	1.25	1.08	1.00
Real Interest Rates (working capital)	-13.4	25.7	24.6	13.4	36.4	32.1	6.4	30.7
Implicit Rate of Return Government Debt (overnight market)	1.3	18.5	26.5	13.6	17.9	15.9	5.8	7.4

* GDP Deflator, annual rate of change.

** Exchange rate deflated by cost of living (Brazil) times US WPI; (increase = depreciation).

TABLE 2B: BRAZIL - SAVING AND INVESTMENT 1980-87

	Base 1980	Recession 1980-83	Recovery 1983-85	Boom 1985-86	Bust 1986-87	Total Period 1980-87
GDP	12,626	-615	1,746.9	1,106.7	432.8	2,671
Change As a Share of Change GDP						
Consumption	10,014	-34.9	46.3	96.7	92.0	77.2
Government	1,139	-2.4	10.2	18.2	92.9	28.7
Private	8,875	-32.4	36.1	78.5	-0.9	48.5
Exports	1,121	47.2	24.7	-17.0	20.2	23.4
Imports	1,399	-72.7	-1.6	22.0	6.9	9.8
Foreign Savings (M-F)	278	-120.0	-26.3	39.0	-27.1	-33.1
Domestic Savings (GDP-C)	2,612	-65.1	53.7	3.3	8.0	22.8
Investment	2,890	-185.1	27.4	42.2	-19.1	-10.3

Sources: 2A: National Accounts (FGV); Scenarios; 2B: World Bank (1988) Tables 1.3 and 1.4.

By the end of 1985, the transfer problem was becoming acute. Inflation was accelerating, velocity was increasing, and financing the government deficit by printing money was becoming more and more difficult. The solution had to be a political consensus on reducing government consumption, or increasing revenues to effect the transfer. Unfortunately, the instincts of the newly elected officials were not in this direction. The opposition, having been denied access to control of the public purse for so long, for the most part sought to extend benefits to their constituencies. The establishment, represented politically by the President, was in no mood to bear the burden of adjustment either. This political stalemate characterizes Brazil macroeconomic policies in the later half of the decade, the outcome of which has been a period of growth (1986) followed by recession (1987-88), followed by a growth spurt again (1989), with inflation held in check only through increasingly unsuccessful wage and price control programs inaugurated roughly once every 18 months, and with private investment crowded out.

The first and most famous of Brazil's stabilization plans was the Cruzado Plan, initiated in February 1986. The key elements of this program included: (a) real wage increases, to pacify organized labor; (2) a monetary reform and price freeze; (3) a government-imposed deindexation of the economy, including financial instruments and the exchange rate; and (4) an exchange rate freeze, (which implied an appreciation) and a more open import policy to ease shortages. All of these measures increased real purchasing power in the short run, increasing aggregate demand. At the same time, the government failed to take the required action to curb government consumption, despite the breathing room that the temporarily lower inflation brought in terms of interest savings and seniorage gains, and the reverse Tanzi effect brought in terms of increased tax collections. On the contrary, fiscal pressures were aggravated by the failure to increase public sector prices prior to the freeze and by the real wage increases granted to government workers as part of the package. The disequilibrium in the balance of supply and demand became evident by July 1986; shortages developed, inflation returned, and the plan collapsed. In addition, as reserves had been used up by the import buying spree of the appreciated exchange rate stimulated (and government import policy facilitated), a debt moratorium was finally imposed in 1987.

Brazil has undertaken two more shock stabilization programs since the ill-fated Cruzado Plan. While both appear to have averted hyperinflation, a constant threat to Brazil as inflation begins to accelerate with each recovery in private aggregate demand, neither program has reversed the negative trend in government savings for more than a month or two. At the same time, a new foreign debt

agreement with commercial banks in 1988 led to renewed savings outflows. With the debt service outflow and the government financing needs eating up savings, the private investment remained stagnant after a short burst during the Cruzado Plan.

The quantitative results of the tradeoff Brazil made in later half of the '80s - less adjustment, more growth, debt and inflation - are summarized in the last column of Table 2B. On the positive side, Brazil managed to increase domestic income by about 16 percent over the level at the beginning of the decade and to meet the savings targets required to continue servicing the foreign debt, moving quickly from a trade deficit position in 1980 to a surplus position in 1982, a position which was maintained throughout the period except during the Cruzado boom c. 1986. Consumption also increased over the period, both private and public and although public consumption increased almost 50 percent faster than private, this consumption increase did help to protect living standards. However, for the period as a whole, the increased debt service was greater than the increase in domestic savings, and thus the level of investment fell sharply. The increasing unwillingness of the private sector to finance government consumption (including debt service payments) has led to an inflation level of above 50 percent per month by the end of 1989. The crowding out of investment in the '80s can be expected to compromise Brazil's growth prospects for the '90s.

Poverty in the '80s

The impact of Brazil's macroeconomic policies on the poor and on the incidence of poverty is transmitted primarily through income flows into poor households. In contrast with non-poor households, poor households tend to be (a) larger, (b) have fewer earners, and (c) consequently, a higher dependency ratio. In 1985, the head of household contributed over 90 percent of household income in roughly 3/4 of poor households. This ratio holds irrespective of region (urban or rural), indicating that does not simply represent the correlation of poverty with agricultural sector activities, where unpaid family labor is common. In non-poor households, only 47 percent relied on the head for over 90 percent of household income. Heads of poor households tend to be slightly younger than their non-poor counterparts, and much less educated. In 1980, 59 percent of heads of poor households were completely without any formal education, compared to only 25 percent of heads of non-poor households.

While most of the poor throughout Brazil, urban and rural, live in households where the head is not employed in the formal sector, in the large cities of the Southeast, poor households do depend on formal sector earnings from the head.

(Table 3) Two thirds of the population in non-poor households have heads working in the formal sector, where average earnings are roughly three times informal sector (including agricultural sector) earnings. (See Table 5, below) Most heads of poor families are self-employed or sharecroppers, earning income in the agricultural or tertiary sectors, although in urban areas, heads of poor households are also found in significant numbers in manufacturing and construction.

Table 3: BRAZIL - OCCUPATIONAL CHARACTERISTICS OF HEADS OF POOR HOUSEHOLDS, SELECTED AREAS (1985)
(Percent of Poor Population in Household)

Characteristic of Head	Brazil	Urban Northeast	Urban Southeast	Rural Northeast	Rural Southeast
Technical/Administrative	4.4	5.2	6.8	2.7	3.1
Agriculture & Mining	39.2	27.6	13.6	85.9	84.9
Manufacturing & Construction	10.3	25.8	33.2	5.5	5.1
Commerce & Related Activities	8.6	12.1	6.7	1.7	.8
Transport & Communications	4.6	4.3	5.7	.9	.6
Services	22.4	6.9	12.8	.7	2.6
Others	13.3	18.2	19.5	2.6	3.0
Formal Sector Employment	17.7	31.8	50.1	5.5	10.9
Memo Item: Share of the Poor	100.0	20.2	17.2	33.8	10.2

Source: See Appendix

An important characteristic of Brazilian labor markets in the '80s is the increasing integration of rural and urban markets. Thus, for example, 25 percent of the heads of poor households in urban Southeast work in primary sector activities, and 15 percent of heads of poor households in the rural Southeast do not work in agriculture. The agricultural labor force has become increasingly proletarianized over the decade as well; by 1987 over 50 percent of those earning income in agriculture were employees (even in the Northeast, the comparable figure is 48 percent). Roughly one fifth of agricultural employees nationwide have signed labor cards (formal sector employment), but this ratio also varies significantly by region, with the level of formalization in the South twice that of the Northeast. While most earners in poor households are at the bottom of the earnings distribution, not all low earners belong to poor households. In 1985, roughly 40 percent of those earning at the

minimum wage in the formal sector were secondary earners in households with per capita incomes in the top 40 percent of the distribution (Alemeida Reis, 1989).

Brazil's poverty record for 1981-87 was ambiguous, although definitely not strongly negative (Table 4).⁹ The recession clearly hurt the poor but by 1985, mean household incomes had risen to 8 percent above their 1981 level, bringing the level and intensity of poverty back to its 1981 trough. The Cruzado Plan appeared to substantially increase the incomes of the poor. It should be noted, however, that this dramatic decline must be at least partially a result of our use of a price index which inadequately measures real purchasing power during this period as the price freeze generated significant shortages of key items in the consumption basket of the poor. Our scepticism about the 1986 numbers is strengthened by the complete reversal in 1987, as inflation accelerated, the economy moved back into recession, and the purchasing power of the poor slipped back to 1985 levels.

Given such a poor economic growth record, it is somewhat surprising that any poverty reduction at all was recorded. Part of the answer to this puzzle is shown by the difference between the growth of GDP per capita and mean household income. For household income to rise twice as fast as per capita GDP is unusual; it did not occur during the previous decade (Fox, 1990). Most of the divergence occurred between 1983 and 1985. There are several possible explanations for this trend. First, it is possible that the survey coverage improved (e.g. more income was recorded in the later survey than in the earlier surveys). This did not happen. Comparison of the nominal value of survey income with GDP in 1981 and in 1987 shows that survey coverage actually declined from 46 percent in 1981 to 45 percent in 1987. A second explanation is that part of the sharp divergence represents differences in the speed of change of relative prices during a period of high and accelerating inflation. The GDP numbers are deflated by the implicit GDP deflator, while the household income numbers are deflated by our low income cost of living index. This does appear to be the case. The accumulated inflation over the period 1981-1987

⁹Measuring changes in real variables is extremely difficult in Brazil's high inflation environment. Depending on the deflator chosen, real average wages in the Sao Paulo manufacturing sector between 1980 and 1988 (1) increased by 50 percent - using the FIPE Sao Paulo cost of living index; (2) decreased by 15 percent - using the FGV broad cost of living index; or (3) increased by 9 percent - using the IBGE narrow cost of living index (INPC). Similar shifts could be recorded for the population in poverty. For purposes of deflating real wages and poverty concepts in this paper, we used index (3), as the basket of goods used to calculate this index better approximates the consumption basket of the poor, and it is a national index. It does, however, have a strong urban bias, as does our data, which are from the national labor force survey. This source tends to underestimate rural incomes, but it does so consistently over the period.

recorded by the INPC (1981 = 100) was 36,931, while the implicit GDP deflator for the same period recorded 39,069. How much of this difference is simply "noise" and how much real gains in the relative price of consumption goods bought by lower income households compared with prices in the rest of the economy (that is, a real gain in purchasing power for lower income households) is impossible to tell.

Although the percent of the population in poverty was roughly constant over the period, the share of household income received by the poor (as measured by the survey data) declined. Between 1983 and 1985, the gain in average income of the poor offset the negative distributional movement, but during the Cruzado Plan and its aftermath this was not true, as the income gap ratio widened.¹⁰ The poorest 10 percent of the population benefitted the least from the income growth over the period. The mean income of this group actually dropped 3 percent between 1985 and 1987 while the population average grew 7 percent during the same period.¹¹

Regionally, the Northeast (27 percent of the population but 50 percent of the poverty population at the beginning of the decade) continued to increase its share of the poor, although the incidence of poverty increased proportionately more in the South and Southeast between 1981 and 1985, and in urban areas, where the bulk of the population resides. Despite the fact that the incidence of poverty in urban areas was the same at the beginning of the decade as at the end, the urbanization process was strong enough to bring the number of urban poor in 1987 almost equal to the number of rural poor for the first time in Brazil's history.

¹⁰The income gap ratio measures the average distance of the household income of the poor from the poverty line, and thus is a measure of the severity of poverty. The poverty gap index is the income gap normalized by the population size. This normalization renders the measure distributionally neutral (see Datt and Ravallion, 1990, for further discussion).

¹¹These numbers are not shown in Table 4 but were computed by the author from the income distribution data.

**TABLE 4: BRAZIL - POVERTY AND DISTRIBUTION INDICATORS
1981 - 1987**

	1981	1983	1985	1986	1987	1981	1987
<u>Poverty Indicators</u>							
<u>Incidence of Poverty by Location</u>						<u>Share of Poor</u>	
Brazil	24.8	30.9	25.4	16.1	23.3	100.0	100.0
Urban	14.9	21.6	17.1	9.4	14.8	42.5	46.4
Rural	46.8	54.2	47.1	33.7	46.3	57.5	53.6
North	18.0	24.8	18.0	10.9	16.8	2.0	2.3
Northeast	44.9	52.5	46.3	32.9	44.2	54.2	55.7
Urban	31.1	40.2	32.0	21.6	31.4	19.8	22.0
Rural	60.5	66.8	63.3	46.2	60.1	34.4	33.7
Southeast	13.5	19.4	15.5	8.2	13.0	24.3	24.9
Urban	9.3	15.0	11.4	5.4	9.2	14.1	15.1
Rural	36.6	43.8	39.1	23.5	34.2	10.3	9.8
South	16.6	25.1	17.4	10.8	17.3	10.9	11.6
Urban	9.0	16.6	11.7	5.9	10.1	3.6	4.5
Rural	28.9	39.4	27.8	20.2	31.6	7.2	7.1
Center/West	23.1	28.1	20.9	10.4	18.5	6.2	5.5
<u>Income Gap Ratio</u>	38.1	40.7	37.7	n.a.	39.0		
<u>Poverty Gap Index</u>	10.1	13.1	9.9	n.a.	9.5		
<u>Index of GDP Per Capita</u>	1.0	0.93	1.01	n.a.	1.08		
<u>Index of Mean Household Income Per Capita</u>	1.0	0.88	1.08	n.a.	1.16		
<u>Distribution of Income Per Capita</u>							
<u>Share of Population</u>	<u>Share of Income</u>					<u>Index of Real Mean Income</u>	
- 10	0.88	0.86	0.85	n.a.	0.76	1.0	1.06
- 25	3.86	3.70	3.66	n.a.	3.45	1.0	1.10
- 50	13.21	12.63	12.57	n.a.	12.29	1.0	1.15
+ 25	68.38	69.46	69.49	n.a.	69.60	1.0	1.25
+ 10	46.17	47.01	47.36	n.a.	47.52	1.0	1.26

Constant poverty line of 1/4 1980 minimum salary per capita. Deflator: INPC. Source: See Appendix.

Analysis of the 1980s

Brazil's macroeconomic policies of the 1980s produced modest growth in per capita income, external balance, and high inflation. Except for the recession, they were also somewhat successful in maintaining the incomes of the poorest one quarter of the population. We now turn to the analysis of the impact of the macroeconomic policy on formal, informal,¹² and agricultural sector earnings and employment, seeking explanations from these factor market outcomes for this result. Table 5 presents the detail of the labor market outcomes, as we have been able to piece them together, and Tables 6-9 summarize the

¹²Note that our definition of the informal sector includes agriculture. Where we could separate out agriculture in terms of output, employment and earnings, we have done so.

changes in these indicators, the sectoral output indicators from Table 1, and the poverty incidence from Table 3 over the three macropolicy periods discussed above.

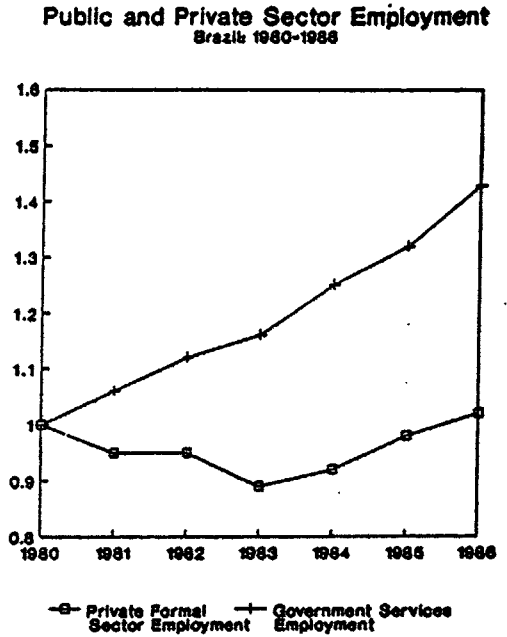
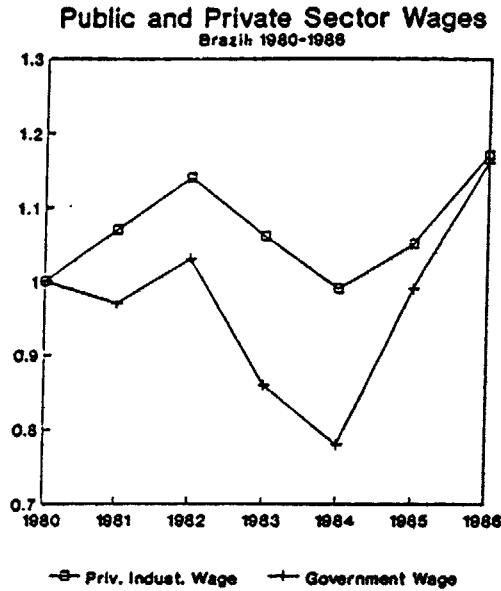
Table 5: BRAZIL - INDICES OF LABOR MARKET OUTCOMES, 1980-1987

	1980	1981	1982	1983	1984	1985	1986	1987
Employment Growth								
Total	1.00	1.01	1.06	1.04	1.12	1.18	1.22	1.27
Agriculture	1.00	0.96	1.02	0.95	1.08	1.10	1.02	1.01
Formal	1.00	1.01	1.03	1.01	1.03	1.11	1.21	1.25
Informal	1.00	1.05	1.22	1.27	1.38	1.49	1.54	1.69
Private Formal								
Sector+	1.00	0.95	0.95	0.89	0.92	0.98	1.02	n.a.
Public Sector+	1.00	1.06	1.12	1.16	1.25	1.32	1.43	n.a.
Open Unemployment (PME, %)								
Sao Paulo	7.2	7.2	5.5	6.8	6.8	5.0	3.4	3.8
Average, 6 cities			6.3	6.7	7.1	5.2	3.6	3.7
Real Wages								
Private Industry								
(Sao Paulo, FIESP)	1.00	1.07	1.14	1.06	0.99	1.05	1.17	1.08
Total Formal Sector+	1.00	1.01	1.07	0.92	0.87	0.98	1.05	n.a.
Gov't Sector+	1.00	0.97	1.03	0.86	0.78	0.99	1.16	n.a.
Minimum Wage	1.00	0.99	1.01	0.91	0.83	0.86	0.89	0.73
Real Average Incomes**								
Formal	1.00*	0.86	1.31	0.97	0.89	1.08	1.34	1.09
Informal	1.00*	0.85	1.30	0.92	1.03	1.20	1.65	1.24
Agriculture	1.00*	0.84	0.96	0.77	0.78	0.84	1.16	0.83
Income Differentials								
Formal/Informal	3.08*	3.10	3.11	3.25	2.66	2.76	2.50	2.71
Informal/Agriculture	0.63*	0.64	0.86	0.75	0.84	0.90	0.90	0.94

* 1979 + RAIS data ** Average earnings, not corrected for hours worked, main occupation.

Note: Informal Sector includes Agriculture, and is defined as labor force participants not contributing to the social security system

Source: See Data Appendix. Deflator: INPC.



During the recessionary period, the formal sector gained slightly at the expense of the informal sector, while the big loser appears to have been agriculture, where roughly 29 percent of the labor force was employed in 1982.¹³ Two government policies appeared to have facilitated this result: (a) the policy of guaranteed six monthly over-indexation for formal sector workers in lower earnings categories; and (b) a generous government employment policy which kept workers employed in the formal sector, reducing the pressure on wages in the informal sector. Private sector employers shed some workers in response to falling demand, but there clearly was some labor stockpiling as well given the extent of the fall in output. Government increased employment over the period, however, such that total formal sector employment did not decline. On the wage side, the evidence is somewhat ambiguous. The minimum wage fell by 10 percent, but industrial real wages increased. As a result there was a large increase in the share of factor income going to labor and an equally large shrinkage in the share of non-financial profits. Within the government sector, the employment increase was accompanied by significant real wage compression, causing average wages in the formal sector as a whole to fall. Given that overall employment in the formal sector was stagnant, and that in agriculture was shrinking, all the increase in the labor force during the recession was absorbed by the informal sector, where average value-added per worker fell by one fourth. Reflecting this surge in employment (as well as the decline in agricultural incomes) informal sector earnings fell by 8 percent between 1979 and 1983. Somewhat surprisingly, the differential between the formal and informal sector incomes remained roughly constant, increasing by only 5 percent for the period.

¹³During this period, the Northeast suffered a major drought. Although agriculture output increased overall, earnings in agriculture must have been affected by the drought conditions, which lasted through the 1982 harvest.

TABLE 6: BRAZIL - EVOLUTION OF KEY VARIABLES: RECESSION (1980-83)
(percent change)

		Informal Sector:	
		Output	- 5
		Employment	+27
		Earnings	- 8*
Formal Sector:		Agriculture:	
Output	-15	Output	+ 7
Employment	0	Employment	- 5
Private Sector	-11	Earnings	-33*
Wages		Incidence of Poverty:**	
Industry	+6	Brazil	+25
Overall	-8	Urban	+44
Labor Share	+19	Rural	+16
Profit Share	-16		
Non-Financial Profits Share	-25		

* 1979-83 ** 1981-83

At the upper end of the income spectrum, profits, especially non-financial profits contracted sharply, as owners of physical capital were hurt by the combination of high interest rates, workers' ability to protect their wages, and sluggish demand. In short, the government's tight money policy, combined with a wage policy which maintained real wages, in effect protected the middle of the earned income distribution against both ends. However, the protection of the middle clearly benefitted the urban informal sector as well by helping to cushion demand for their services, so the policy was not strongly anti-poor.¹⁴ Nonetheless, the fall in incomes in the agricultural sector, where the majority of the poor earn their incomes, combined with the crowding of the new entrants into the informal sector, where average earnings are one-third of those in the formal sector, clearly pushed a significant portion of the population back into poverty, especially in the urban areas in the South and Southeast, where most of the urban population is located.

During the recovery period, formal sector holders of capital and informal (including agricultural) workers improved their position, at the expense of existing private formal sector workers. During this period, the formal-informal earnings differential fell. Public employment continued to swell while private sector employment kept pace with output growth. In addition, in 1984, when inflation took a sharp jump upwards, formal sector workers appear to have been left behind. These income losses led workers to demand (and receive in some sectors) a halving of the indexation period in 1985. Although private sector workers did not gain over the

¹⁴The simulation exercise below confirms this result.

period, government workers began to recover wages lost during the previous period. The increase in informal sector incomes combined with the increase in formal sector employment (which automatically raises average wages in the economy as the formal sector is the high wage sector), brought a significant decrease in urban poverty and in poverty overall. In this period, growth did trickle down to the poor, reversing the adverse effects of the previous period.

TABLE 7: BRAZIL - EVOLUTION OF KEY VARIABLES: RECOVERY (1984-85)
(percent change)

		<u>Informal Sector:</u>	
		Output	+38
		Employment	+17
		Earnings	+29
<u>Formal Sector:</u>		<u>Agriculture:</u>	
Output	+11	Output	+22
Employment	+10	Employment	+15
Private Sector	+10	Earnings	+8
<u>Wages:</u>		<u>Incidence of Poverty:</u>	
Industry	0	Brazil	-18
Overall	+6	Urban	-21
Labor Share	-3	Rural	-13
Profits Share	+7		
Non-Financial Profits Share	+10		

The Cruzado Plan in 1986 resulted in a short-run gain for all groups which was unsustainable. Interest rates went down, while profits and consumption increased and prices went down, resulting in real income increases across the board. Employment went up, especially in the higher earnings formal sector. As labor markets tightened, the earnings differential between the formal and informal sector narrowed further, and the increased demand relative to the supply of labor sharply increased real earnings in the informal sector. Agricultural incomes also took a jump, as employment dropped in response to the urban boom. These real income gains were felt immediately by the poor, as poverty dropped below pre-crisis levels.

TABLE 8: BRAZIL - EVOLUTION OF KEY VARIABLES: BOOM (1986)
(percent change)

		<u>Informal Sector:</u>	
		Output	+22
		Employment	+3
		Earnings	+38
<u>Formal Sector:</u>		<u>Agriculture:</u>	
Output	+17	Output	-10
Employment	+9	Employment	-8
Private Sector	+4	Earnings	+39
<u>Wages:</u>		<u>Incidence of Poverty:</u>	
Industry	+11	Brazil	-37
Overall	+7	Urban	-45
Labor Share	+6	Rural	-29
Profits Share	+8		
Non-Financial Profits Share	+25		

Unfortunately, the boom of the Cruzado period was not sustainable, and in 1987 inflation returned as the government tried to get the private sector to finance the fiscal stimulus. As prices went up, incomes came back down, both in terms of labor earnings and profits. The acceleration in inflation clearly hurt labor incomes, especially in the less organized parts of the formal sector where average earnings fell almost 20 percent. Informal sector earnings also dropped (back to 1985 levels), and the incidence of poverty fell back to the 1985 level.

While it would appear that from a poverty perspective, the boom and bust of the Cruzado was neutral, in fact, the recession following the Cruzado plan lasted through 1988. Preliminary tabulations of the 1988 data show a real earnings decline in both the formal and informal sectors, and an increase in poverty, back to 1985 levels. More importantly, the absolute income gap of the poorest also widened as their real incomes dropped over the period (Table 4), indicating that for the poorest of the poor, the boom and bust was not neutral. In addition, the excesses of the Cruzado plan worsened the stabilization and adjustment problem for the future by adding to the debt burden. If Brazil had actually stabilized in 1986 allowing a return to sustained economic growth (and the size of the imbalances shown in Table 2 are not so great as to render this possibility absurd), then the poor might have realized strong income gains by the end of the decade. As we will see in the next section, the longer the stabilization and adjustment is postponed, the worse off the poor become.

TABLE 3.9: BRAZIL - EVOLUTION OF KEY VARIABLES: TOTAL PERIOD (1980-87)
(percent change)

		<u>Informal Sector:</u>	
		Output	+50
		Employment	+70
		Earnings	+25***
<u>Formal Sector:</u>		<u>Agriculture:</u>	
Output	+ 7	Output	+28
Employment	+25	Employment	+ 1
Private Sector	+ 2*	Earnings	-17***
<u>Wages:</u>		<u>Incidence of Poverty:**</u>	
Industry	+ 8	Brazil	- 5
Earnings	+ 9***	Urban	- 1
Labor Share	+20	Rural	- 1
Profits Share	- 8		
Non-Financial Profits Share	-17		

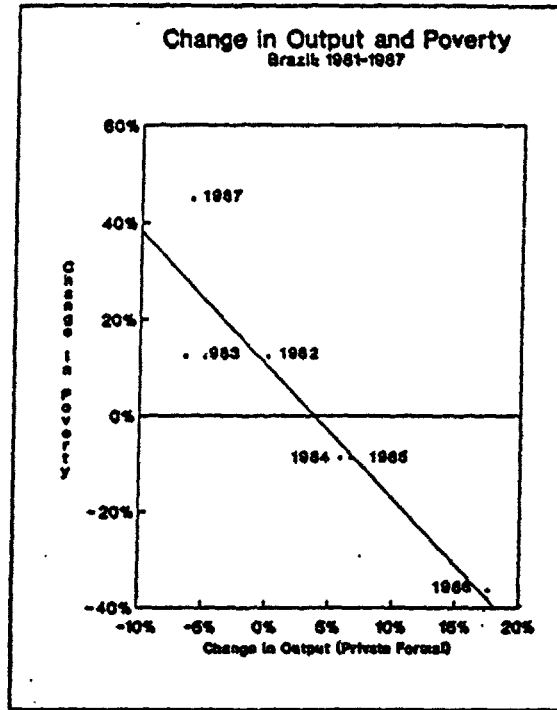
* 1980-86

** 1981-87

*** 1979-87

Surveying the seven year period as a whole from a poverty alleviation perspective, Brazil's macroeconomic policies did not help the poor. But given Brazil's lackluster growth performance (although better than most countries in the hemisphere), the indifferent poverty performance is actually a bit surprising. As we noted above, the difficulty of measuring changes in real variables as inflation accelerated does not allow us to confidently state that the incomes of the poor did not go down significant over the period, but we can be reasonably sure that the incidence and intensity of poverty did not worsen very much after 1983. The main reason appears to be the protection of formal sector wage incomes during the recession, and the expansionist fiscal policies in the post-recession period. As Graph 1 shows, in the 80s (as in the 70s), private formal sector output growth was strongly related to poverty reduction. The major factor keeping the economy afloat was government consumption, a significant portion of which was public employment. This fiscal stimulus helped maintain employment and stimulate some real output growth. The income growth appears to have trickled down to the poor most rapidly in 1984-85, when formal sector output also expanded rapidly. During the 1986-87 period, the poor were not as fortunate, as negative distributional shifts overwhelmed overall income growth to worsen the average incomes of the poorest 10 percent.

GRAPH 1



The expansionist fiscal policies throughout the later half of the decade which kept the economy afloat were not distributionally neutral. Furthermore, there are likely to be high costs to these policies in the future. The public sector deficit absorbed a large share of private sector savings, crowding out the private sector investment needed for more accelerated growth and labor productivity improvements in the 1990s. The high interest rates the government paid on its internal debt represented a significant and regressive income transfer as the share of national income going to debt service rose to 10 percent of GDP by the middle of the decade. The household survey data used in this analysis does a very poor job of recording capital income, and thus the effect of this transfer on the distribution of income is not well captured by this data. Nonetheless, the size of this transfer to holders of government bonds may have been a factor in the worsening of Brazil's already unequal income distribution registered over the period.

Modeling the Effects of Brazil's Macroeconomic Policies on Incomes

From the above analysis, it is clear that the ultimate answer to the question posed at the beginning of the paper--who paid the bill for Brazil's external debt policies of the '70s--only will be known in the '90s because one of the important results of Brazil's macroeconomic policies of the '80s has been the capitalization of

that bill into domestic debt. Our conclusion from the analysis of the '80s is that Brazil now faces, in essence, the same tradeoffs faced in 1981 and in 1985, but with fewer degrees of freedom, as the stock of capital is lower and the stock of debt higher. In this section, we seek to complete our analysis of this question by analyzing the impact of some of Brazil's policy choices for the '90s on the poor. This is done by constructing a model to project the effect of alternative stabilization strategies in 1988-1995 on incomes in the formal and informal sectors. The model also gives new insights about the impact of Brazil's alternative policy choices in the 1980s on employment and poverty.¹⁵

The model we have chosen is a simple extension of one originally presented by Modigliani and Paddoa-Schioppa (1978) (M-PS). They built model to examine the effect of various sorts of indexing arrangements on anti-inflation policy in Italy, a good starting point for a Brazilian model because of the role of the indexation system and its effects on the supply side. On the supply side, our version of their model fits the Brazilian formal sector quite nicely (and thus the economy as a whole, as the informal sector is a residual in our framework). On the demand side, we found that a simple monetarist demand for money equation far outperformed the M-PS disaggregated model of consumption, investment and the trade balance, an indication of the dominance of monetary policy in determining macro outcomes in Brazil in the '80s.

Turning first to the supply side, in the M-PS framework non-financial profits are written as a markup on total costs.

$$(1) \quad m(WL + rkw + eP^*I) = (1-t)PY$$

¹⁵It was our original intention to incorporate a fully specified model of the demand side in order to endogenize the interaction between the formal and informal sector and to incorporate in a behavioral way the effect of correcting the government budget deficit. The difficulty of modelling the real balance effect in a time of rising inflation and rising budget deficits precluded this approach. Presented instead is a short run model, calibrated with parameter values from the 1980s which provides predictions for employment, real wages and the division of factor income in the formal sector and, by extension, the level of employment and output in agriculture and the informal sector.

Where P = price
m = markup
W = wage
L = labor inputs
Y = output
r = interest
kw = working capital
e = exchange rate
I = intermediate imports
P* = international price
t = indirect tax rate.

It is now well known that markup pricing is not generally a profit-maximizing strategy, at least in a world of perfect foresight and information, yet its use is widely observed. The reason appears to be that it is a good rule of thumb approximation to the optimal price in a world where demand and input costs fluctuate. In addition, the assumption is quite useful as it permits the disaggregation of income between labor and profit, and shows the effect of changes in the target wage, the real exchange rate and the interest rate, all of which had an important influence on inflation, output, and the distribution of income in Brazil.

To help interpret equation (1) it is useful to express it in terms of shares, by dividing through by PY.

$$(2) \quad \frac{m(WL + rkw + eP^*I)}{PY} = 1-t$$

The first term in the parenthesis is the real wage times labor per unit of output, or the share of labor. The second is the real interest rate times working capital per unit of output, or the share of working capital in total cost; the last term is the share of imported intermediates. This representation nets out domestic intermediaries, since the level of analysis is the entire formal sector. What we have therefore is domestic value-added plus the real imported intermediate inputs, and equation (2) says that the share of the three plus profits must add up to one minus the tax rate. At any point along the supply curve we shall now derive, that must be the case.

The question for the model is how the various shares vary with inflation and output. For simplicity it is assumed that neither L/Y, kw/Y nor I/Y are a

function of Y , each being fixed by technical factors, but that the markup is a positive function of Y , implying that business raises the profits' share as demand increases.¹⁶

$$(3) \quad m = m^+(Y)$$

It is assumed that both the real interest and the real exchange rate are exogenous, and that the nominal rates are adjusted often enough to make the real rates invariant with respect to the level of inflation. But that is not true for the real wage. It is now well known that in any system of wage adjustment, even one with so-called 100 percent ex post indexing, the actual average level of the real wage is negatively related to the inflation rate. Even if the full change in the cost of living is reflected in each wage adjustment, the higher the inflation rate the lower the average real wage across the indexing period will be.¹⁷ To model the outcome of the wage setting process in the formal sector, it is assumed that workers enter the bargaining process with a target real wage, and that with each wage adjustment workers are trying to get real wages to the target wage. The observed real wage is the result of this bargaining process. Obviously, a rise in the target wage or an increase in the number of times wages are adjusted would both increase the real wage for a given rate of inflation.

Summarizing, the real wage is written as a negative function of inflation, a positive function of both the target wage μ and the number of times (n) that wages are readjusted during the production period.

$$(4) \quad \frac{W}{P} = w(\pi, \mu, n)$$

Equation (4) implies that the labor share in value added is negatively related to inflation. Now, combining the two assumptions on the markup and the labor share:

¹⁶An alternative would be to make the markup a function of excess demand which would permit capital formation to play a role on the supply side. In the short run, or in an adjustment recession, the formulations are equivalent because capacity is fixed.

¹⁷The only way to avoid this inflation loss would be for the peak wage itself to be a function of the level of inflation, something which no indexing system in Brazil (or anywhere else that we are aware of) has ever done.

$$(5) \quad m(Y) \left(\frac{W(\pi)L + rkw + eP^*I}{PY} \right) = 1-t$$

The labor share and profit share must add up to one less the share of working capital, imports and taxes. Equation (5) describes the process. Any rise in output increases the profit share, which must be accompanied by an increase in the inflation rate sufficient to drive the real wage and the labor share down by the necessary amount. In other words, the supply curve of the economy in output-inflation space is upward sloping. Rewriting equation (5) in the form of a supply curve:

$$(6) \quad \pi = s(Y, \frac{r}{P}, \frac{e}{P}, \mu, n, t)$$

Equation (6) is a long run Phillips curve. Note that it is upward sloping rather than vertical because under the indexing assumption inflation has a long run effect on the real wage because cost of living wage adjustments are not instantaneous. The curve will be steeper the more often these adjustments take place and the smaller the share of labor in total output.

All the other variables are positive shifters on the supply curve. An increase in either the real exchange rate or the interest rate decreases the share of value added available for profits and labor, requiring either an increase in the inflation rate or a reduction in output to satisfy equation (5). Similarly an increase in the target wage shifts the supply curve up and to the left. Indeed, if output is fixed, so according to the model is the labor share as with given labor productivity the share determines the necessary real wage. Worker attempts to increase the real wage by raising the target wage cannot succeed. They only increase the inflation rate. There are many examples of this process in Brazil. But shortening the indexing period (increasing n) makes inflation less effective in lowering the real wage, and as inflation accelerated in Brazil, this has been workers' key demand. However, in the limit, with instantaneous indexing the real wage is invariant with respect to inflation and the economy supply curve is vertical. Thus raising n rotates the supply curve counter-clockwise and drives up the inflation rate provided equilibrium is at a positive inflation.

On the demand side we attempted without much success to fit a disaggregated model which would trace out demand for formal and informal sector

output and show the effect of alternative government fiscal programs on demand. However, data on the structure of consumption and the determinants of savings, (particularly inflation and the deficit), are not very reliable. In addition, the tremendous increase in government bonds and money over the period and the large swings in velocity associated with the accelerations and decelerations in inflation between 1985-87 made it almost impossible to fit a system of equations, as the structure of the system seemed to be changing yearly, giving very erroneous predictions of demand at the high inflation rates observed in 1985 and 1986. We get a far more accurate (and simple) prediction of aggregate demand using a monetarist model based on the demand for money. Accordingly we can write:

$$(7) \quad M_d / P = b(Y_1^+ r_1^-)$$

The demand for real balances is a positive function of income and a negative function of the rate of interest. In a high inflation economy like Brazil the cost of holding cash balances can be represented by the inflation rate, replacing r with P in equation (7). It is then useful to rewrite the equation in terms of elasticities:

$$(8) \quad \hat{M} = e_y \hat{Y} - e_p \hat{\pi} + \pi$$

Where: e_y is the income elasticity of the demand for real balances

e_p is the elasticity of the demand for real balances with respect to the inflation rate.

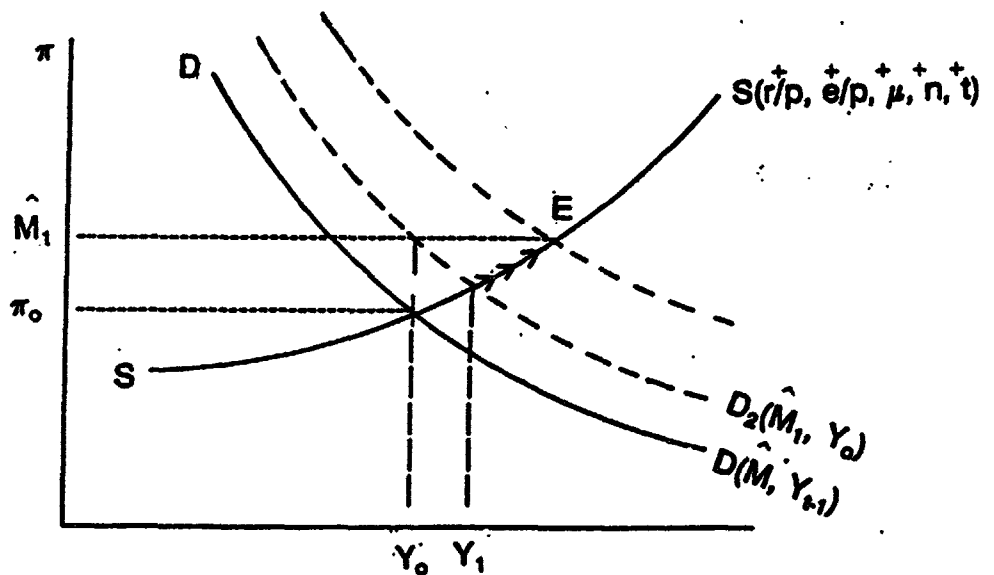
Equation (8) is the Harberger equation and it implies that changes in real balances are a function of changes in real income and changes in the rate of inflation. Reversing this equation and solving for the level of output provides a demand curve which depends on the inflation rate (just like the supply curve), the growth rate of M , and last year's output.

$$(9) \quad Y_t = \left[\frac{\hat{M} + e_p \hat{\pi} - \pi + e_y}{e_y} \right] Y_{t-1}$$

This demand curve has some unusual features, the most important of which is that its position depends on last years output level, as well as exogenous forces such as the growth in M . Clearly, for any level of Y_{t-1} the demand curve is negatively related to inflation. Indeed, the slope of the demand curve is approximately equal to $1 - e_p$. We are going to use equation (9) as the short-run demand side of our model. Holding the capital stock and growth constant, in the long run, the equilibrium condition must be that both inflation and output are constant for any \hat{M} . That implies that $Y_t = Y_{t-1}$ and $\hat{\pi} = 0$. From equation (9) that implies that in the long run $\hat{M} = \pi$, or real balances must be constant regardless of the values of e_p and e_y .

Translating the above equations into a standard aggregate supply-demand diagram using equation (6) as the supply curve, and equation (9) as the demand curve, gives:

Figure 1
Aggregate Supply and Demand



At any point in time, money growth, plus the exogenous factors on the supply side, determine short-run equilibrium. In the long-run π must be equal to \hat{M} , which is equivalent to saying that on the short-run demand curve at $Y_{t-1}, \pi = \hat{M}$. If that point happens to be on the supply curve, then the economy is at long-run equilibrium.

Suppose that the economy is in long-run equilibrium. That means that $\hat{M} = \pi$ at Y_0 . Now suppose that there is an increase in \hat{M} from \hat{M}_0 to \hat{M}_1 . In the short run this shifts the demand curve out to D_1 . Output rises to Y_1 and inflation rises, but not all the way to \hat{M}_1 . The economy does not immediately go to the new long run equilibrium, which is at the intersection of \hat{M}_1 and the supply curve, point E. Each period the short-run curve shifts out and to the right as income increases. Thus in a rather curious reversal of the usual Phillips curve analysis, here the long-run Phillips curve is upward sloping but not vertical, while the short-run demand curve is downward sloping and the long-run demand curve is horizontal and determined by the growth rate of money. Because of the negative relationship between inflation and the real wage money is not neutral in this economy, even in the long-run.

Applying the Model to Brazil

The next step is to use the model to explain or predict output in the formal, urban sector. First, estimates of the demand equation, a specification of the markup function (equation (3)) and a full set of the exogenous variables that appear in the supply and demand equations are needed. Armed with all of that, we can calibrate the model using data from 1980 through 1987 and compare its predictions for the actual values of output and inflation. Once the model tracks the 1980s well, it is used to: (a) project backward the effects of alternative policy regimes in the early part of the decade on output and employment, and (b) project forward the effects on the same variables of two alternative policy scenarios, one in which the fiscal problem is resolved and one in which it is not, resulting in high inflation and low growth through 1995.

There is insufficient data to estimate a markup function for Brazil. Instead, it is assumed that the markup is a log linear function of output.

Thus we write:

$$(10) \quad m = mY^\alpha,$$

Where α the elasticity of the markup with respect to output.

The relationship between the real wage and inflation is measured as the average of the target wage at the beginning of the indexing period and the real wage at the end of the period; or

$$(11) \quad \frac{W}{P} = \frac{\mu}{2} \left(\frac{2 + \pi}{1 + \pi} \right)$$

We combine equations (5, 10-11) to get an expression for the supply curve, and then combine this expression with equation (9) to get equilibrium output and inflation. Note that our solutions are short run.

$$(12) \quad Y = \left(\frac{1 - t}{m[1\mu(2 + \pi) / 2(1 + \pi)] + rk/P + ep^*/P} \right)^{\frac{1}{\alpha}}$$

Where l = L/Y - labor/output
 k = kw/Y - working capital/output
 i = I/Y - imports/output.

Equation (12) is a relatively steep supply curve and equation (9) a relatively flat demand curve. Wages are affected by inflation, but the effect is fairly small given the small share of labor in output and the switch to twice-a-year indexing in 1980 when our sample starts. This has the important implication that the real level of output is primarily determined on the supply side, by shifts in exogenous supply-side variables such as the target wage, the real interest rate or labor productivity. Inflation is then largely determined by the growth in money.

The parameters used to estimate the model are described in the Appendix. Table 10 displays the model's predictions and observed values for output and inflation. Note that the inflation rate is derived from the national accounts series for the real and nominal values of output for services plus industry. The model with the variable markup does extremely well in tracking output, as of course it should, given the way the markup was constructed. A measure of the model's performance is how much the markup had to vary to track output. In our estimate, m has a 10 percent variation from 1980 to 1987, the bulk of which occurred in 1987 when price controls and mildly contractionary macroeconomic policy limited business ability to pass along cost increases, particularly wages and interest. It is clear that more work could be done on the markup equation, but it does appear to reproduce trends in output and the real wage well enough to serve for forecasting purposes.

TABLE 10: PREDICTED AND ACTUAL VALUES, FORMAL SECTOR

	Inflation (percent)		Output (1980=1)	
	Predicted	Actual	Predicted	Actual
1980	92	92	1.000	1.000
1981	115	113	0.934	0.935
1982	77	107	0.936	0.938
1983	146	145	0.901	0.901
1984	277	216	0.919	0.919
1985	284	228	0.969	0.970
1986	163	121	1.112	1.112
1987	171	245	1.070	1.076

As for the demand side, the estimated Harberger equation performs reasonably well, particularly in the early years before the acceleration of inflation and the wage and price freeze in 1986 shocked the system and shifted the demand curve. It overforecasts inflation coming out of the 1983 recession when M_2 was growing far faster than prices, but then the actual price index catches up with our predicted price in 1987 when the effects of repressed inflation pushed the inflation rate far above the expansion in the money supply. Although velocity has increased steadily over the period (and by 55 percent since 1973) all velocity measures have behaved erratically in recent years—dropping sharply in 1986 and rising sharply in 1987—both movements being more than can be explained by changes in the inflation rate.

What if Brazil Had Successfully Adjusted in the Early 1980s?

Having achieved a reasonable fit of the model with the actual data, we can now address more formally the question of the costs of Brazil's failure to adjust in the 1980s. We start by simulating alternative policies and outcomes in the early part of the decade. A note of caution is in order, however. The reason that the Harberger equation fits the 1980s so well is partly the dominance of monetary phenomena on the demand side. That is, the explosion in the internal debt and its financing swamped the effects of any other changes on the expenditure side. Had Brazil instead effected a fiscal adjustment in the early eighties, other demand side effects might have been more important and possibly more measurable in our modelling exercise.

Our first simulation looks at the tradeoff between monetary and fiscal policy in the first half of the decade on output and employment. As a result of Brazil's tight money and loose fiscal policies, interest costs rose by 53 percent between 1980 and 1985. This had an unfavorable and perverse effect on employment, output and the distribution of income. To see how large this interest rate effect was, we ran a counterfactual simulation in which we kept the interest cost at its 1980 level through 1985. Since this increased the level of output, we adjusted the labor productivity parameter to eliminate stockpiling for those years

in which output rose above its 1980 level. Our simulation results show that had Brazil curtailed public spending sufficiently to keep interest rates at their 1980 level, by 1985, output would have been 15.5 percent higher, while formal sector labor employment and income would both have been 7.5 percent higher. The big gainer would have been non-financial profits which would have risen by 16 percent due both to lower interest costs and higher labor productivity. These results are achieved by reducing the depth of the private sector recession. The counterfactual thus makes clear the payoff to a stabilization policy mix that depends more on fiscal and less on monetary policy. Note that our simulation does not include the possible output cost that such a fiscal contraction might have entailed, as our demand side does not include these variables. It is also fairly clear from the history of the decade that the fiscal contraction was not tenable politically in 1981-83.

We also ran a simulation to see the effect of rising target wage demands on output and employment. As we pointed out above, a rise in real wages and the labor share were a significant feature of the period up to 1983 and 1986-87. What would have happened had the target wage stayed at its 1980 level through 1987? As in the interest rate simulation we adjusted the labor productivity parameter to eliminate stockpiling in those years when output exceeded its 1980 level. We also set the markup parameter at its 1981 value. Holding wages down has a significant effect on output, but little effect on employment during the 1981-83 recession. Output in 1983, instead of being 10 percent below its 1980 level, is only 1.7 percent below, but employment is virtually unchanged because of stockpiling. In the subsequent recovery, through 1986, the counterfactual output and employment are both about 5 percent higher than what was observed. Thus holding down wage demands sharply reduces the recessionary effect of stabilization, and also permits an increase in employment during the 1985-86 recovery. But despite the higher level of real income and employment, formal sector labor is worse off in the counterfactual world because the decline in the labor share is so pronounced that it more than offsets whatever increase there is in employment. Holding down wage demands transfers income to profits, but labor real income stays roughly constant at its 1980 level except in 1986, whereas it increased substantially in the historical simulation, even in the 1981-83 recession. In addition, the political viability of this alternative policy regime is suspect as well, as by 1981 labor union federations had formed and the political opening was already underway.

Evaluation of Brazil's Policy Options for the 1990s

As Brazil's macroeconomic environment is extremely unstable at present, predicting Brazil's future growth path is complicated. Clearly, Brazil could not have continued along its 1989 path, as a hyperinflation with ensuing economic disorganization would eventually ensue. Brazil could be seen as having two choices. The first would be to finally effect the required adjustment, structurally adjusting public consumption to levels consistent with minimal private sector transfers. This would allow a resurgence in private sector investment, stimulating economic growth, reversing the downward trend in labor productivity, and allowing increased employment and real wages. The second would be to

only partially effect the adjustment--just enough to stabilize the economy and avert hyperinflation. Some scaling back of public consumption, effectively stabilizing the growth of the internal debt, might allow the economy to continue to generate positive growth (zero on a per capita basis) for a few years, until the political consensus for a more ambitious adjustment program was reached.¹⁸ Obviously, either of these future growth paths, (or several alternatives in between) can also be reached through the detour of hyperinflation. However, our model is not very helpful in analyzing this phenomenon. The purpose of this analysis is to illuminate the implications of a continued failure to adjust public consumption to the poor, and the two scenarios sketched out above serve this purpose well. The first enters Brazil on a virtuous course of relatively low inflation and high growth, the second enters Brazil into a vicious circle of inflation and slow growth.

To estimate the impact of alternative macroeconomic scenarios on labor market outcomes and poverty in Brazil, a four-step procedure was followed. First, using a macroeconomic accounting framework to ensure consistency, growth rates of sectoral outputs, savings, investment, and the external balance were estimated, conforming to the normative policy scenarios sketched out above. Then, using estimates plus norms of inflation and interest rates for each scenario, we used a behavioral model of portfolio balance (e.g. demand for money and bonds) to estimate a financeable government deficit and the government interest bill (including external financing) for each case.¹⁹ Third, using this estimate of the financeable deficit and the interest bill, the policy measures required to produce a set of government accounts (consumption, investment) consistent with our aggregate macro projection were estimated. In the final step, we plugged the estimates from the previous three steps into the model described above and (a) checked again for consistency, making minor modifications where justified, and (b) estimated the results of the stabilization and growth processes simulated in steps 1-3 on the functional distribution of income under each scenario. The parameter estimates are shown in the Data Appendix; we describe the results of this process and the implications for poverty below.

The first scenario (the high case) is a highly normative scenario, implying a high degree of consensus among policymakers (legislative, executive and judiciary) and economic sectors on a stabilization course. It assumes that immediately following the elections, Brazil begins an adjustment program consisting of an incomes policy (wage and price controls) and structural adjustment in fiscal accounts. Subsidies are reduced by 6 percent in the first year, and more rapidly thereafter, as are transfers to the social security and health system. Government employment is reduced slightly (or wages are cut), as are

¹⁸Alternatively, Brazil could continue to experience stop-go cycles of stabilization and recession followed by a return to growth as the government loosens its purse strings, with growth each time choked off by a lack of investment, thus in return of inflation again. On average, this scenario would look the same as a low-growth scenario.

¹⁹This model is described in Coutinho, 1989.

purchases of goods and services. Public confidence is high, velocity of money declines dramatically, and tax collections return to their historical levels. Real interest rates fall significantly, as the government is no longer forced to pay high rates to finance the debt. A debt reduction reduces required interest payments by about .5 percent of GDP, aiding in the fiscal adjustment. After the stabilization, the government also initiates major sectoral adjustments, including privatization, trade reform, and deregulation, improving the efficiency of the economy.

TABLE 11: BRAZIL - PREDICTED HIGH CASE OUTCOMES

	1988	1989	1990	1991	1992	1993	1994	1995
<u>Formal Sector</u>								
Real Wages	1.00	0.986	0.977	0.987	1.025	1.056	1.090	1.127
Employment	1.00	0.961	0.969	0.983	1.010	1.048	1.091	1.125
Real Income	1.00	0.943	0.940	0.965	1.032	1.099	1.188	1.262
Non-Financial Profit Income	1.00	1.071	1.032	1.029	1.064	1.120	1.181	1.252
Formal Sector Profit Income	1.00	1.094	1.055	1.090	1.150	1.234	1.300	1.378
<u>Informal Sector</u>								
Employment	1.00	1.181	1.262	1.335	1.395	1.439	1.477	1.535

The predicted result of these policy measures on output growth in our normative high scenario is highly positive after a short adjustment period.²⁰ By 1992, Brazil returns to 5 percent growth per annum under a strong resurgence of private investment and could continue along this path through the decade, in the absence of any major shocks. Table 11 shows what happens to income and employment in both the formal and informal sectors. Note that informal sector employment is treated as a residual here. Starting with the formal sector, the return to rapid growth by 1992 permits a significant increase in the real wage labor income and employment. In our simulations we assumed formal sector productivity growth of 2.3 percent per year, slightly less than the 2.7 percent rate observed during the 1970s, because of the lower overall growth rate. We also assumed that both labor and capital shared the benefit of lower real interest rates through a slight rise in the share of each factor. Employment, which was sluggish throughout the 1980s, grows at an average of 3 percent from 1990-95 while real wages grow by 2.9 percent and labor incomes by 6.1 percent. This split of the growth dividend permits non-financial profits to grow by 30.5 percent over the same period, supporting the necessary increase in private investment.

²⁰Note that this scenario implies very low costs of adjustment, with only about 18 months of recession. Given Brazil's recent history of failed stabilization policies, such a scenario may be too optimistic.

Turning to the informal sector, where the bulk of the poor derives incomes, this sector will still be forced to absorb rural workers even in the high growth scenario because agricultural employment is roughly constant.²¹ A good fraction of that increase occurs during the adjustment period, but even in the 1990-95 period informal sector employment must grow at 4 percent per year. This does not imply that rapid growth will not have a significant impact on poverty. On the contrary, since average output in the informal sector is growing even faster than the labor force, average informal wages should increase, especially if the 1990s are like the 1980s in which periods of growth led to a narrowing in the formal/informal wage differential. In addition, our assumed 3.5 percent productivity growth in agriculture should permit some increase in wages there as well. Nevertheless, the implied growth in the informal sector in the high scenario only underlines the point that 5 percent growth in Brazil must be near the minimum at which significant progress can be made in reducing poverty through formal sector employment growth alone.

The second scenario (the low case) shows a much less rosy outcome. A stabilization program, again consisting of incomes policy and fiscal reduction, is initiated in 1990, which averts hyperinflation. However, the fiscal reduction is not sufficient, and a high real interest rate policy must be maintained in order to finance the deficit. In a vicious circle, failure to raise taxes and lower government expenditures makes it impossible to control monetary expansion. As a result the economy suffers with two vicious circles. First, deficits financed by bond sales force up the real interest rate, which remains at high levels exacerbating the deficit problem. Second, because of the continuation of inflation, it is not possible to lengthen the indexing period and Brazil enters into a fruitless struggle between labor and capital over the distribution of slowly growing formal sector output--a struggle resolved through high inflation.

²¹We assume agricultural productivity growth of 3.5 percent per year, somewhat lower than the rate observed in the '70s, when the agricultural labor force fell by 3 percent over the decade, or .3 percent per year, while output was rising by 4.8 percent per year.

TABLE 12: BRAZIL - PREDICTED LOW CASE OUTCOMES

	1988	1989	1990	1991	1992	1993	1994	1995
Formal Sector								
Real Wages	1.00	0.986	0.996	0.990	1.00	1.00	1.010	1.019
Employment	1.00	0.961	0.968	0.979	0.987	0.999	1.006	1.018
Labor Income	1.00	0.943	0.961	0.968	0.982	0.993	1.014	1.032
Profit Income	1.00	1.071	1.063	1.084	1.010	1.120	1.137	1.157
Non-Financial								
Profit Income	1.00	1.094	1.088	1.109	1.123	1.144	1.162	1.181
Informal Sector								
Employment	1.00	1.181	1.242	1.264	1.342	1.432	1.522	1.710

In the low scenario we have set formal sector growth at 1.85 percent per year. Table 12 shows the deleterious effect of this on all participants in the economy. Even though we keep the labor share constant, the real wage only grows by .5 percent per year here and labor incomes expand by only 7.4 percent during 1990-1995, compared to 35 percent in the high scenario. The growth in profits is equally modest. The big impact of slow growth is seen in the informal sector because it is the residual employer. One percent growth in the formal sector means that it only absorbs about 250,000 new entrants per year. But with agriculture not absorbing labor, the informal sector must expand by about 1.5 million per year (7.7 percent growth). By 1995 there will be about 3 million more workers in the informal sector in the low than in the high scenario, underlining the key role that growth plays in creating good rather than marginal jobs. Average value added per worker declines in the informal sector, which undoubtedly implies a falling real wage and an increase in the formal/informal wage differential, just exactly what has already been happening between 1986 and 1989.

In this case, the unconvincing stabilization has a high cost. Failing to eliminate the deficit, the government is forced into a high-interest, high-inflation, low-investment, low-growth trajectory. Formal sector growth is insufficient to absorb rural-urban migrants and new entrants. Real wages are roughly constant in the formal sector, and poverty increases in the rapidly expanding informal sector.

Conclusions

From a macroeconomic standpoint, Brazil solved half of the adjustment problem it and other high debt countries faced in the 1980s - the need for balance of payments surpluses to service the external debt. However, Brazil failed to cut from consumption the domestic counterpart of the increased foreign interest burden, preferring to reduce investment instead. Government consumption was financed by

extracting resources from the private sector through deficit financing and inflation. As the deficit grew, the government was increasingly forced to pay high rates of interest to extract these resources. While these policies clearly helped to maintain consumption levels and thus prevent an increase in poverty, they had high costs in terms of Brazil's future, as they resulted in declining investment in the private sector and increasing capital flight. By 1987, the distributional costs of these policies were higher than the income gains, resulting in a widening of the income gap.

Private formal sector output growth is clearly necessary for poverty alleviation in Brazil. Virtually all of the net increase in poverty took place during the recession of 1981-83, when formal sector output declined 15 percent. An important factor in that output decline was Brazil's reliance on tight money policies, which choked off investment and cut non-financial profits, instead of fiscal adjustment. Our counterfactual simulations suggest that Brazil could have achieved a much better poverty performance in the '80s if it had been able to reach political agreement on a reduced level of consumption in either 1982-83, or in 1985 (either by reducing government expenditures or increasing taxes, thus reducing private consumption). This was very difficult, as the loosening of authoritarian controls gave voice and power to new groups, bringing a rush of pent-up demand for consumption, especially government services. Ironically, the failure to exercise restraint in the early and middle years of the decade compromised growth for the rest of the decade, hurting all groups.

Our review of the macroeconomic record shows that Brazil's wage policies in the '80s strongly benefitted formal sector workers, especially during the recession. In this Brazil's experience differs quite sharply from many other countries during stabilization. Furthermore, during the recession, private sector firms did not reduce employment as fast as output declined, choosing instead to stockpile labor and sacrifice profits. While the direct effects of these policies should not be particularly pro-poor (as most poor households do not receive earnings from this sector), the indirect effects (the income multiplier effects) appear to have been strong enough to have prevented real incomes in the informal sector (including agriculture) from falling relative to the formal sector. Had the government not tried to protect the wages of lower-skilled private sector workers, firms would most likely not have increased employment, but rather increased profits. When private formal sector output did increase in 1983-86, employment increased pari passu.

Government sector wage and employment policies do seem to have been ill-advised from a poverty point of view. During the recession, these policies helped to maintain formal sector employment, albeit at lower wages. We could not estimate the cost of these policies in terms of forgone output in the private sector (caused by the deficit financing), nor does our data allow us to estimate how many of these jobs went to poor households or near-poor households. Thus we cannot assess their net

impact during the recession, but owing in part to the wage compression, we suspect that their negative impact on poverty via an increased deficit during these years was low. However, as government salaries began to recover in the middle years of the decade and employment kept increasing, personnel costs at all levels of government became an important expenditure item, rising 30 percent in real terms between 1985 and 1988 to almost 9 percent of GDP. Financing these expenditures must have had an output cost over the same period. In addition, as government employees with 5 years of service or more were given permanent tenure under the new constitution, the government's generosity during these years is likely to take its toll in the 1990s as well.

Our scenarios of growth and adjustment in the '90s suggest that Brazil can still stabilize and return to a sustainable growth path in the next decade, and that such a course would bring about significant poverty reduction. The trick to entrance on this virtuous course is for all groups (including the poor) to suffer a short-run loss. The loss would only be short run if the stabilization is effective within a very short time and investor confidence brings a resurgence of private investment. Then, repeating the pattern of the '70s in more sustainable fashion, output increases in the private formal sector would translate into higher employment and earnings in the higher paid formal sector and higher earnings in the informal sector where the poor earn the bulk of their income. Ironically again, entrance on this course would permit government consumption to reach its highest absolute level ever without resorting to inflation, allowing the option of addressing Brazil's long list of social needs, including improving access to social services among the poor.

A repeat of the stabilization failures of 1986-89, on the other hand, brings grim prospects for the poor. The government would be forced to continue a high interest rate policy and an expansionist monetary policy in a fruitless effort to maintain government consumption, which continues to decline over the decade. Investment remains flat, and stagnation in the formal sector crowds workers into the informal sector, lowering earnings in this sector. No expansion of social services is possible, and living standards of the poor deteriorate.

This analysis of the prospects for poverty reduction has focused on an aggregate analysis of the country as a whole. Our prediction of the prospects for poverty reduction depend on the mechanism of expansion of the private formal sector. In the '70s (and again in the period 1984-85), output growth in this sector brought both formal sector employment growth (higher paying jobs) and increased incomes in the informal sector through strong linkage effects. We noted above that this mechanism worked much better in the more developed southern areas of the country, where the degree of formalization is much greater and the share of the private sector employment in total formal sector employment is much greater. While we do expect that if the scenario of stabilization, adjustment and growth materializes the Northeast

will benefit, we are much less confident about the magnitude of the benefit there than in the southern areas. The stabilization period will be especially difficult for the major cities in the Northeast, as this period implies a reduction in either employment or wages in the public administration sector or both, and thus the recovery may take longer to bring poverty reduction benefits to these areas. Achieving reductions in poverty in this less developed area will clearly require policies that make growth more efficient at poverty reduction--in other words, improve the rate of trickle down.

References

- Almeida Reis, Jose Guilherme. "Salario Minimo e Distribuicao de Renda," in Perspectivas da Economia Brasileira 1989. Rio de Janeiro: IPEA/INPES, 1989
- Bonelli, Regis and Guilherme Luis Sedlacek. "Distribuicao de Renda: Evolucao no Ultimo Quarto de Seculo," in Mercado de trabalho e distribuicao de renda: Uma coletanea. Guilherme Luis Sedlacek and Ricardo Paes de Barros, eds. IPEA, Serie Monografica, Rio de Janeiro: IPEA/INPES, 1989.
- Cacciamali, Maria Cristina. "Emprego no Brasil durante a Primeira Metade da Decada de 80," in Mercado de trabalho e distribuicao de renda: Uma coletanea. Guilherme Luis Sedlacek and Ricardo Paes de Barros, eds. IPEA, Serie Monografica, Rio de Janeiro: IPEA/INPES, 1989.
- Cardoso, Eliana and Daniel Dantas. "Brazil After 1982: Adjusting or Accommodating?" Mimeo, 1989.
- CEPAL. Antecedentes Estadisticos de la Distribucion del Ingreso: Brasil, 1960-1983, Santiago: U.N., 1989.
- Coutinho, Rui. "A Portfolio Allocation Model for Brazil," Mimeo, June 1989.
- Datt, Gaurav and Martin Ravallion. (1990). Growth and Distribution Components of Changes in Poverty Indices. Mimeo.
- do Valle e Silva, Nelson and Carlos Hasenbalg. Estrutura Social, Mobilidade e Raca. Sao Paulo: Edicoes Vertice and IUPERJ, 1988.
- Fishlow, Albert. "Brazilian Size Distribution of Income," American Economic Review, 1972 (May), pp. 391-402.
- Fox, M. Louise. "Income Distribution in Brazil: Better Numbers and New Findings," Ph.D. diss., Vanderbilt University, 1982.
- Fox, M. Louise, "Poverty Alleviation in Brazil, 1970-1987," Internal Discussion Paper, Latin America and the Caribbean Region, July 1990.
- Harberger, Arnold. "The Dynamics of Inflation in Chile," in Measurement in Economics, C. Christ, ed. Standford University Press, 1963.

- Hoffman, Rudolfo. "Evolucao da Distribuicao da Renda no Brasil, entre pessoas e entre familias, 1979-86," in Mercado de trabalho e distribuicao de renda: Uma coletanea. Guilherme Luis Sedlacek and Ricardo Paes de Barros, eds. IPEA, Serie Monografica, Rio de Janeiro: IPEA/INPES, 1989, pp.25-54.
- Maia, Rosane and Rosangela Saldana. "Politica de Salario minimo: Uma Questao a Ser Equacionada," in Mercado de trabalho e distribuicao de renda: Um a coletanea. Guilherme Luis Sedlacek and Ricardo Paes de Barros, eds. IPEA, Serie Monografica, Rio de Janeiro: IPEA/INPES, 1989.
- Maia, Rosane and Rosangela Saldanha. "Abrindo a Caixa Preta: Estudo Sobre a Evolucao do Emprego na Administracao Publico Estadual e Municipal," mimeo, December 1988.
- Modigliani, Franco and Tommaso Paddoa-Schioppa, "The Management of an Open Economy with '100 percent Plus' Wage Indexation," Princeton Essays in International Finance # 130, December 1978.
- Morley, Samuel and Albert Fishlow, "Deficits, Debt and Destabilization," Journal of Development Economics 1987, pp. 227-244.
- Morley, Samuel A. Labor markets and Inequitable Growth: The Case of Authoritarian Capitalism in Brazil. Cambridge: Cambridge University Press, 1982.
- Pastore, Jose, Helio Zylberstajn and Carmen Silvia Pagotto. Mudanca Social e Pobreza no Brasil: 1970-1980. (O que Ocorreu com a Familia Brasileira?). Estudos Economico, FIPE/PIONEIRA, 1983.
- Pastore, ose. "Inequality and Social Mobility: Ten Years Later," in Social Change in Brazil 1945-1985: The Incomplete Transition. Edmar L. Bacha and Herbert S. Klein, eds. Albuquerque: University of New Mexico Press, 1989.
- Rocha, Sonia and Hamilton Tolosa. "Pobreza Metropolitana e Politicas Sociais," in Perspectivas da Economia Brasileira 1989. Rio de Janeiro: IPEA/INPES, 1989
- World Bank. Brazil: An Assessment of the Current Macroeconomic Situation. World Bank: Report No. 7540-BR, December 1988.
- World Bank. Brazil: A Macroeconomic Evaluation of the Cruzado Plan. Washington, D.C.: World Bank, 1987.

DATA APPENDIX

Notes to Tables

Table 2. The macro indicators (fiscal policy, savings and investment) are from Brazil national accounts data. The 1987 numbers are the preliminary estimates. The estimates of formal and informal sector output were obtained as follows. First, we defined earners in the formal sector as those contributing to the social security system (Previdencia). Using the distribution of earnings from the main job for these two groups reported in the household survey data (PNAD), we calculated mean earnings for each group for each year, and the differential in mean earnings for each year. This differential is reported in Table 5. The formal share of total output was then $1-(1-d)/(1-d+d(\text{differential}))$ where d is the share of the labor force in the formal sector. We calculated the differential between the informal and the agricultural sector in the same way except that here we used the average income of both contributors and non-contributors, since the bulk of agricultural labor does not contribute to social security.

Table 3. These numbers are compiled from special tabulations of the PNAD survey prepared by IBGE for Nelson do Valle Silva. Dr. Silva generously made these tabulations available to us.

Table 4. Published tabulations of the distribution of per capita income are only available for selected years, and are found in the IBGE series, Maes and Crianças. Income is reported in minimum salaries (after 1986, the piso nacional). Our constant poverty line was obtained by (a) converting minimum salaries for the reference month for each year into constant cruzados; and the (b) converting this value into constant 1980 minimum salaries (e.g. correcting for changes in the real minimum wage). As the survey reference period often spanned a period of minimum salary change, we had to choose a reference month. In these cases, we chose the reference month identified by IBGE in the published tabulations of the PNAD data. Table A-1 shows this calculation.

TABLE A-1: REAL MINIMUM WAGE INDEX FOR PNAD, CENSUS DATA

Survey Ref. Period	Index Ref. Period	Nominal Value (Cz\$)	INPC (3/86=100)	Real Value (Cz\$)	Index	Poverty Line, per Capita (MS)
1/8 - 31/8	1980 (average)	4.02	0.48	8.37	1.00	0.250
11/8 - 11/14	11/1981	8.46	1.15	7.35	0.88	0.284
9/19 - 12/11	11/1982	23.57	2.38	9.90	1.18	
9/25 - 1/10	9/1983	34.78	5.58	6.23	0.74	0.337
9/23 - 9/29	9/1984	97.18	16.24	5.98	0.71	
9/22 - 9/28	9/1985	333.10	51.42	6.48	0.77	0.323
9/28 - 10/4	9/1986	804.00	106.15	7.57	0.90	0.276
9/27 - 10/3	9/1987	2,400.00	406.24	5.91	0.71	0.352

The income distribution data, mean household income per capita, and poverty gap are our own calculations, based on special tabulations of the PNAP survey data prepared by INPES/IPEA. The methodology is described in Fox (1990).

Table 5. The first four employment indices are taken from PNAD and census data as reported in Cacciamali (1989). The formal sector is taken to be those contributing to the national social security system, a more inclusive concept than the alternative, workers with a signed worker card. The RAIS index numbers are from the Ministry of Labor, where a fixed panel of establishments was used to calculate the indices. In these data, "public sector" refers to public administration workers only. The PME and FIESP numbers are widely available; our source was Conjuntura Economica. The real average income indices and differentials are the same ones used in the calculations for Table 2.

Tables 6-9. Value added per worker is derived from the output and employment data whose indices are displayed in Tables 2 and 5. To derive an estimated of factor shares we used the definition of the labor share as WL/PQ , using the observed level of productivity in the formal sector, and the observed average FIESP industrial real wage as reported in Table 2. Financial profit is defined as the share of interest costs (measurement described below), and we then obtained the non-financial profit share as a residual after all other costs (taxes, imports) were subtracted. The indices of factor incomes are the product of the indices of factor shares and an index of total output which include finance, taxes, and imported inputs in addition to value added. Our estimates, year by year, are shown below.

TABLE A-2: VALUE ADDED PER WORKER, FACTOR SHARES AND FACTOR INCOMES

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
<u>Value Added per</u>								
<u>Worker</u>								
Total	1.00	0.96	0.92	0.91	0.90	0.92	0.96	0.96
Agriculture	1.00	1.13	1.05	1.13	1.02	1.11	1.10	1.27
Formal	1.00	0.92	0.91	0.87	0.88	0.89	0.95	0.88
Informal	1.00	0.88	0.81	0.75	0.83	0.89	1.05	0.90
<u>Index of Factor Shares</u>								
Labor Share	1.00	1.16	1.25	1.19	1.09	1.16	1.23	1.20
Profit Share	1.00	0.85	0.82	0.84	0.92	0.91	0.98	0.92
Non-Financial Profit Share	1.00	0.77	0.73	0.75	0.85	0.81	1.02	0.83
<u>Index of Factor Incomes</u>								
Labor (formal only)	1.00	1.09	1.17	1.07	1.00	1.12	1.37	1.20
Profit	1.00	0.86	0.83	0.82	0.91	0.95	1.06	1.06
Non-Financial Profit	1.00	0.80	0.77	0.76	0.86	0.88	1.09	0.99

Estimation of the model

Values of exogenous parameters are shown below in Table A-3. These values were obtained from published data, observed values for tax collections, labor productivity, working capital and imports were obtained. These were converted to shares of observed value-added plus imports, giving observed values for t , l , rk/p , and eP^*i/P for the period 1980-87. The target wage was more difficult because of Brazil's staggered system of wage setting. In fact, a certain fraction of the labor force has their semi-annual adjustment each month, so there is no single target wage, and the value of the Sao Paulo industrial wage index (Table 5) in year $t-1$, deflated by the National Consumer Price index (INPC), was used to approximate the target wage.

TABLE A-3: VALUES OF EXOGENOUS PARAMETERS

	Labor Share % of Output L/Q	Target Wage Index u	Taxes t	Import Share eP*/P	Real Interest rk/p	Money Supply Growth (%) M ₂	Indexing Period n	Markup m
1980	0.283	0.976	0.114	0.099	0.066	0.87	2.00	2.197
1981	0.308	1.000	0.125	0.093	0.092	1.05	2.00	2.140
1982	0.310	1.070	0.131	0.084	0.090	0.83	2.00	2.025
1983	0.318	1.140	0.127	0.088	0.088	1.35	2.00	2.075
1984	0.312	1.060	0.115	0.082	0.095	2.65	3.00	2.185
1985	0.313	0.990	0.118	0.065	0.101	2.90	3.00	2.180
1986	0.298	1.050	0.135	0.046	0.050	1.85	3.00	2.080
1987	0.314	1.050	0.126	0.047	0.097	1.67	2.00	1.970

Determining an appropriate value for interest costs was also difficult. Theoretically the right value should be the real cost of working capital, whether or not it is financed by outside borrowing. This value is not reported or observed in Brazil. Two options are available. First, there is the real interest cost of borrowed working capital as reported by the banking system. That is a small amount, less than one percent of total formal sector cost of production. A second estimate can be derived from corporate income statements found in *Conjuntura Economica*, which report nominal interest costs including monetary correction. Even when deflated, they are a very large proportion of gross profits, over 60 percent in the high interest years of 1981-83. This estimate surely overstates true interest costs because it ignores gains from the reduction in the real value of outstanding debt due to inflation. As our estimate we chose a third alternative, which stands between these two. It is the real imputed value of the services of financial intermediaries, adjusted for the share of government bonds in bank assets. This estimate understates interest costs to the extent that it leaves out interest payments on deposits as well as required reserves. But it also includes an element of overstatement to the extent that banks lend outside the formal sector to either consumers or to agriculture. All three series have the same pattern over the 1980s--rising from 1980-1985, falling sharply in 1986 and returning to a high level in 1987 and 1988.

We started our system in 1980 where we had census observations of the labor and capital share in services, commerce and industry. Using the observed value of the real wage and the inflation rate, we were then able to normalize our labor productivity measures and our markup so that we got exactly the observed labor share, and real wage at the observed level of output and inflation. We then experimented with a range of different values of the markup elasticity parameter, finally choosing the value 1.2. This choice caused us some difficulty because it became clear by inspection that because of very large fluctuations in the supply side exogenous variables, particularly the target wage and the interest rate, the model would predict a deeper downturn in 1983 than actually occurred and then a far more rapid subsequent

expansion in 1984-86. The markup equation clearly needs more work. But since we do not have the data to properly test alternative specifications, and since we have a good idea of what the labor share must have been from our labor productivity and real wage series, we adjusted the markup parameter (m) downward in the deep recession of 1983 and upward to compensate the subsequent years. This is equivalent to saying that the markup is more sensitive to the level of output than is implied in our elasticity parameter α . The values for n reflect government wage policy and private sector practice.

Turning to the demand equation, we used M2 as our dependent variable and estimated the equation using yearly data from 1973 through 1987. Given the rising pattern of inflation in Brazil, there is a high degree of multi-collinearity between income and the inflation rate. To avoid that problem we set the income elasticity at one and re-estimated the equation, which came a regression of velocity on the inflation rate. The resulting equation was:

$$\ln M/P = -1.48 + \ln Y - .15P$$

$$(-58.0) \quad (-4.59)$$

$$\text{adj } R^2 = .59$$

$$\text{D.W.} = 1.09$$

Simulation parameters

Table A-4 shows the simulation parameters used to estimate the high and low case outcomes in the simulation exercise. To derive the formal sector labor share, in the high case, we assumed an increasing productivity trend over the period 1991-1995, with an average of 2.3 percent per annum. In the low case, we assumed a 1 percent productivity increase. Using these assumptions, we derived l/Q (labor per unit of output), and formal sector employment growth. In both cases, we assumed no growth in agricultural employment (e.g. labor productivity grows the same rate as output in agriculture, 3.5 percent per annum). In agriculture, this represents continuation of the trends of the 80s. From these assumptions, the growth of employment in the informal sector was a residual (holding the unemployment rate constant at the 1987 share of the labor force).

TABLE A-4: SUMMARY OF HIGH AND LOW CASE PARAMETERS

	HIGH CASE							
	1988	1989	1990	1991	1992	1993	1994	1995
GDP Growth rate	-0.3	1.0	1.0	2.8	5.0	6.0	6.0	6.0
			(percentage of GDP)					
Current Account Balance	1.2	0.3	-0.4	-0.6	-0.9	-0.9	-0.9	-0.4
Consumption	77.9	77.5	78.9	76.6	75.8	74.2	73.4	75.2
Investment	17.0	18.0	18.0	21.0	22.0	24.0	25.0	25.0
Gov't Accounts (Consolidated)								
Revenues	24.4	24.1	25.0	26.6	25.7	25.4	25.2	25.0
Expenditures								
Current	31.0	24.8	23.7	22.2	21.3	20.6	20.3	20.1
Capital	3.2	2.7	2.8	3.0	3.4	3.8	4.0	4.0
Deficit Financing:	—	—	2.0	-1.0	1.7	2.3	2.5	2.5
External	—	—	0.4	0.6	0.8	0.7	0.6	0.4
Money	—	—	1.1	2.8	2.6	1.9	1.8	1.8
Bonds	—	—	0.5	-4.4	-1.7	-0.3	0.2	0.3
Other Items (%)								
Real Domestic Interest Rate	20.5	12.0	10.0	10.0	10.0	10.0	10.0	
Inflation Rate (Dec.-Dec.)	935.0	1300.0	600.0	80.0	50.0	50.0	50.0	50.0
No. of Indexing Periods	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0
Taxes (t)	0.140	0.118	0.14	0.153	0.153	0.153	0.153	0.153
Interest Costs (rk/p)	0.097	0.094	0.090	0.070	0.060	0.050	0.050	0.050
Import Share (eP^wi/p)	0.046	0.048	0.054	0.057	0.059	0.061	0.063	0.063

LOW CASE

	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
GDP Growth rate	-0.3	1.0	1.0	2.0	2.0	2.0	2.0	2.0
			(percentage of GDP)					
Current Account Balance	1.2	0.3	-0.4	-0.4	-0.7	-0.8	-0.7	-0.6
Consumption	77.9	77.5	80.0	80.4	80.6	80.8	80.9	80.8
Investment	17.0	18.0	17.0	17.0	17.0	17.0	17.0	17.0
Gov't Accounts (Consolidated)								
Revenues	24.4	24.1	22.5	22.5	22.2	22.1	22.1	22.1
Expenditures								
Current	31.0	24.8	22.6	22.2	22.0	22.0	22.0	22.2
Capital	3.2	2.7	2.0	2.0	2.0	2.0	2.0	2.0
Deficit Financing:	—	—	2.1	-1.5	1.8	2.0	1.9	1.8
External	—	—	0.6	0.8	0.9	1.0	0.8	0.7
Money	—	—	0.9	1.0	0.9	0.9	0.9	0.9
Bonds	—	—	0.7	-0.3	-0.0	0.1	0.2	0.3
Other Items (%)								
Real Domestic Interest Rate	20.5	17.8	17.8	17.8	17.8	17.8	17.8	
Inflation Rate (Dec.-Dec.)	935.0	1300.0	800.0	800.0	800.0	800.0	800.0	800.0
No. of Indexing Periods	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Taxes (t)	0.140	0.118	0.118	0.118	0.118	0.118	0.118	0.118
Interest Costs (rk/p)	0.097	0.094	0.092	0.092	0.092	0.092	0.092	0.092
Import Share (eP*i/p)	0.046	0.048	0.054	0.057	0.059	0.061	0.063	0.063

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