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Distributive Effects of Brazilian Structural Reforms

Marcelo Neri ^{*}
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I - Introduction

Brazil is not only a late-comer in terms of structural reforms and stabilisation; major institutional changes observed during the last 11 years have not pointed towards the so-called New Economic Model (NEM). In particular, while all major Latin American economies were moving towards a sounder fiscal apparatus and more flexible labour regulation schemes, the Brazilian Constitution of 1988 introduced many obstacles to the NEM on both counts.

On the other hand, liberalisation of international trade started with the Collor administration in 1990 and was intensified by the Cardoso administration in 1994. Similarly, domestic financial reforms, liberalisation of the capital account and privatisation were implemented rather late in comparison with the rest of the continent (but at least they are in line with the NEM).

The impacts of the reforms implemented by Collor and Cardoso on income distribution were dominated by changes in the macroeconomic environment (inflationary instability, deep recession, stabilisation boom and external crisis). It is not a trivial exercise to gauge the impacts of economic reforms. For instance, the overlapping of the post-Constitution period with the period after the external opening of the economy does not allow us to identify which impulses were dominant for the fairly sharp increase in labour productivity (i.e. the increased labour costs or the increased exposure to competition).

This chapter attempts to measure the evolution of income distribution and its determinants during the period of economic reforms. Our point of departure is to establish a few conceptual points: first, the movement towards reforms is not unidirectional in Brazil and many institutional changes have occurred simultaneously. This creates difficulties in the assessment of the distributive effects of specific reforms. Second, there has been a rather long delay before the idea of reform gains momentum in the country. Fernando Henrique Cardoso first term in office (1995-98) will go down as a period of consolidating stabilisation rather than of implementing reforms. The peak of the first generation of reforms is only now becoming visible in Brazil. In this sense an analysis of the effects of Brazilian reforms on income distribution must include updated data and a prospective component. Third, the permanent decline in inflation observed after the *Real* Plan should be treated as an economic reform given its effects on economic behavior and institutions. Finally, the effects of macroeconomic fluctuations on Brazil's distributive variables are so prominent that they can not be left out of the analysis.

The chapter is divided into two parts: in the first part, long-term relations between reforms and income distribution are explored. The main empirical strategy pursued here is to establish comparisons between reform-related institutional characteristics and income distribution aspects at different points in time. The contrast between the situation observed before and after the reforms

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allows for tentative interpretations of causal relations between the reforms that were actually implemented and the distributive outcomes.

In order to set key dates for the implementation of reforms, we use indices of institutional reforms found in the literature (Morley et al. (1999) and Lora (1997)) and other types of evidence (section II.1). The main reforms measured are related to the following fields: trade, labour, tax, financial, capital account and privatisation. The change of inflationary regime in 1994 is perceived as a separate reform.

On the income distribution side, we use information at the national level extracted from PNAD¹ household surveys to construct aggregate inequality measures (section II.2) and to apply standard decomposition techniques (section II.3). These exercises are performed for different definitions (income concepts, population concepts and inequality measures) calculated for the following years: 1976, 1985, 1990, 1993 and 1997. The 1976-90 period is used as evidence of the pre-reform period whereas the reform period (1990-97) plays a central role in the analysis. This reform period is divided in two parts: 1990-93, as an initial period of reforms with inflationary instability, and 1993-97, as a period for which the effects of the new round of reforms, including stabilisation, are assessed.

At the end of the first part of the chapter, we attempt to study the impact of the economic reforms on the rich (section II.4). First, we analyse absolute income changes in the top 10% of the income distribution. At this point we also assess how the composition of this group changed during the reform period. Second, we assess the contribution of this group and the university graduates group to overall inequality.

The second part of the chapter explores PME² monthly household surveys to extract relations between movements of distributive variables, on the one hand, and economic reforms and macroeconomic fluctuations, on the other. It qualifies the effects of the 1994 stabilisation on income distribution (section III.2). First, it takes advantage of the higher degree of freedom afforded by PME in comparison with PNAD to choose dates before and after stabilisation for comparing income distribution. For instance, PME allows us to measure the moment prior to the launching of the stabilisation plan and compare it with the end of 1998, incorporating the effects of the adverse external shocks that have recently beset the Brazilian economy. Second, the fact that PME follows the same individuals over short periods of time allows us to qualify the nature of the changes observed in inequality. In particular, the longitudinal aspect of PME makes it possible to disentangle the effects of lower inflation rates on the temporal variability of earnings from those exerted on *stricto sensu* inequality measures (and its "between groups" and "within groups" components).

Given the occurrence of sharp macroeconomic fluctuations in the Brazilian case and the possibility of measuring various aspects of income distribution in a detailed manner with PME, the final part of the chapter attempts to isolate the distributive effects of macro shocks and policies. The possibility of constructing for the 1980-99 period monthly series of specially tailored variables according to individual and family records of PME allows us to apply standard time series techniques that capture the effects of macro variables on labour earnings distribution variables (section III.2). We analyse the correlation patterns between macro variables (unemployment, inflation, various types of exchange rates, interest rates and minimum wages) and distributive

¹ National Household Sampling Survey.

² Monthly Employment Survey.

variables (aggregate inequality measures and mean earnings of different groups (by years of schooling, age, household status, sector of activity and working class³)).

As usual, the chapter ends with a summary of the main conclusions (section IV). This section may be used as an executive summary.

II - Portraits of Reforms and Income Distribution

This section assesses the long-term impacts of reforms on income distribution in Brazil. It draws comparisons between reform-related institutional characteristics and income distribution aspects at different points in time. The contrasts between portraits observed before and after reforms were launched allows for tentative interpretations of causal relations between implemented reforms and distributive outcomes. We start by setting an economic background for the implementation of reforms. The second step is to identify key dates in terms of reform implementation. These points are used to study the effects of reforms on income distribution.

II.1. Analysis of Reforms

II.1.1. Economic Background

Amongst Latin American countries, the experience of Brazil has been quite peculiar in the sense that reforms, and in particular trade liberalisation, only started a few years ago. Whereas other countries in the region started opening their economies in the early and mid-1980s, in Brazil the process started effectively in the early 1990s. With stabilisation, the story is the same. Whereas Mexico started its stabilisation process in the mid-80's and Argentina in the early 1990s, in Brazil successful price stabilisation was achieved only in 1994.

In the early 1990s two major changes took place: the opening of the economy and the launching of a successful stabilisation plan in 1994. The structural changes introduced by the trade liberalisation-cum-stabilisation are so significant for explaining the macroeconomic environment and the dynamics of implementation of other reforms that the present analysis must inevitably focus on these events.

II.1.2. Stabilisation

Since at least the beginning of the 1980s inflation became the central policy issue in Brazil. Three major stabilisation efforts have been attempted since then: the Cruzado Plan in 1986, the Collor Plan in 1990 and the *Real* Plan in 1994. The first two plans failed. The *Real* Plan has been very successful in bringing down inflation and the prospects in this respect are very good even after the waves of external shocks that beleaguered the Brazilian economy in September, 1997 (Asian crisis), September, 1998 (Russian crisis) and the January, 1999 exchange rate fluctuation.

The *Real* Plan of 1994 differed from previous plans in at least two major ways. First, a very successful process of "de-indexation" was based on the establishment of a transitory unit of account fully indexed to inflation. Second, the economy was considerably more open and the government was prepared to let the currency appreciate. As a consequence, imports played a key role as an adjustment variable between aggregate demand and domestic aggregate supply while the nominal exchange rate established a ceiling for prices, at least in the tradeable sector.

³ By working class we mean the following categories: formal employees, informal employees, self-employed workers and employers.

The opening of the economy and the appreciation of the *real* are two central elements in what is so far deemed a very successful stabilisation effort. Trade liberalisation has helped stabilisation and, at the same time, the government considers it a key element in the new development strategy.

II.1.3. Trade Opening

Apart from stabilisation, the most important element of the reforms is the opening of the economy. Until 1990 Brazil was a very closed economy. This resulted from a deliberate strategy of import substitution and, due to the debt crisis in the 1980s, from the pressures to produce trade surpluses. Since the early 1990s the environment has changed. On the one hand, the international context has changed with the return of foreign credit. On the other, there is a widely shared view that the closedness of the economy and the active trade and industrial policies of the 1980s were a hindrance to price stability and sustained growth.

The debt crisis of the 1980s imposed a severe external constraint on the Brazilian economy. The drastic reduction of foreign credit and the increase in interest service on external debt required large trade surpluses. The exchange rate became pegged to the rate of inflation and imports were gradually reduced with the adoption of both tariff and non-tariff barriers.

Since 1985 the trade surplus varied between US\$ 8 billions (1986) and US\$ 19 billions (1988). On average, between 1985 and 1994, it topped US\$ 10 billions. Trade surpluses were roughly sufficient to balance the current account until 1994.

Trade liberalisation starts formally in the late 1980s but more effectively in the early 1990s. Its most dramatic effects took place after 1994, with the expansion of domestic demand and the appreciation of the *real*. There were two episodes of currency appreciation. The first, in 1989-90, is associated with the rapid acceleration of inflation and, to a certain extent, can be seen as “involuntary”. The second episode occurred in 1994-5, when the exchange rate was used as an instrument of the stabilisation strategy. The government deliberately let the nominal exchange rate appreciate in order to increase the competitive pressure on the prices of tradeable goods.

Until mid-1994 the average monthly trade surplus was around US\$ 1.1 billion. The surpluses turned into deficits in 1994. Imports of intermediary and capital goods increased about 150% between 1992-3 and 1995-6 while imports of consumption goods increased 300%. In the 1993-95 period GDP grew around 15%: comparing both rates gives an idea of the increase in the import coefficient.

II.1.4. Dating Reforms

In order to measure the timing of reforms we use estimates found in Morley et al. (1999) and Lora (1997). The reforms are related to: trade policy, labour policy, taxes, financial deregulation, capital account and privatisation. Each index is normalised to vary between zero and one, with one corresponding to a full reform or freedom from distortions or government intervention.

These indices provide a good comparative view of specific countries and present a good overview of the main relative trends. Graph 2.1 presents the simple average relative to five reforms (it excludes labour reforms). Brazil was more liberalised than other Latin American countries in the

region at the beginning of the series, but its reform process stagnated during the 80s. The average regional reform index rises by 50% during the 1970-90 period. In the late 1980s Brazil engaged in a serious catch-up effort. In a period of three years starting in 1988, the general Brazilian reform index rises 40%. The analysis of individual reforms reveals that financial, trade and tax reforms are the main determinants of this leap. The upward trend continues until the end of the period of analysis. The index rises from 0.74 to 0.81 in the last three years.

It is important now to make a few qualifications about the general reform index in Brazil for the present purposes. First, it gives equal weight to the different reforms considered, while some aspects of reforms are clearly more important. Trade liberalisation is probably more important for income distribution purposes than other reforms considered. The trade reform index only incorporates tariffs while the elimination of quantitative restrictions beginning in 1990 was far more important. So if one were to incorporate these restrictions into the analysis, Brazil would be less liberalised before 1990 and the size of the leap observed in this year would be magnified.

A second problem of the general Brazilian index is to give zero weight to labour and social security reforms which have had fairly important distributive consequences.

A final related problem is that the general index does not consider the inflationary environment and its pervasive effects on income distribution either. The 1987-94 period was characterised by high and unstable inflation rates, which decisively influenced economic behavior and institutions. As Table 2.1 shows, annual inflation rates that were 475% in 1991 reached a peak of 2,489% in 1993 falling to 9.1% in 1996. The coefficient of variation follows a similar movement: 3.86 in 1991, 20.03 in 1994 and 0.41 in 1996⁴ ⁵. Once again, the result would be to neutralise at least in part the leap towards liberalisation observed in 1988. By the same token, the permanent fall of inflation observed in 1994 after the *Real* Plan should be treated as a key economic reform.

In summary, our perception is that once the analysis takes into account the end of quantitative restrictions on international trade that occurred in 1990, the labour and social security counter-reforms observed in 1988 and the inflationary environment, two decisive dates for the implementation path of reforms in Brazil are: 1990 and 1994.

II.2. Temporal evolution of income distribution

The biggest advantage of the Brazilian case in this type of study is in terms of data availability. There is a long-established tradition with household surveys. We will focus our empirical analysis on two geographical dimensions: a) at the national level; b) for six main metropolitan areas. As we move from the national to the metropolitan level, the availability of updated data increases. We will use as basic data sources two household surveys: i) PNAD 1976, 1981, 1985, 1990, 1993 and 1997; ii) PME from 1980 onwards.

⁴ Perhaps the most beneficial consequence of stabilisation is that real earnings temporal variance of logs measured at an individual level over four consecutive months falls from 0.1363 in 1994 to 0.106 in 1996 (table 2.1). The sharp reduction of volatility observed had direct consequences on the level of social welfare but it creates additional difficulties to measure inequality.

⁵ On the other hand, the level of nominal wage rigidity, measured by the proportion of fixed nominal wages between two consecutive months was augmented from 24.8 in 1991 to 32.25 in 1995 (table 2.1). In this sense, inflation greased the wheels of the labour market, in the sense that frequent (and costly) nominal adjustments induced by inflation did not allow real wages to depart too much from equilibrium values. In this sense, one consequence of stabilisation was to swell the demand for labour reforms that would reinstate the level of wage flexibility lost.

Pesquisa Nacional de Amostras a Domicilio (PNAD) - This is a national annual household survey performed in the third quarter that interviews 100,000 households every year. It has been conducted by IBGE (the Brazilian Geography & Statistics Institute) since 1967. PNAD underwent a major revision between 1990 and 1992, increasing the size of the questionnaire from 60 to 130 questions. The new questionnaire is available for 1992, 1993, 1995, 1996 and 1997.

The national coverage and the diversity of income sources are the main advantages of using PNAD, although the changes in the questionnaire demand some compatibility efforts and impose imperfections in the comparisons over time.

II.2.1. Income Concepts and Units of Analysis

We will work with two basic inequality measures: the Gini coefficient and the Theil-T. The popularity of the Gini coefficient and the fact that it allows for incorporating null incomes into the analysis justify its use. The Theil-T is the central measure used here, given its exact decomposable property. PNAD will be our main data source in this study and the analysis covers the years: 1976, 1985, 1990, 1993 and 1997.

We will work with the five pairs of population-income concepts using PNAD:

Income Concept	Population Concept			
	Economically			Total
	Occupied	Active	Active Age	
Labor NH*				
Labor				
Individuals All sources				
Per Capita All sources				

* NH = Normalised by working hours.

We use as our benchmark value the Theil-T based on economically active and all income sources⁶.

II.2.2. Temporal Evolution of Inequality

Tables 3.1.A and 3.1.B present the Theil-T and the Gini coefficient during the 1976-97 period across the different pairs of population-income concepts. The analysis of the temporal evolution of inequality reveals the following features:

i) The 1976-85 period corresponds to the final years of the military regime: there is a fall in inequality in this period for all concepts used. Our benchmark measure (i.e. Theil-T based on all income sources for the economically active population) falls from 0.825 to 0.72.

ii) The 1985-90 period is characterised by the absence of reforms, rises in inflationary levels and increasing income volatility induced by successive failed stabilisation attempts which produced a rise in inequality for all concepts analysed. Our basic inequality measure rises from 0.72 to 0.748 during this interval.

⁶ This income concept includes labour earnings, transfers, rents and interest rate payments.

Looking at the period 1976-90 as a whole, our basic benchmark measure falls from 0.825 to 0.748. This downward trend is closely followed by broader inequality concepts, such as those based on the active age population and on total per capita income, while narrower measures based on occupied population show a slight upward movement. This contrast can be partially credited to the increase in female participation in labour markets, as the next section shows.

1990-97 is the most interesting period, due to the implementation of economic reforms. Our benchmark inequality measure (i.e. economically active and all income sources) falls from 0.748 to 0.699. This downward movement is followed by all Theil-T measures except the one for the per capita all income sources concepts.

As explained in section II.1, the 1990-97 period of reforms can be further divided into two subperiods.

iii) The 1990-93 period is characterised by the combination of high inflation and economic reforms: the direction of inequality changes is not robust across the different concepts used. For example, while our basic measure rises from 0.748 to 0.793, the inequality concept based on the occupied population-labour income concepts falls, while broader concepts present mild increases. The difference between broader and narrower inequality concepts may be explained by the reduction in the participation of young contingents in labour markets at the beginning of the decade, which partially compensates the effects of increased female participation observed in previous years.

iv) The 1993-97 period is characterised by the combination of successful price stabilisation and the intensification of economic reforms. There is a fall of inequality for all concepts used. For example, the measure based on economically active and all income sources falls from 0.793 to 0.699.

Overall, during the 1976-97 period there is a fall of all five population-income pairs of concepts for both inequality measures used. The average Theil-T index across concepts falls 12.6%. The same statistic for the Gini coefficient presents a fall of 2.87%. This result is interesting because during the 1976-93 period the inequality fall is not homogeneous across all population-income pairs used for both inequality measures. The average Theil-T index across concepts falls 4.83% in the 1976-93 period (38.3% of the total fall observed in the 1976-97 period). The same exercise applied to the Gini index yields similar results: a fall of 0.08%, corresponding to 28.9% of the total fall observed in the 1976-97 period. In other words, most of the reduction in inequality measures observed in Brazil in these 21 years took place in the last four years. We believe that this is mostly explained by the effects of the 1994 stabilisation on income distribution. We will return to these issues in section III.1 of the chapter.

II.3 - Income Distribution Decompositions

This section attempts to identify the main structural determinants of Brazilian inequality. As we saw in the previous section, income distribution according to several concepts underwent various changes in recent years. It is necessary to go a step further and to quantify the determinants of this evolution. In searching for an association between inequality measures, on the one hand, and the availability, utilisation, and return of different factors of production and personal characteristics on the other, we perform a standard inequality decomposition exercise:

Theil index decomposition

$$T = \sum \alpha_g \beta_g \text{Log } \alpha_g + \sum \alpha_g \beta_g T_g \quad (1)$$

where,

$\alpha_g = Y_g/\mu$ - Ratio between the mean income of group G (Y_g) and overall mean income.

$\beta_g = n_g/N$ - Share of group G in the total population.

T_g - Theil index of group G.

The first term of expression (1) corresponds to the "between groups" component while the second term corresponds to the "within groups" component. Table 4.1 identifies between and within groups components for the following subgroups arbitrarily defined: gender, age, schooling, working class, sector of activity, population density and region.

The different classification criteria used in Table 4.1 can be aggregated in terms of variables related to human capital (education and age), physical capital accumulation (sector of activity and working class), personal characteristics subject to discrimination (gender and race) and location (demographic region and population density). Table 4.1 adopts this decomposition for both the economically active population and all income sources used as a benchmark. It illustrates the different arbitrarily chosen categories for each classification criterion used.

As a specific illustrative example, the decomposition of groups defined according to the educational attainment of individuals. In terms of the static picture presented for 1997 in the first three columns of the table, we see that the between group component accounts for 34.7% (0.243/0.699) of the total Theil-T index of 0.699.

The last three columns of Table 4.1 present the changes in these levels observed for 1997 when compared with the beginning of the economic reform period in 1990. Most of the inequality fall of -0.049 (0.699 minus 0.748) observed from the perspective of different schooling categories is explained by the fall of the 'within' group component of -0.048 (0.456 - 0.504) whilst the 'between' groups component remained almost unchanged (-0.001).

II.3.1. Gross Rates of Contribution

The gross decomposition of the Theil index summarises the relative importance of the 'between' groups term for the different criteria used in total inequality. Among all the variables considered, years of schooling and working classes are the variables that contribute most to total inequality. The explanatory power of both variables increased substantially during the whole period under analysis (Table 4.2.A): between 1976 and 1997, the gross contribution of years of schooling and working class for total inequality increased from 28.2% to 34.7%, and from 16.9% to 21.4%, respectively.

Age – taken here as a proxy for human capital accumulation due to the acquisition of experience - presents the third highest gross contribution to total inequality in 1997 but also an oscillating pattern over time. Between 1976 and 1990 its gross contribution increases from 8.1% to a maximum of 9.9% in 1985, but decreasing to 8.2% in 1997.

Gender classification presents the lowest gross contribution rate for total inequality and decreased almost monotonously between 1976 and 1997 from 4.6% to 2.7%. The variable sector of

activity also presents a low contribution for total inequality even not considering its likely interactions with working class. The gross contribution of this variable decreased from 6.7% to 5.2% between 1976 and 1990 but it increased slightly to 5.6% in 1997.

Similar behavior is observed with regard to population density: falling from 9.7% to 7.9% between 1976 and 1990, and constant until 1997 (7.8%). Finally, the classification related to the five main Brazilian regions shows more stable behavior, with a small decrease in its explanatory power between 1976 and 1997, from 5.9% to 5.4%.

II.3.2. Marginal Rates of Contribution

In order to take into account the interactions between the different classifications and isolate the marginal impact of each variable once the other classifications were taken into account, we chose a smaller set of different classification criteria to be implemented simultaneously. The sum of the gross contribution of the ‘between group’ components of the three main variables (age, working class and years of schooling variables) is 64.6% of total inequality, while the gross effects of the other five variables correspond to less than 30% of total inequality. We will therefore be working with the interactions between age, working class and years of schooling variables as shown in table 4.2.B.

The first point to note is that the sum of the marginal contribution of these three classifications to overall inequality in the first four years of the series is fairly stable and never below 41%, attaining a rather low value of 38.2% in 1993. A similar phenomenon is also observed when we use the sum of the gross contributions of the seven classification criteria: it obtains a value of 73.8% in 1993, well below the 80% figure in the other years. The low explanatory power of the ‘between’ groups components in 1993 may be credited to the high inflationary instability observed (which magnifies the ‘within’ groups components). We will return to this point in section III.1. For now we will not consider 1993 in the analysis of Table 4.2.B.

The marginal explanatory power of schooling (by far the most important variable) rises from 25.7% in 1976 to 26% in 1990, increasing to 26.4% in 1997. The marginal contribution of age, (once years of schooling and working class effects have been taken into account), decreases slightly from 7.1% in 1976 to 6.8% in 1990 and then decreases more sharply reaching 5.9% in 1997. Finally, the marginal working class contribution decreases from 9.2% in 1976 to 8.7% in 1990 and remains at this level in 1997.

In summary, the 1990-97 period - characterised by the implementation of reforms in Brazil - presents an increase of the explanatory power of education, a decrease for age while the contribution of working class remained even, in the extreme points of the series.

II.3.3. Gross and Marginal Contributions: Robustness Analysis

Table 4.3 allows us to test the difference of gross contribution rates across the five population-income pairs used for 1997. The comparison of the contribution rates for occupied population with and without controlling working hours shows that the explanatory power attributed to gender, race and age reduces drastically (especially gender) once the effects of partial working hours is taken into account.

The comparison of individual concepts (for example, the economically active population) with family-based measures (represented by per capita income) according to the characteristics of the head of household) shows that:

- i) The contribution of gender and age falls from 2.7% to zero and 7.3% to 0.9%, respectively.
- ii) The gross contribution of race rises from 9.4% to 12.1%. This is explained by the high propensity of marriages within the same race groups.
- iii) Similarly, classifications such as population density and region are also less subject to marriages of different sorts. This reinforces the contribution to inequality at the family level when compared to inequality measures at the individual level
- iv) The gross and marginal contribution of age decreases when one moves from individual to family level concepts. The marginal contribution falls from 5.9% to 2.8% when one moves from EAP to per capita concepts.
- v) The gross and marginal contribution of years of schooling increases substantially when one moves from individual to family level concepts, rising from 26.4% to 34.9%.
- vi) In contrast, the marginal and gross contribution of working class falls from 8.7% to 5.3% when we move from EAP to per capita concepts.

II.4 - The Impact of the Reforms on the Riches

II.4.1. Aggregate Absolute Impact

In Brazil the 10% richest individuals own nearly half of the aggregate per capita income. This subsection evaluates how this wealthy group performed during the reform period using standard poverty techniques applied to the analysis of individuals at the top of the income distribution.

In order to assess how the rich were affected during the 1990-97 post-reform period, we take the per capita income level roughly at the 90% figure for 1997. More precisely, we take individuals with per capita income above R\$ 500 at 1997 values, which corresponds to the 10.61% of the richest individuals in 1997, 8.61% in 1993 and 12.92% in 1990, according to Table 5.1. This Table shows that there was an initial reduction (33%) in the number of rich people between 1990 and 1993. This process may be credited not only to the effects of the economic reforms implemented by the Collor Administration (such as the opening of the economy) which broke the monopoly power of the industrial elite - including both entrepreneurs and unionised workers – coupled to an aggressive but short-lived administrative reform which affected civil servants. The freezing of 80% of the means of payment (M4) affected wealthy groups more intensely.

During the second part of the 1993-97 reform period, there was a 23% increase in the number of the rich, but for the whole 1990-97 period the number of rich people actually fell by 17.9%.

The evolution of the wealthy can also be captured by the mean distance of the per capita income of the rich with respect to a given wealth line. In other words, we calculate not only the size of the group defined as rich but the extension of their income flows as well. During 1990, the average income distance of the rich with respect to the poverty line amounted to 16.39%, which means that the rich average per capita income corresponds to 583 *reais* in 1997. It drops sharply in

1993 to 10.57% and finally recovers approximately half of the loss incurred in the 1990-93 period, reaching 12.99% in 1997.

II.4.2. Profile of the Impact of the Reforms on the Rich

Table 5.2 also shows a profile of the wealthy. This profile allows for comparisons between the rich and the whole population according to the following characteristics.

Household Characteristics: region, population density, dependency ratio, housing status, access to water, access to sanitation, access to electricity and access to refuse collection.

Characteristics of Heads of Family: gender, race, age, schooling, immigration status, working class, employment tenure, enterprise size, sector of activity.

These profiles also compute standard FGT poverty indices⁷ of the individuals above the arbitrary wealth line chosen and their contribution to these measures.

For 1997, the Southeast region (44% of the population) concentrated 60% of the rich (or 62%, if we take into account their distance from the wealth line). These statistics were quite similar in 1990 indicating that reforms did not affect the spatial distribution of wealth in Brazil.

In terms of population density, 18% of the population live in metropolitan areas. But these areas concentrate 39% of the rich and 47% of wealth.

As expected, the rich are over-represented among those with a dependency ratio equal to one: 29%, compared with 10% for the total population. The rich are also over-represented among those paying for their own house and those who pay rent. They are under-represented among those living in loaned premises as well as among those living in their own house without land property rights.

Access to public services such as water, sanitation, electricity and refuse collection is nearly universal among the rich but not so for the non-rich groups of Brazilian society. The biases stemming from gender, age and immigration status of the head of household among the rich are relatively small, while the race bias is quite impressive: 53% of households are headed by white individuals; for the rich this statistic reaches 82%.

The importance of the explanatory power of human capital is impressive: 7.83% of the population has 12 or more years of schooling while among the rich this share corresponds to 44%.

⁷ We use FGT poverty indices, using the degree of poverty aversion equal to 0, 1 and 2 that is P^0 , P^1 and P^2 , respectively. The general formula of the FGT index is given:

$$P^{\alpha} = \frac{1}{n} \sum_{i=1}^q \left(\frac{Z - Y_i}{Z} \right)^{\alpha} \quad (1)$$

where

- n = number of individuals in the population,
- q = number of individuals below the poverty line
- Z = the poverty line
- Y_i = income of individual i
- α = degree of poverty aversion

In terms of the specific human capital acquired through job tenure, 43% of the total population declared to be headed by an individual with five or more years of experience in the present job. For the rich this statistic rises to 54%. In other words, most of the rich indicated that they did not change jobs during the reform period, thus preserving and enhancing their stock of specific human capital.

Finally, the working class and sector of activity of the household heads reveals that the rich were over-represented in the public sector, services and among employers in 1997. The increase in the degree of over-representation among employers is the most noticeable change.

II.4.3. Exercises in Inequality Decomposition

Following Sam Morley's suggestions and based on his work (Morley (1999)), this subsection evaluates how much of the changes in inequality observed from pre-reform to post-reform years comes from changes at the top of the distribution. We perform this exercise in two ways: for the 10% richest and for the group with university-level education.

II.4.4. The Top 10%

Table 5.3 shows the details, which allow for the evaluation of how the share of the overall Theil due to the 10% changed over time. This is defined as the 'between' groups total Theil index plus the 'within' group Theil index for the richest 10% as a percentage of the total Theil index. For instance, in 1990 the percentage contribution of the top 10% is $(0.475+0.119)/0.748 = 74.9\%$. This evidence demonstrates that it is the differences within the top group and between this group and all the others that are mainly responsible for the high levels of inequality in Brazil. Of these two sources of inequality, the differences in average income are by far the most important component.

While the absolute contribution of the rich to total inequality is extremely high, there is not much evidence to suggest it has increased over the period of reforms. In the 1990-93 period this contribution for the economically active population has risen from 79.5% to 83.5%, falling to 81.7% in 1997. The contribution of the top 10% according to population in active age displays a similar movement rising from 84.8% to 87.7% between 1990 and 1993 and falling to 85.9% in 1997. The per capita concept displays a similar pattern in the reform period; the only difference is that the fall observed in 1993-97 more than compensates the rise observed in 1990-93. The contribution of the top 10% to inequality rises from 59.5% to 66.2% between 1990 and 1993 and then drops to 57.2% in 1997.

II.4.5. University Graduates

The contribution of university graduates is shown in Table 5.4. One of the reasons for this breakdown is the evidence that growth is increasingly skill-intensive and that there has been a rise in the skill-differential between the university group and the rest of the labour force. The idea is to evaluate how much this increased differential has contributed to changes in inequality over the period. In addition, we can look at changes within the university group to see whether the new economic model has created a subgroup of winners, which should be reflected as a rise in the 'within' groups Theil indices.

The rise in the contribution of the university group to overall inequality was so great that it completely offsets favourable trends among the remainder of the population. If one looks at the

‘within’ group Theil indices for the non-university group, one can see what inequality would look like and how it would have changed over the period.

Morley (1999) determined how much of the rise in the university contribution comes from the increase in the skill differential, how much comes from the change in the size of the university group, and how much comes from increased variance within the university group itself. Is the rising university component of inequality due to growth having raised the return of all university graduates relative to everyone else, is it due to the new economic model having created a sub-group of big winners among the university group, or is it mainly because the size of the group is increasing? In Brazil the contribution of university graduates to total inequality is far lower than elsewhere in spite of the fact that its skill differential is by far the highest in the region. Looking at Table 5.4, the reason is that the fraction of the labour force with university education is so small, that it simply does not carry much weight in any inequality computations.

This illustrates an important point, and a serious one for those seeking a reduction in inequality. As Morley (1999, page 10) puts it:

"As Brazil gradually improves its education profile, the percentage of university graduates in its labour force is going to rise. If nothing else changes, that improvement is going to increase inequality. Look again at the calculations for occupied labour for 1976 for Brazil. The total Theil was 0.81, university graduates made up only 0.3% of the adult population, and they earned 8.8 times as much as the non-university group. To show how this works, suppose that over time the university group expands until it accounts for 5% of the labour force. If the wage differential stays at 8.8, the group will have about 31.5% of total income. Holding the within group Theils constant at their 1976 levels, we can calculate the hypothetical distribution with this better educated labour force. It turns out to be a full twenty points higher than the 1976 distribution. For countries with very small university educated population, raising the share of the university graduates in the labour force is regressive over a large range or for a very long time unless it is accompanied by a significant decline in the skill differential. In the Brazil case, to hold the overall Theil constant at its 1976 level when the university population share grows to 5%, one would have to cut the skill differential in half (from 8.8 to 4.2). The reason that countries have this problem is that a small favoured group (the university graduates) expands relative to the rest of the population. That is regressive, until the group gets big enough to be representative of the population as a whole."

II.4.6. Rates of Return to Schooling

This sub-section complements the previous one assessing the changes observed in the rates of return to schooling during the reform period. The continuous movement of active age individuals towards higher years of schooling brackets combined with the trend towards technological progress based on highly skilled workers generates ambiguous effects on the rates of return to education (Tables 5.5.A and B).

In the 1990-97 period the rate of return to primary and secondary education levels falls while the rate of return to university degree level rises steeply. Overall, calculations based on more disaggregate categories show that the average rate of return for each additional year of schooling falls from 18% to 17%.

III - Dynamic Aspects of Income Distribution

The second part of the chapter explores PME monthly household surveys to extract relations between movements of distributive variables, on the one hand, and economic reforms and macroeconomic fluctuations, on the other. It first provides a description of the PME data used. We argue that PME allows higher degrees of freedom in choosing representative pre and post-stabilisation dates. At the same time, PME's longitudinal aspect allows us to refine the inequality decomposition exercises performed in section II.3, with PNAD, thus qualifying the effects of the 1994 stabilisation on income distribution. The remainder of this section aims to isolate the distributive effects of macro shocks and policies using standard time-series techniques.

III.1 - Reforms, Stabilisation and Income Distribution

Pesquisa Mensal do Emprego (PME) - This monthly employment survey is carried out in the six main Brazilian metropolitan regions by IBGE. It has covered an average of 40,000 households monthly since 1980. PME presents detailed information on personal and occupational characteristics of all household members. This allows us to perform standard inequality decomposition analysis. PME's large sample size combined with its high frequency also allows us to construct monthly time series on earnings distribution at a reasonably detailed level of disaggregation.

PME replicates the US Current Population Survey (CPS) sampling scheme attempting to collect information on the same dwelling eight times during a period of 16 months. More specifically, PME attempts to collect information on the same dwelling during months t , $t+1$, $t+2$, $t+3$, $t+12$, $t+13$, $t+14$, $t+15$. This short-run panel characteristic of PME allows us to infer a few dynamic aspects of reforms regarding income distribution.

III.1.1. An Updated Assessment of Inequality

Despite its geographical and income concept limitations, PME is more suitable than PNAD to provide a detailed picturing of the effects of macroeconomic shocks (price stabilisation in particular) on income inequality in Brazil. First, the peak of inflation was reached by mid-1994, just before the launching of the *Real* Plan. Unfortunately, there was no PNAD in 1994 so PNAD-93 (dating from September) used in sections II.2 and II.3 is not the ideal proxy for the inequality level prior to stabilisation. PME is more suitable for this purpose. For example, the first line of Table 6.1.A. shows that the Theil-T index for labour earnings for the population that was always occupied during four observations in 1994 was 11% above the corresponding one for 1993 (0.79 against 0.71). Similar comparisons using Gini coefficient indices shown in the first line of Table 6.1.B indicate that the values found for 1994 were 4.3% above the values found for 1993 (0.62 against 0.59).

Second, the various external shocks that hit the Brazilian economy in September 97 (Asian crisis), August 98 (Russian Crisis) and January 99 (*Real* Devaluation Crisis) should be incorporated into the analysis. Otherwise, we would have an over-optimistic view of the trends of Brazilian income distribution and its relation to economic reforms (in particular, the opening of the economy). In this sense, PNAD-97 (September - the most recent nationwide survey available) can be perceived only as a (broad) picture, just before the new waves of external shocks hit the Brazilian economy.

The comparison between PME data gathered in 1996, 1997 and 1998 provides evidence on the effects of the Asian Crisis on Brazilian income distribution. The first line of Table 6.1.A shows that the Theil-T index for labour earnings for the population that was always occupied during four observations went from 0.533 in 1996 to 0.545 in 1997 and to 0.547 in 1998: the upward inequality movement occurred before the bulk of the effects of the Asian Crisis were felt. At the same time, the upward trend observed between 1996 and 1998 is not confirmed by the Gini coefficient series presented in Table 6.1.B.

One could argue that given the rise of unemployment rates observed after January 1998, most of the effects of the 1997 Asian Crisis were not felt by the occupied population. Nevertheless, the first line of Table 6.1.C shows that the Gini coefficients for the group of active age individuals were almost constant between 1997 and 1998.

One could extrapolate this exercise to make inferences about the possible effects of the Russian crisis on income distribution, not yet fully incorporated into the data. The effects of the latest devaluation crisis are harder to predict⁸.

III.1.2. PME's Longitudinal Aspect and Inequality Comparisons

We have also decided to incorporate PME data because its longitudinal aspects provide relevant insights into what has happened to inequality in Brazil in recent years, especially allowing for pre and post-stabilisation inequality comparisons. We have used the micro-longitudinal aspect of PME in two alternative ways: first, the four consecutive observations of the same individuals were treated independently before the inequality measures were assessed; second, we considered earnings average over four months before the inequality measures were calculated. The Theil-T is decomposed as follows: Month by Month Theil-T equals Mean Earnings Theil-T plus Individual Earnings Over Time Theil-T. In other words, the difference in the levels of inequality measures between month by month and average over four months is explained by the variability component of individual earnings over the four-month period.

The main result here is that the fall of month-to-month inequality measures observed after the fall of inflation in 94 drastically overestimates the fall of inequality when one compares it with mean earnings over four months. A comparison of the two lines in Table 6.1.A indicates that for the always occupied population the month-by-month Theil-T indices fell from 0.709 in 1993 to 0.545 in 1997. The Gini coefficient time series in Table 6.1.A. present a fall from 0.592 to 0.530 in that period. The fall of inequality measures based on mean individual earnings over four months is much smaller than in the case of monthly earnings. Theil-T falls from 0.551 to 0.508 between 1993 and 1997 while Ginis fell from 0.529 to 0.514. Similar results were obtained for two other population concepts, such as the active age population and individuals occupied at least once in four consecutive observations, as shown in Tables 6.1C and 6.1.D.

The greater fall of traditional inequality measures on a monthly basis in comparison with measures on a four-month basis is explained by the fall of the individual volatility measures following the sharp decline in inflation rates observed in this period. In sum, stabilisation produced more stable earnings trajectories (i.e., lower temporal inequality (in fact, volatility) of individual earnings). On the other hand, the observed fall of inequality *stricto sensu* was much smaller than inequality measures based on monthly measures would have suggested.

⁸ PNAD/98 data will only be available at the beginning of 2000.

In sum, the post-stabilisation fall in inequality for the group of population always occupied is much higher on a monthly basis (as traditionally used in Brazil) than when one uses mean earnings over four months. The fall of Theils and Ginis is 2 to 4 times higher when one uses the former concept.

Another way of looking at the effects of inflation and stabilisation is to note that most of the fall in inequality measures is attributed to the within groups component, especially in the month-by-month inequality measures. Table 6.2 presents a disaggregate view of these components for the population always occupied in four consecutive observations for changes between 1993 and 1997. Table 6.3. summarises this information in terms of the gross and marginal contribution of different groups' characteristics. For example, in the case of the month-by-month income concept presented in part B of table 6.3, during 1993 the sum of the marginal contributions of the between groups component relative to schooling, working class and age (i.e. the three main characteristics) explains only 31.5% of total inequality. This statistic rises to 42.3% in 1997, which corresponds to a 34.3% increase of relative contributive power to total inequality. In the case of the corresponding measures based on mean earnings over four months presented in table 6.3. part A, the relative rise of explanatory power is 12%. These results seem to confirm the idea that the explained share of total inequality tends to increase as we approach the permanent income concept.

Overall, the main point of this section is that most of the monthly earnings inequality fall observed after stabilisation may be credited to a reduction of earnings volatility and not to a fall in the permanent income inequality (or *strictu sensu* inequality).

III.1.3. Other Distributive Impacts of Stabilisation⁹

Apart from reducing the volatility of earnings as discussed in the previous subsection, stabilisation also produces *true* redistributive impacts.

Reduction of the inflation tax. The inflation tax results from the fact that some agents are not able to protect part of their financial wealth from inflation. During the period of high inflation in Brazil government bonds were indexed to inflation and were very liquid. Agents who kept bank accounts were able to protect their financial wealth from inflation by using government bonds as a *store of value*. The low income group did not have bank accounts and therefore could not protect their cash balances from inflation. There were other forms of protection which the low income group could use: anticipating consumption and buying building materials, for example. As inflation increased over the 1980s, these forms of protection became widespread. However, since these forms of protection were partial, low income group families kept paying the inflation tax. As inflation fell from an average monthly rate of 45% to 2% in 1994, there was an income gain following the reduction in the inflation tax. This gain was significantly more important (10%) for low income families than for middle and high income families (1%).

Changes in relative prices. The *Real Plan* is part of the family of “exchange-rate based stabilisation” plans in which the exchange rate plays an important part in imposing a ceiling for the prices of tradeable goods. The prices of non-tradeable goods do not suffer directly from the opening of the economy and the appreciation of the exchange rate. Hence there is a change in relative prices against the tradeable sectors and in favour of the non-tradeable sectors. Low income workers are concentrated in some of the non-tradeable sectors notably personal and social services. In the labour market, they are concentrated among the informal wage earners and the self-employed. On the

⁹ This sub-section summarises the results found in Amadeo and Neri (1997).

educational scale, they are concentrated among the less educated. Hence, there are reasons to believe that the change in relative prices has had important redistributive effects.

III.2 - Macro Determinants of Income Distribution: a Time Series Approach

The possibility of constructing monthly series of specially tailored variables according to individual and family records of PME for the 1980-99 period allows us to apply standard time series techniques to capture the effects of macro variables on labour earnings distribution variables.

All the variables included in the regression are expressed as logs, so the coefficients can be read directly as elasticities. We analyse below the partial correlation patterns between macro variables (unemployment, inflation, various types of exchange rates, interest rates and minimum wages) and the following endogenous variables:

- a) Gini coefficient of labour earnings.
- b) Mean earnings.
- c) Mean earnings of different groups by Years of Schooling, Age, Household Status, Sector of Activity and Working Class.

Most of the series discussed above are presented in Graphs 7.1 A to H.

III.2.1. Income Distribution Determinants

The option adopted here was to center the analysis on the whole active age population (including individuals with null incomes) during the 1982-96 period. The fact that some relevant variables related to the exchange rate regime are only available for this period explains this choice. In terms of inequality measure, we chose the Gini coefficient since, as opposed to the Theil-T, it can incorporate null incomes into the analysis. Table 7.1. presents the central equation to be analysed here, with the Gini as the dependent variable¹⁰. We also analyse the effect of each macro variable in isolation on mean earnings (also in table 7.1) and on mean earnings of different socio-economic groups (Tables 7.3.A to E)¹¹. The purpose of this last exercise is to identify the winners and losers of specific macroeconomic innovations (both exogenous shocks and domestic policies). Heuristically, this part can be perceived as the time series counterpart of the inequality decomposition analysis developed in section II.3.

III.2.2. Unemployment

The unemployment rate variable attempts to capture the effects of the level of activity on earnings inequality. The effect is positive. For simplification we, will omit from the analysis references to statistically significant variables and deal instead with variables that are not significant at conventional confidence levels. Table 7.1 shows that the coefficient on the Gini indices equals 0.025. This Table also shows that the effects on mean earnings is equal to -0.42. This means that (as expected) higher unemployment is correlated with a worsening of inequality.

Table 7.3 allows us to analyse the unemployment effects on mean earnings of different labour market segments. As the economy slows down, less skilled workers are strongly affected, as can be perceived in all categories analysed:

¹⁰ A robustness analysis of the different coefficients found using alternative periods (1982-96 versus 1982-98), income concepts (individual versus family per capita), population concepts (all versus those with positive earnings) and inequality measures (Gini versus Theil-T) is presented in table 7.2.

¹¹ In the case of sector of activity and working class we used the universe of occupied individuals, instead of the economically active population.

a) Years of Schooling - the unemployment elasticity is -0.45 for illiterate active age individuals and -0.42 for workers with more than 12 years of schooling. The intermediary skill groups are much like this former group but overall the elasticities are but not statistically different one from another.

b) Age - The elasticity for less experienced workers (between 15 and 25 years) is -0.56 against -0.49 for workers above 60 years of age. The intermediary age groups are much like this latter group.

c) Household Status - The elasticities for sons (-0.52) are higher than those found for Heads (-0.44) and Spouses (-0.43).

d) Sector of Activity - The elasticity for manufacturing workers (-0.25) is lower than that found for construction (-0.51) and services (-0.37) workers.

e) Working class - Similarly, the elasticity for formal employees unemployment (-0.24) is lower than that found for informal workers (illegal employees (-0.42) and the self-employed (-0.62)).

It is interesting to note that when one uses the sample of occupied workers the results related to schooling, age and household status referred to above are reversed. This may be explained by the fact that low wage workers are more easily displaced during recessions (and/or conversely more easily hired during booms).

f) Inflation - Higher inflation often leads to a worsening of income distribution. However, the elasticities found here for inflation rate are in general much lower than those found for unemployment. The elasticity for the Gini coefficient inflation is 0.004 while the mean earnings inflation elasticity is -0.05. Graph 7.2.A shows that the elasticity of the Gini in relation to inflation is zero. This exercise can be understood by means of a simple Phillips curve rationale: if higher inflation buys lower unemployment then the effect of the fall of unemployment on inequality can offset the direct inequality effect of higher inflation.

One interpretation for the positive partial elasticity of the Gini coefficients in relation to inflation is that earnings at the bottom of the distribution are less perfectly indexed. This interpretation is not confirmed by the analysis of the elasticities of the different groups classified by years of schooling, age, working class and sector of activity. The elasticities for low income groups such as the uneducated, young, spouses or sons, service sector or civil construction workers and informal employees are not statistically different from those estimated for the entire population.

An alternative explanation for the partial positive effects of inflation on earnings dispersion is measurement problems regarding earnings volatility. This is consistent with the evidence presented in section III.1 where we show that stabilisation reduces inequality in the 'within' groups component and not the 'between' groups component (which is affected by relative earnings levels).

g) Real Interest Rates - Higher interest rates do not lead to higher inequality (the coefficients are positive but not statistically different from zero). One interpretation is that once the contractionary effects of higher interest rates are taken into account through the unemployment variable, there is no residual to be explained. A complementary explanation is that since PME does not capture financial income, the positive effect of higher interest on high income individuals that have access to financial applications is not taken into account (Neri (1990)). As Graphs 7.2.B show,

the pure Gini interest rate elasticity is positive while the partial regression exercise shows that this correlation disappears when we take into account the other variables belonging to the basic regression estimated.

However, higher interest rates lead to lower mean aggregate incomes with an elasticity equal to -0.82 , even when one controls for unemployment.

h) Minimum Wages - The partial elasticity of the Gini with regard to minimum wage is null. This result is somewhat surprising, given that the pure elasticity of the Gini with regard to the minimum is negative. According to standard economic theory, a rise in the minimum wage should increase unemployment, which is positively related to the Gini¹². One possible solution to this puzzle is that higher minimum wages diminish unemployment.

The effect of the minimum wage on mean earnings is positive. Partial elasticity corresponds to 0.32 .

i) Exchange Rate - Table 7.1 shows that an appreciated exchange rate is positively correlated with Gini coefficients, the elasticity being -0.064 . The impact of exchange rates on per capita income is not statistically different from zero.

IV - Conclusions

This chapter has endeavoured to measure the evolution of income distribution and its determinants during the period of economic reforms. The chapter was divided in two parts: the first and main part of the chapter explored long-term relations between reforms and income distribution; the second part explored relations between movements of distributive variables, on the one hand, and economic reforms and macroeconomic fluctuations, on the other.

The main empirical strategy pursued in the long-run part of the chapter was to establish comparisons between reform-related institutional characteristics and income distribution aspects at different points in time. The contrasts between the picturing before and after reforms allowed for tentative interpretations of causal relations between the reforms and the distributive outcomes.

In order to set key dates in terms of reform implementation, we used indices of institutional reforms. The two main institutional changes observed in the Brazilian case were the opening of the economy and stabilisation. The two turning points identified in the implementation of reforms in Brazil were 1990 and 1994.

On the inequality side, in the 1976-90 period the basic benchmark measure used based on the economically active population falls from 0.825 to 0.748 . This downward trend is closely followed by broader inequality concepts such as those based on the active age population and on total per capita income while narrower measures based on occupied population show a slight upward movement.

1990-97 is the most interesting period, owing to the implementation of economic reforms. Our benchmark inequality measure falls from 0.748 to 0.699 . This downward movement is followed by almost all inequality measures.

¹² One could explore a similar effect through the inflationary effects of the minimum wage, however Graph 7.2 shows that the pure correlation between inflation and the Gini is null.

The 1990-97 period can be further divided into two subperiods. The 1990-93 subperiod is characterised by the combination of high inflation and economic reforms; the direction of inequality changes is not robust across the different concepts used. For example, while our basic measure rises from 0.748 to 0.793, the inequality concept based on the occupied population-labour income concepts falls. The 1993-97 subperiod is characterised by the combination of successful stabilisation and the intensification of economic reforms. The result is a fall of inequality for all concepts used. For example, the benchmark measure falls from 0.793 to 0.699.

Overall, the average Theil-T index falls 4.83% in 1976-93 (38.3% of the total fall observed in 1976-97). The same exercise applied to the Gini index yields similar results: a fall of 0.08% in 1976-93, corresponding to 28.9% of the total fall observed in 1976-97. In other words, the main part of the reduction in inequality measures observed in Brazil during the 21 years considered took place in the last four years, after stabilisation.

The following step was to identify the main structural determinants of the evolution of Brazilian income using standard inequality decomposition exercises with respect to variables related to human capital (education and age), physical capital accumulation (sector of activity and working class), personal characteristics subject to discrimination (sex and race) and location (demographic region and population density).

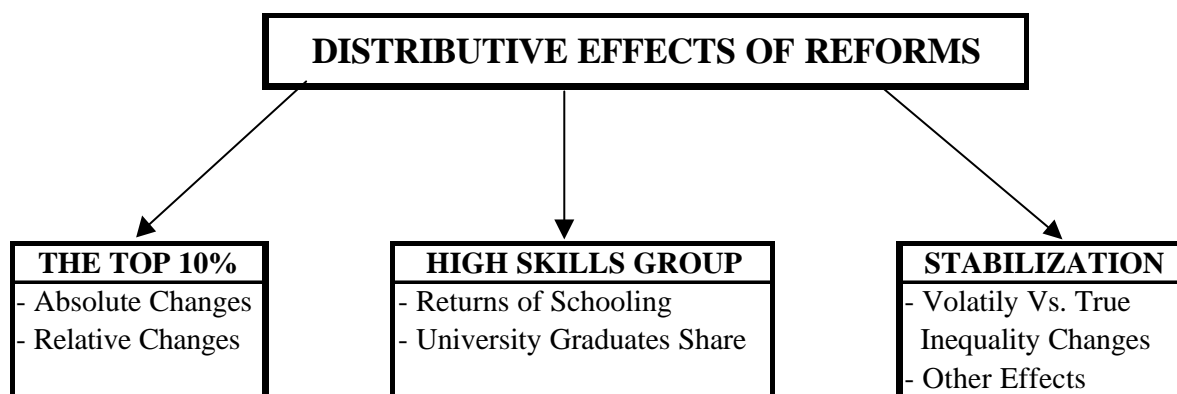
The gross decomposition of the Theil index summarises the relative importance of the between groups term for different criteria used in total inequality. Among all the variables considered, years of schooling and working classes contribute most for total inequality. The explanatory power of both variables increased substantially during the whole period under analysis. Between 1976 and 1997, the gross contribution of years of schooling and working class for total inequality increased from 28,2% to 34,7%, and from 16.9% to 21.4%, respectively.

In order to take into account the interactions between the different classifications to obtain an idea of the marginal impact of each variable once the other classifications are considered, we chose a smaller set of different classification criteria. Since the sum of the gross contribution of the between group components of the three main variables (age, working class and years of schooling variables) is 64.6% of total inequality while the gross effects of the other five variables is residual (amounting to less than 30% of total inequality) we worked with the interactions between the former group of variables.

The marginal explanatory power of schooling – by far the most important variable - rises from 25.7% in 1976 to 26% in 1990, and to 26.4% in 1997. The marginal contribution of age, (once years of schooling and working class were taken into account) decreases slightly from 7.1% in 1976 to 6.8% in 1990 and then to 5.9% in 1997. The marginal contribution of working class decreases from 9.2% to 8.7% in 1990 and remains at these levels in 1997.

In brief, the 1990-97 period presents an increase in the explanatory power of education, a decrease for age while working class remained at the same level in the extreme points of the series.

The chapter stresses three channels by which reforms have affected income inequality:



First, we attempted to study the impact of the economic reforms on the rich. We evaluated the absolute income changes in the top 10% of the income distribution assessing how the composition of this group changed during the reform period. The share of individuals with per capita incomes above that required to classify them among the 10% richest in 1997 fell 17.9% in the reform period of 1990-97 (a combination of a 33% fall in 1990-93 and a 23.9% rise in 1993-97).

We also assessed how much of the changes in inequality observed between the pre-reform and post-reform years comes from changes in the group of the 10% richest individuals. While the absolute contribution of the 10% richest people to total inequality is extremely high in Brazil, there is not much evidence to suggest that it has increased over the period of reforms. In 1990-93 this contribution in the case of the economically active population rose from 79.5% to 83.5% then fall to 81.7% in 1997.

The second channel considered here is the skill-differential between the high schooling group and the rest of the labour force. One of the reasons why this breakdown is of interest is the evidence that growth is increasingly skill-intensive. The analysis of the profile of the 10% richest stresses the importance of the explanatory power of human capital: 7.83% of the population has 12 or more years of education, while the share of this group among the rich corresponds to 44% (61% when one takes into account the extension of rich group income). This last statistic was 53% in 1990, indicating a sharp effect of the reforms on the composition of the rich, favouring highly educated groups. In the period of reforms (1990-97), the rate of return to primary and secondary education levels fell while the rate of return on university degree rose steeply.

The third distributive channel emphasised here is the effect of stabilisation on inequality measures, especially those operating through changes in the volatility of individual income. We used the micro-longitudinal aspect of PME in two alternative ways: first, the four consecutive observations of the same individuals were treated independently. Second, we took earnings average over four months before inequality measures were calculated. The difference in levels between month-by-month and average over four months inequality measures is explained by the variability component of individual earnings over the four month period.

The main result obtained is that the fall of monthly inequality measures observed after the decline in inflation in 94 drastically overestimates the fall of inequality based on mean earnings over four months: monthly based Theil-T indices fall from 0.709 in 1993 to 0.545 in 1997 while four-month-based Theil-T falls from 0.551 to 0.508 in the same period. The greater fall of traditional monthly inequality measures in comparison with four month-based measures is

explained by the fall of the individual volatility measures observed produced by the sharp fall of inflation rates recorded in this period.

In sum, the post-stabilisation fall of inequality measures is 2 to 4 times higher on a monthly basis (traditionally used in Brazil) than when one uses mean earnings over four months. Another way of looking at these effects of stabilisation on inequality measures is to note that most of the fall of the inequality measures is attributed to the within groups component in the monthly inequality measures. Overall, the main point here is that most of the monthly earnings inequality fall observed after stabilisation may be credited to a reduction of earnings volatility and not to a fall in permanent earnings inequality.

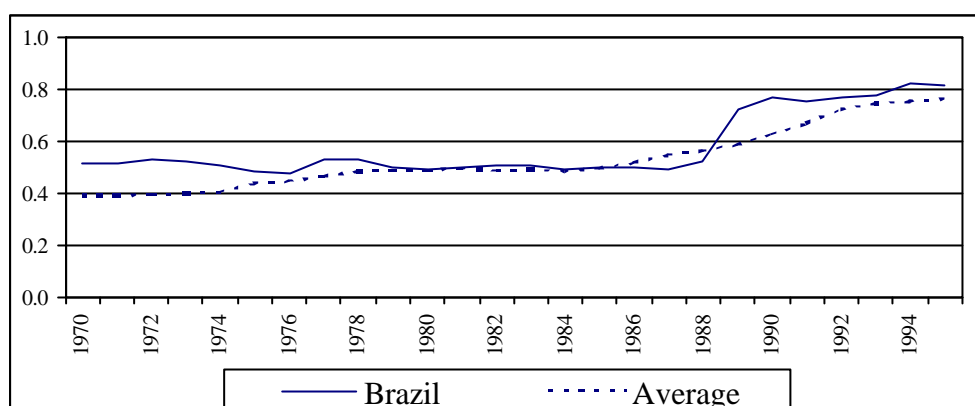
Finally, section III.2 took advantage of the possibility of constructing monthly series of specially tailored variables according to individual and family records of PME and applied standard time series techniques capturing the effects of macro variables on distribution variables. We analyzed the correlation patterns between macro variables (unemployment, inflation, exchange rates, interest rates and minimum wages) and distributive variables (aggregate inequality measures and mean earnings of different groups (by years of schooling, age, household status, sector of activity and working class)). The exercise aimed at identifying the winners and losers of specific macroeconomic changes. In general, the correlations between macro variables and income distribution variables follows standard textbook predictions. The main lesson here is to stress the close association between macroeconomic fluctuations and income distribution variables in Brazil. Without taking into account such factors one may fail in assessing the distributive impacts of structural reforms.

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Graphs 2.1

General Index of Reforms *



Source: Morley et alli (1999)

*Excludes Labour Reforms

Tables 2.1

Stabilisation

	1991	1996	Peak Value	Date Peak	Source
Annual inflation rate level	475.10	9.10	2,489.10	1993	CPI - IBGE
Variability of monthly inflation rates ¹	3.86	0.41	20.03	1994	CPI - IBGE
Temporal real earnings variability ²	0.1206	0.1060	0.1363	1994	PME Longitudinal
Nominal wage rigidity ³	24.8	30.7	32.25	1995	PME Longitudinal

¹ Coefficient of variation within year

² Variance of Log real earnings across 4 consecutive months

³ Percentage of fixed wages between 2 consecutive months

Tables 3.1

A - THEIL-T INDEX - BRAZIL

Population Concept - Income Concept	1976	1985	1990	1993	1997
Occupied - Labor Income	0.795	0.702	0.800	0.771	0.686
Occupied - Labor Income Normalized by	0.846	0.772	0.854	0.831	0.809
Economically Active - All Income Source	0.825	0.720	0.748	0.793	0.699
Active Age - All Income Sources	0.850	0.745	0.782	0.791	0.710
Total - Per Capita All Income Sources	0.826	0.698	0.748	0.756	0.715

Source: PNAD

B - GINI COEFFICIENT - BRAZIL

Population Concept - Income Concept	1976	1985	1990	1993	1997
Occupied - Labor Income	0.595	0.590	0.600	0.596	0.578
Occupied - Labor Income Normalized by	0.610	0.608	0.615	0.610	0.602
Economically Active - All Income Source	0.603	0.595	0.605	0.601	0.583
Active Age - All Income Sources	0.609	0.604	0.618	0.600	0.587
Total - Per Capita All Income Sources	0.616	0.590	0.607	0.599	0.595

Source: PNAD

Tables 4.1

THEIL-T INDEX DECOMPOSITION AND VARIATION - BRAZIL

Universe : Economically Active Population - All Income Sources

		1997			Diff. Between 97 and 90		
		Total	Between	Within	Total	Between	Within
Gender	Male	0.602	0.099	0.503	-0.071	-0.012	-0.059
	Female	0.097	-0.080	0.177	0.022	0.006	0.016
Total		0.699	0.019	0.680	-0.049	-0.006	-0.043
Race	Indigenous	0.000	0.000	0.000	0.000	0.000	0.000
	White	0.667	0.183	0.484	-0.028	0.003	-0.031
	Black	0.010	-0.131	0.141	-0.018	0.000	-0.017
	Yellow	0.022	0.014	0.008	-0.003	-0.002	0.000
	Not specified	0.000	0.000	0.000	0.000	0.000	0.000
Total		0.699	0.066	0.633	-0.049	0.000	-0.048
Age	Up to 24 years	-0.042	-0.079	0.038	-0.001	0.015	-0.016
	25 to 34 years	0.130	-0.014	0.144	-0.045	-0.022	-0.023
	35 to 59 years	0.536	0.146	0.389	0.006	0.003	0.003
	More than 60 years	0.076	0.005	0.071	-0.008	-0.004	-0.004
Total		0.699	0.058	0.642	-0.049	-0.008	-0.040
Schooling	0 Years	-0.030	-0.046	0.017	0.001	0.010	-0.009
	1 to 4 years	0.002	-0.096	0.098	-0.024	0.002	-0.026
	5 to 8 years	0.032	-0.054	0.087	-0.036	-0.011	-0.025
	9 to 12 years	0.177	0.050	0.127	-0.013	-0.018	0.006
	13 to 16 years	0.407	0.295	0.111	-0.007	-0.011	0.004
	More than 16 years	0.112	0.094	0.018	0.030	0.027	0.003
	Not specified	0.000	0.000	0.000	0.000	0.000	0.000
Total		0.699	0.243	0.456	-0.049	-0.001	-0.048
Working Class	Unemployed	0.001	-0.003	0.003	0.001	-0.002	0.002
	Public Servant	0.160	0.065	0.095	0.008	0.009	-0.002
	Formal Employee	0.137	-0.006	0.142	-0.057	-0.009	-0.048
	Informal Employee	-0.026	-0.083	0.056	-0.001	-0.003	0.002
	Self-Employed	0.140	-0.019	0.159	0.034	0.017	0.017
	Employer	0.293	0.204	0.089	-0.029	-0.009	-0.021
	Unpaid	-0.004	-0.009	0.005	-0.005	-0.008	0.003
	Not specified	0.000	0.000	0.000	0.000	0.000	0.000
Total		0.699	0.149	0.550	-0.049	-0.005	-0.044
Sector of Activity	Agriculture	0.008	-0.056	0.063	-0.017	-0.001	-0.016
	Manufacturing	0.103	0.007	0.096	-0.018	0.004	-0.022
	Construction	0.015	-0.012	0.027	-0.008	-0.002	-0.006
	Public Sector	0.168	0.066	0.102	-0.031	-0.013	-0.018
	Services	0.405	0.036	0.369	0.025	0.014	0.011
	Not specified	0.001	-0.003	0.003	0.001	-0.002	0.002
Total		0.699	0.039	0.660	-0.049	0.000	-0.049
Population Density	Metropolitan	0.425	0.145	0.280	-0.032	0.002	-0.034
	Urban	0.286	-0.026	0.312	-0.023	-0.021	-0.002
	Rural	-0.012	-0.064	0.053	0.006	0.014	-0.008
Total		0.699	0.055	0.645	-0.049	-0.004	-0.044
Region	South	0.115	0.009	0.106	0.006	0.006	0.000
	South-east	0.463	0.111	0.352	-0.017	0.018	-0.035
	North	0.020	-0.006	0.026	-0.015	-0.012	-0.002
	North-east	0.035	-0.081	0.116	-0.010	-0.001	-0.009
	Center-west	0.066	0.005	0.061	-0.013	-0.008	-0.005
Total		0.699	0.038	0.661	-0.049	0.003	-0.051

Source: PNAD

Tables 4.2

A - GROSS RATES OF CONTRIBUTION THEIL-T

Universe : Economically Active Population - All Income Sources					
	1976	1985	1990	1993	1997
Groups:					
Gender	4.6%	4.9%	3.3%	3.5%	2.7%
Age	8.1%	9.9%	8.8%	8.0%	8.2%
Schooling	28.2%	32.0%	32.6%	30.3%	34.7%
Working Class	16.9%	22.3%	20.6%	18.7%	21.4%
Sector of Activity	6.7%	5.2%	5.2%	3.7%	5.6%
Population Density	9.7%	7.1%	7.9%	5.6%	7.8%
Region	5.9%	4.6%	4.7%	4.0%	5.4%
Source: PNAD					

B - MARGINAL RATES OF CONTRIBUTION THEIL-T

Universe : Economically Active Population - All Income Sources					
	1976	1985	1990	1993	1997
Age	7.1%	8.0%	6.8%	6.2%	5.9%
Schooling	25.7%	25.3%	26.0%	23.8%	26.4%
Working Class	9.2%	9.6%	8.7%	8.2%	8.7%
Source: PNAD					

Tables 4.3

A - RATES OF CONTRIBUTION THEIL-T - 1997

GROSS RATES					
Population Concept	Occupied	Occupied	Economically A	Active Age	Total - Per Capita
Income Concept	Labor NH ¹	Labor	All Sources	All Sources	All Sources
Groups:					
Gender	0.6%	2.7%	2.7%	3.3%	0.0%
Race	8.3%	9.4%	9.4%	8.5%	12.1%
Age	6.6%	7.8%	8.2%	7.3%	0.9%
Schooling	35.0%	34.6%	34.7%	36.0%	41.3%
Working Class	16.8%	21.0%	21.4%	19.8%	14.2%
Sector	5.9%	5.1%	5.6%	6.0%	10.2%
Population Density	6.9%	7.5%	7.8%	7.5%	11.1%
Region	4.0%	5.4%	5.4%	4.9%	8.3%
MARGINAL RATES					
Population Concept	Occupied	Occupied	Economically A	Active Age	Total - Per Capita
Income Concept	Labor NH ¹	Labor	All Sources	All Sources	All Sources
Groups:					
Age	3.9%	4.7%	5.9%	5.7%	2.8%
Schooling	26.6%	25.7%	26.4%	28.0%	34.9%
Working Class	5.6%	8.7%	8.7%	8.5%	5.3%

1/ Normalized by Hours

Tables 5.1

WEALTH INDICES

Wealth Line : R\$ 500,00

	P0 (%)	P1 (%)	P2 (%)
1997	10.61	12.99	58.71
1993	8.61	10.57	66.85
1990	12.92	16.39	90.79

Source: PNAD - IBGE

Tables 5.2

A - WEALTH PROFILE - 1997

Wealth Line : R\$ 500,00

Wealth Line : R\$ 500,00		Contribution to Total Wealth								
Characteristics of the Household	Sub-Groups	Total Population	Average Per Capita Earnings	P0 (%)	P1 (%)	P2 (%)	Population (%)	P0 (%)	P1 (%)	P2 (%)
Total		155,627,427	242.65	10.61	12.99	58.71	100.00	100.00	100.00	100.00
Region	North	7,566,784	180.54	6.55	7.23	30.20	4.86	3.00	2.71	2.50
	North-East	45,341,554	127.56	4.31	4.68	14.01	29.13	11.83	10.50	6.95
	Center-East	10,769,715	264.26	11.43	15.61	96.04	6.92	7.45	8.32	11.32
	South-East	68,126,103	313.05	14.59	18.52	87.30	43.78	60.17	62.38	65.09
	South	23,823,271	270.34	12.16	13.67	54.24	15.31	17.54	16.10	14.14
Zone	Metropolitan Core	28,004,399	428.35	22.77	34.09	163.72	17.99	38.60	47.21	50.17
	Metropolitan Perinherv	18,652,518	249.41	9.27	9.69	68.30	11.99	10.46	8.93	13.94
	Large Urban	29,628,427	302.41	15.10	16.46	59.35	19.04	27.08	24.11	19.24
	Medium Urban	24,257,879	228.42	9.54	9.72	35.18	15.59	14.01	11.66	9.34
	Small Urban	23,310,326	153.81	4.46	4.51	18.76	14.98	6.29	5.19	4.79
	Rural	31,773,878	95.34	1.85	1.84	7.24	20.42	3.56	2.89	2.52
Dependency Ratio	1	16,164,540	550.54	29.33	48.80	289.84	10.39	28.70	39.01	51.27
	1<d<=1.5	23,361,120	351.68	17.41	19.24	71.96	15.01	24.62	22.23	18.40
	1.5<d<=2	34,885,439	274.46	12.36	13.21	48.67	22.42	26.10	22.79	18.58
	2<d<=3	33,734,418	175.55	5.83	5.72	19.63	21.68	11.90	9.54	7.25
	3<d<=4	21,829,495	148.64	4.65	4.54	16.31	14.03	6.14	4.90	3.90
	d>4	22,890,854	83.31	1.83	1.36	2.42	14.71	2.53	1.53	0.61
	Other/Not Specified	2,761,561	0.00	0.00	0.00	0.00	1.77	0.00	0.00	0.00
Housing	Own House already Paid with Own Land	99,802,985	247.55	10.96	13.59	64.08	64.13	66.22	67.09	69.99
	Own House already Paid without Own Land	8,638,718	133.64	3.67	5.53	37.40	5.55	1.92	2.36	3.54
	Own House Still Paid	9,270,837	372.92	19.57	24.16	85.67	5.96	10.98	11.08	8.69
	Rent	19,109,555	311.61	14.86	17.77	74.84	12.28	17.19	16.79	15.65
	Ceded	17,814,217	129.85	3.17	2.66	6.62	11.45	3.42	2.34	1.29
	Other	728,085	150.99	3.36	2.99	8.23	0.47	0.15	0.11	0.07
	Not Specified	263,030	257.89	8.10	18.00	268.15	0.17	0.13	0.23	0.77
Water	Canalized	126,630,268	284.56	12.97	15.88	71.41	81.37	99.46	99.43	98.96
	No Canalized	28,740,940	57.91	0.24	0.24	0.87	18.47	0.42	0.34	0.27
	Other/Not Specified	256,219	255.49	7.88	17.92	274.58	0.16	0.12	0.23	0.77
Sanitation	Sewage System	60,056,979	366.74	18.70	23.78	108.33	38.59	67.97	70.63	71.20
	Concrete Cesspit 1	14,617,434	344.11	17.14	21.09	87.33	9.39	15.17	15.24	13.97
	Concrete Cesspit 2	18,604,745	223.20	8.55	8.84	35.67	11.95	9.62	8.14	7.26
	Rudimental Cesspit	37,168,933	126.19	2.72	2.73	15.43	23.88	6.11	5.02	6.28
	Drain	3,179,433	100.26	0.99	0.83	1.24	2.04	0.19	0.13	0.04
	River or Lake	4,339,763	142.04	2.55	2.53	9.55	2.79	0.67	0.54	0.45
	Other	350,581	100.06	1.12	0.87	0.85	0.23	0.02	0.02	0.00
	Not Specified	17,309,559	51.72	0.23	0.33	4.16	11.12	0.24	0.28	0.79
Eletricity	Yes	143,923,608	258.05	11.45	14.00	62.96	92.48	99.74	99.67	99.16
	No	11,440,615	48.61	0.18	0.16	0.53	7.35	0.12	0.09	0.07
Garbage	Other/Not Specified	263,204	257.31	8.52	18.20	267.97	0.17	0.14	0.24	0.77
	Collected Directly	103,304,297	303.61	14.28	17.31	78.49	66.38	89.33	88.45	88.73
	Collected Indirectly	11,854,587	245.26	10.31	14.97	64.91	7.62	7.40	8.78	8.42
	Burned	21,971,909	100.15	1.86	1.86	7.44	14.12	2.47	2.02	1.79
	Unused Plot of Land	16,529,644	65.04	0.58	0.53	1.24	10.62	0.58	0.43	0.22
	Other/Not Specified	1,966,990	110.07	1.84	3.29	38.60	1.26	0.22	0.32	0.83

Source: PNAD - IBGE

Wealth Line : R\$ 500,00

							Contribution to Total Wealth			
Head of the Household	Sub-Groups	Total Population	Average Per Capita Earnings	P0 (%)	P1 (%)	P2 (%)	Population (%)	P0 (%)	P1 (%)	P2 (%)
Total		155,627,427	242.65	10.61	12.99	58.71	100.00	100.00	100.00	100.00
Gender	Men	127,476,261	243.89	10.66	13.18	61.72	81.91	82.30	83.09	86.10
	Women	28,151,166	237.06	10.38	12.15	45.13	18.09	17.70	16.91	13.90
Race	Indigenous	240,718	125.46	2.26	1.05	0.98	0.15	0.03	0.01	0.00
	White	82,813,067	330.20	16.37	21.18	100.33	53.21	82.06	86.72	90.93
	Black	71,883,113	138.22	3.73	3.12	8.18	46.19	16.23	11.10	6.43
	Yellow	668,257	671.48	41.35	65.54	360.85	0.43	1.67	2.17	2.64
	Not Specified	22,272	175.51	6.72	1.61	0.39	0.01	0.01	0.00	0.00
Age	24 Years or Less	6,090,113	149.17	3.95	3.30	7.35	3.91	1.46	0.99	0.49
	25 to 44 Years	75,353,866	227.17	9.59	11.29	43.50	48.42	43.75	42.05	35.87
	45 to 64 Years	56,395,297	266.22	12.45	15.29	76.62	36.24	42.51	42.65	47.29
	65 Years or More	17,788,151	265.51	11.41	16.26	84.01	11.43	12.28	14.30	16.35
Years of Schooling	Less than 1 Year	32,566,084	87.37	0.81	0.58	2.02	20.93	1.60	0.93	0.72
	1 to 4 Years	31,961,631	126.36	2.49	1.65	4.61	20.54	4.82	2.61	1.61
	4 to 8 Years	47,030,711	186.32	5.47	3.98	9.80	30.22	15.57	9.26	5.05
	8 to 12 Years	31,890,847	341.70	17.56	16.52	70.63	20.49	33.91	26.06	24.65
	More than 12 Years	12,178,154	921.28	59.82	101.51	510.00	7.83	44.10	61.13	67.97
Immigration	No Immigrant	63,148,690	219.05	9.55	11.67	42.33	40.58	36.51	36.46	29.26
	0 to 5 Years	11,681,757	230.42	10.04	11.69	44.16	7.51	7.10	6.75	5.65
	6 to 9 Years	6,439,113	223.19	8.84	11.28	50.84	4.14	3.45	3.59	3.58
	More Than 10 Years	46,134,746	250.79	11.03	12.67	58.07	29.64	30.82	28.91	29.32
	Other/Not Specified	28,223,121	291.67	12.95	17.41	104.25	18.14	22.13	24.29	32.20
Working Class	Inactive	27,548,418	231.52	10.26	10.65	33.79	17.70	17.12	14.50	10.19
	Unemployed	4,801,946	91.20	2.05	1.94	4.84	3.09	0.59	0.46	0.25
	Formal Employees	35,783,905	245.47	9.50	10.25	34.13	22.99	20.59	18.13	13.37
	Informal Employees	20,520,320	133.52	3.72	3.65	10.93	13.19	4.62	3.70	2.45
	Self-Employed	42,541,735	195.69	7.59	8.60	32.78	27.34	19.55	18.09	15.26
	Employer	8,211,702	698.78	40.30	70.96	522.55	5.28	20.03	28.82	46.96
	Public Servant	13,136,777	378.23	21.10	24.26	78.36	8.44	16.78	15.76	11.27
	Unpaid	3,061,738	127.50	3.89	3.56	7.47	1.97	0.72	0.54	0.25
	Other/Not Specified	20,886	70.91	4.01	0.80	0.16	0.01	0.01	0.00	0.00
Employment Tenure	0 Years	32,350,364	210.69	9.04	9.35	29.49	20.79	17.71	14.96	10.44
	1 Years or More	19,308,095	184.75	6.68	6.93	21.72	12.41	7.81	6.62	4.59
	1 to 3 Years	23,380,174	225.14	8.72	10.25	45.36	15.02	12.35	11.85	11.61
	3 to 5 Years	13,340,239	248.03	9.71	12.28	52.69	8.57	7.84	8.10	7.69
	More than 5 Years	66,249,243	282.23	13.50	17.81	90.48	42.57	54.13	58.33	65.60
	Other/Not Specified	999,312	110.08	2.62	2.72	6.63	0.64	0.16	0.13	0.07
Enterpriser Size	1	2,293,312	460.07	26.48	32.62	112.53	1.47	3.68	3.70	2.82
	2 a 5	11,266,094	317.90	16.24	20.95	92.12	7.24	11.08	11.67	11.36
	6 a 10	5,523,207	333.26	15.24	23.41	157.32	3.55	5.10	6.39	9.51
	>11	934,794	1503.79	72.27	211.72	2,451.17	0.60	4.09	9.79	25.08
	Other/Not Specified	135,610,020	220.34	9.26	10.21	34.52	87.14	76.06	68.44	51.23
Sector of Activity	Agriculture	29,740,290	103.64	2.54	3.12	17.97	19.11	4.56	4.59	5.85
	Manufacturing	18,465,354	265.42	11.29	13.20	81.16	11.87	12.62	12.05	16.40
	Construction	12,999,652	171.71	4.19	4.62	17.84	8.35	3.29	2.97	2.54
	Services	49,398,856	318.54	15.17	19.74	93.24	31.74	45.36	48.23	50.40
	Public Sector	12,658,127	394.69	21.46	27.48	103.71	8.13	16.45	17.20	14.37
	Other/Not Specified	32,365,148	210.61	9.04	9.35	29.48	20.80	17.71	14.96	10.44

Source: PNAD - IBGE

Tables 5.3

DECOMPOSITION THEIL-T INDEX - BRAZIL

Universe : Economically Active Population - All Income Sources

	1976			1985			1990		
	Total	Between	Within	Total	Between	Within	Total	Between	Within
10+	1.002	0.812	0.189	0.866	0.752	0.114	0.883	0.763	0.119
90-	-0.177	-0.297	0.120	-0.146	-0.288	0.141	-0.135	-0.288	0.153
Total	0.825	0.515	0.309	0.720	0.464	0.256	0.748	0.475	0.273

	1993			1997		
	Total	Between	Within	Total	Between	Within
10+	0.957	0.794	0.162	0.858	0.740	0.118
90-	-0.164	-0.295	0.130	-0.159	-0.287	0.128
Total	0.793	0.500	0.293	0.699	0.453	0.246

Source: PNAD

Tables 5.4

Percent of Total Variance Explained by University Grads - Brazil

Source : PNAD - Morley (1999)

Universe: Occupied - Labor Income Normalized By Hours

	Pop Share	Y Share	Theil	Within	Between	Total	Percent of Contrib. Univ.	Skill Diff.
1976								
Univ. Grad	0.0032	0.0272	0.3600	0.00979	0.05848			
Rest	0.9968	0.9728	0.7840	0.76268	-0.02373			
Total	1.0000	1.0000		0.77247	0.03475	0.80722	5.52%	8.8
1990								
Univ. Grad	0.0071	0.0485	0.4326	0.02100	0.09332			
Rest	0.9929	0.9515	0.7932	0.75467	-0.04057			
Total	1.0000	1.0000		0.77567	0.05275	0.82842	8.90%	7.13
1997								
Univ. Grad	0.0083	0.0567	0.4100	0.02323	0.10857			
Rest	0.9917	0.9433	0.7645	0.72114	-0.04713			
Total	1.0000	1.0000		0.74437	0.06144	0.80581	10.51%	7.14

Tables 5.5

A - Returns to schooling (Basis : 0 years of education)

Universe : Economically Active Population - All Income Sources

Years of Schooling	1976	1985	1990	1993	1997
0	1.00	1.00	1.00	1.00	1.00
1-4	1.88	1.77	1.80	1.65	1.70
4-8	2.59	2.26	2.24	1.91	2.05
8-12	4.01	3.80	3.75	3.24	3.35
12-16	10.11	9.79	9.26	8.35	8.48
16+	17.67	17.35	14.99	14.75	16.12

Source: PNAD

B - Population Composition (%)

Universe : Economically Active Population - All Income Sources

Years of Schooling	1976	1985	1990	1993	1997
0	24.4	18.2	15.5	14.9	12.9
1-4	43.7	38.6	35.2	37.4	33.0
4-8	18.5	22.1	24.2	23.3	25.4
8-12	9.0	14.3	17.1	17.0	20.3
12-16	4.1	6.3	7.3	6.8	7.6
16+	0.3	0.4	0.7	0.7	0.8

Source: PNAD

Table 6.1

INEQUALITY AND THE EARNINGS MEASUREMENT INTERVAL

A

Population Concept - Income Concept	THEIL-T INDEX						
	1985	1990	1993	1994	1996	1997	1998
Always Occupied - Month by Month	0.504	0.651	0.709	0.787	0.533	0.545	0.547
Always Occupied - Mean Earnings	0.448	0.580	0.551	0.646	0.497	0.508	0.512

B

Population Concept - Income Concept	GINI COEFFICIENT						
	1985	1990	1993	1994	1996	1997	1998
Always Occupied - Month by Month	0.520	0.566	0.592	0.618	0.527	0.530	0.527
Always Occupied - Mean Earnings	0.496	0.541	0.529	0.566	0.510	0.514	0.512

C

Population Concept - Income Concept	THEIL-T INDEX			GINI COEFFICIENT		
	1993	1997	1998	1993	1997	1998
Once Occupied - Month by Month	0.915	0.746	0.753	0.6666	0.6142	0.6137
Once Occupied - Mean Earnings	0.703	0.653	0.660	0.5955	0.5810	0.5806

Source : PME

D

Population Concept - Income Concept	GINI COEFFICIENT		
	1993	1997	1998
Active Age Individuals - Month by Month	0.8021	0.7634	0.7688
Active Age Individuals- Mean Earnings	0.7599	0.7431	0.7490

Source : PME

Tables 6.2

VARIATION OF THEIL-T INDEX - Between 93 and 97
Universe : Longitudinal Data - 4 Observations - Always Occupied

		Mean Earnings			Month by Month		
		Total	Between	Within	Total	Between	Within
Gender	Male	-0.043	-0.006	-0.037	-0.131	-0.006	-0.125
	Female	0.000	0.003	-0.003	-0.033	0.003	-0.037
Total		-0.043	-0.003	-0.040	-0.164	-0.003	-0.161
Age	Up to 24 years	-0.006	0.003	-0.009	-0.019	0.003	-0.023
	25 to 34 years	-0.049	-0.019	-0.030	-0.085	-0.019	-0.066
	35 to 59 years	0.011	0.021	-0.010	-0.057	0.021	-0.078
	More than 60 years	0.001	0.002	-0.001	-0.002	0.002	-0.005
Total		-0.043	0.007	-0.050	-0.164	0.007	-0.171
Schooling	0 Years	0.004	0.006	-0.002	0.001	0.006	-0.005
	1 to 4 years	-0.014	0.010	-0.024	-0.034	0.010	-0.044
	5 to 8 years	-0.017	-0.009	-0.008	-0.041	-0.009	-0.033
	9 to 12 years	-0.053	-0.038	-0.015	-0.087	-0.038	-0.049
	13 to 16 years	0.015	0.028	-0.013	-0.021	0.028	-0.049
	More than 16 years	0.022	0.021	0.000	0.019	0.021	-0.003
Total		-0.043	0.019	-0.062	-0.164	0.019	-0.183
Working Class*	Public Servant	0.014	0.010	0.003	-0.003	0.010	-0.013
	Formal Employee	-0.130	-0.071	-0.059	-0.184	-0.071	-0.113
	Informal Employee	0.003	-0.002	0.005	0.000	-0.002	0.003
	Self-Employed	0.026	0.007	0.019	0.017	0.007	0.010
	Employer	0.026	0.031	-0.005	0.016	0.031	-0.015
	Not specified	0.018	0.033	-0.015	-0.011	0.033	-0.045
Total		-0.043	0.009	-0.052	-0.164	0.009	-0.173
Sector of Activity*	Agriculture	0.003	0.001	0.002	0.003	0.001	0.002
	Manufacturing	-0.068	-0.029	-0.039	-0.094	-0.029	-0.065
	Construction	0.002	0.002	0.000	-0.002	0.002	-0.005
	Public Sector	0.022	0.018	0.003	0.003	0.018	-0.015
	Services	0.012	0.011	0.001	-0.040	0.011	-0.051
	Not specified	-0.014	-0.005	-0.009	-0.034	-0.005	-0.029
Total		-0.043	-0.002	-0.041	-0.164	-0.002	-0.162
Region	Rio de Janeiro	0.018	0.018	0.000	0.004	0.018	-0.014
	São Paulo	-0.005	0.012	-0.017	-0.041	0.012	-0.053
	Porto Alegre	0.037	0.013	0.023	0.016	0.013	0.002
	Belo Horizonte	-0.058	-0.022	-0.036	-0.090	-0.022	-0.068
	Recife	-0.036	-0.018	-0.018	-0.049	-0.018	-0.031
	Salvador	0.001	0.001	0.001	-0.005	0.001	-0.005
Total		-0.043	0.004	-0.047	-0.164	0.004	-0.168

Source: PME

* Individuals that changed status are classified as Not Specified

Tables 6.3

A - GROSS AND MARGINAL RATES OF CONTRIBUTION THEIL-T

Universe : Longitudinal Data - 4 Observations - Always Occupied
Mean Earnings Across 4 Months

	GROSS							MARGINAL						
	1985	1990	1993	1994	1996	1997	1998	1985	1990	1993	1994	1996	1997	1998
Groups:														
Gender	6.5%	4.4%	3.7%	3.4%	3.6%	3.5%	3.4%							
Age	9.7%	8.7%	7.1%	6.7%	9.1%	9.2%	9.0%	10.4%	7.0%	6.3%	5.7%	6.9%	7.1%	7.6%
Schooling	34.5%	35.8%	32.2%	30.7%	37.5%	38.7%	37.8%	31.5%	30.7%	28.8%	26.8%	32.5%	33.2%	33.1%
Working Class*	10.7%	10.5%	9.2%	11.0%	11.8%	11.8%	12.2%	5.2%	4.5%	5.4%	6.3%	5.7%	5.2%	5.8%
Sector of Activity*	3.4%	2.7%	2.2%	2.3%	1.7%	2.0%	2.1%							
Region	1.6%	2.0%	3.2%	7.0%	4.9%	4.3%	3.3%							

Source: PME

* Individuals that changed status are classified as Not Specified

B - GROSS AND MARGINAL RATES OF CONTRIBUTION THEIL-T

Universe : Longitudinal Data - 4 Observations - Always Occupied
Month by Month Labor Earnings

	GROSS							MARGINAL						
	1985	1990	1993	1994	1996	1997	1998	1985	1990	1993	1994	1996	1997	1998
Groups:														
Gender	5.8%	4.0%	2.9%	2.8%	3.4%	3.3%	3.2%							
Age	8.6%	7.8%	5.5%	5.5%	8.4%	8.6%	8.5%	9.3%	6.2%	4.9%	4.7%	6.4%	6.6%	7.1%
Schooling	30.6%	31.9%	25.0%	25.2%	34.9%	36.1%	35.4%	27.9%	27.4%	22.4%	22.0%	30.2%	30.9%	31.0%
Working Class*	9.5%	9.3%	7.2%	9.0%	11.0%	11.0%	11.5%	4.6%	4.0%	4.2%	5.2%	5.3%	4.8%	5.4%
Sector of Activity*	3.0%	2.4%	1.7%	1.9%	1.6%	1.9%	2.0%							
Region	1.4%	1.8%	2.5%	5.8%	4.5%	4.0%	3.1%							

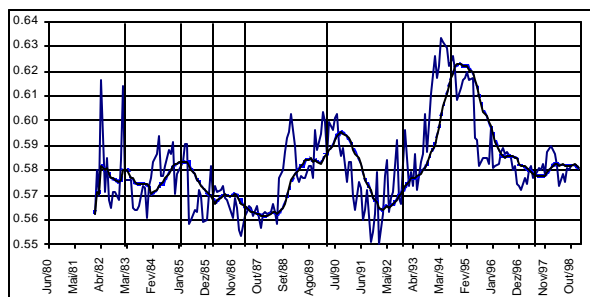
Source: PME

* Individuals that changed status are classified as Not Specified

Graphs 7.1

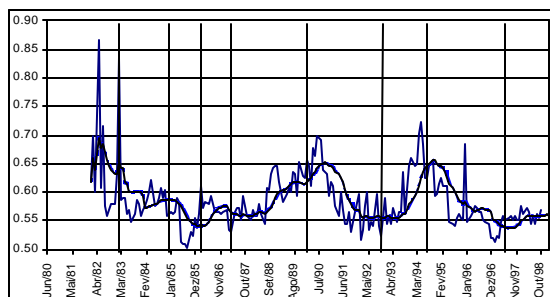
A- Gini Coefficient

(Universe : Active Age Population - Total Labor Earnings)



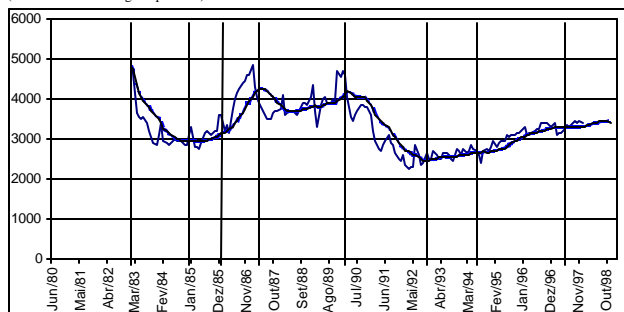
B - Theil-T Index

(Universe : Active Age Population - Only Positive Labor Earnings)

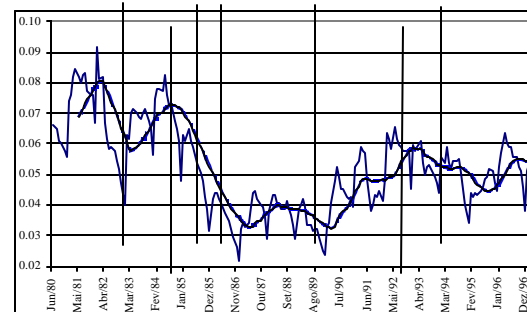


C - Average Earnings

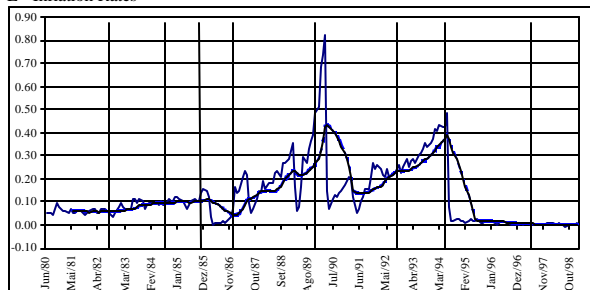
(Universe : Active Age Population)



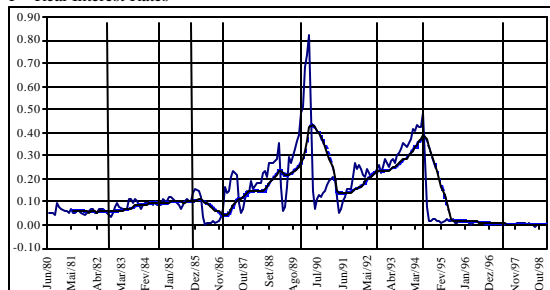
D - Unemployment Rates



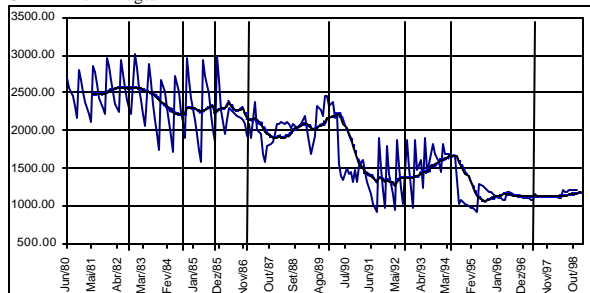
E - Inflation Rates



F - Real Interest Rates



G - Minimum Wages



H - Real Exchange Rate

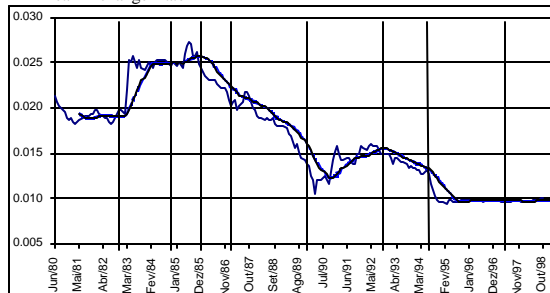


Table 7.1

	Unemployment Rate		Inflation Rate		Real Exchange Rate I		Real Interest Rate		Minimum Wages		R^2
Gini	0.025	2.88	0.004	2.45	-0.064	-6.53	0.072	1.02	-0.003	-0.19	37%
Mean Earnings	-0.416	-11.38	-0.045	-6.51	-0.038	-0.89	-0.824	-2.78	0.323	6.57	68%

Table 7.2

Partial Correlation Signs Between Macro Variables and Inequality Measures

Concept : Active Age Population - Labor Earnings

(Data in Logs)

		Unemployment Rate		Inflation Rate		Real Exchange Rate I		Real Interest Rate		Minimum Wages		R^2
Gini (1982 a 1996)	All Earnings	0.025	2.88	0.004	2.45	-0.064	-6.53	0.072	1.02	-0.003	-0.19	37%
	Only PositiveEarnings	0.004	0.49	0.004	3.17	-0.029	-2.96	0.040	0.57	-0.001	-0.38	15%
Gini (1982 a 1998)	All Earnings	0.051	2.41	0.011	4.46	-0.168	-6.64	0.093	0.49	0.087	3.22	28%
	Only PositiveEarnings	0.002	0.23	0.003	3.45	-0.026	-2.81	0.035	0.50	0.030	2.95	16%
Theil (1982 a 1996)	Only PositiveEarnings	0.014	0.58	0.015	3.31	-0.130	-4.70	0.037	0.18	0.087	2.88	21%
Theil (1982 a 1998)	Only PositiveEarnings	0.025	1.09	0.010	3.80	-0.131	-4.78	-0.005	-0.03	0.126	4.26	20%

Source : PME

Table 7.3

A - Partial Correlation Signs Between Macro Variables and Mean Earnings By Years of Schooling

Universe : Active Age Population - Labor Earnings

(Period : 1983 to 96 - Data in Logs)

	Unemployment Rate		Inflation Rate		Real Exchange Rate		Real Interest Rate		Minimum Wages		R^2
0 Years	-0.45	-12.32	-0.04	-6.10	0.06	1.36	-0.81	-2.73	0.23	4.62	68%
0 to 4 Years	-0.45	-12.14	-0.06	-7.89	0.10	2.31	-1.10	-3.64	0.27	5.33	72%
4 to 8 Years	-0.45	-11.11	-0.05	-7.12	0.19	3.98	-0.91	-2.77	0.28	5.20	73%
8 to 12 Years	-0.46	-11.87	-0.05	-7.27	0.15	3.31	-0.83	-2.66	0.34	6.55	75%
More Than 12 Years	-0.42	-10.67	-0.05	-6.19	0.00	0.09	-0.75	-2.35	0.33	6.21	66%

OBS.: a) Small numbers correspond to t-statistics b) Constant and seasonal dummies omitted

**B - Partial Correlation Signs Between Macro Variables and Mean Earnings
By Age Brackets**

Universe : Active Age Population - Labor Earnings

(Period : 1983 to 96 - Data in Logs)

	Unemployment Rate		Inflation Rate		Real Exchange Rate		Real Interest Rate		Minimum Wages		R ²
15 to 25 Years	-0.56	-15.63	-0.05	-7.95	0.14	3.44	-0.42	-1.43	0.36	7.33	80%
25 to 45 Years	-0.43	-13.26	-0.06	-9.84	0.02	0.49	-0.46	-1.76	0.35	7.93	76%
45 to 60 Years	-0.45	-11.94	-0.07	-9.25	-0.16	-3.69	-0.55	-1.81	0.35	7.03	69%
More than 60 Years	-0.49	-9.29	-0.07	-7.44	-0.03	-0.42	-0.98	-2.31	0.41	5.77	62%

OBS.: a) Small numbers correspond to t-statistics b) Constant and seasonal dummies omitted

**C - Partial Correlation Signs Between Macro Variables and Mean Earnings
By Household Status**

Universe : Active Age Population - Labor Earnings

(Period : 1983 to 96 - Data in Logs)

	Unemployment Rate		Inflation Rate		Real Exchange Rate		Real Interest Rate		Minimum Wages		R ²
Head	-0.44	-11.65	-0.05	-7.52	0.03	0.69	-0.85	-2.77	0.32	6.39	71%
Spouse	-0.43	-12.62	-0.06	-8.94	-0.30	-7.73	-0.54	-1.98	0.27	5.91	74%
Son or Daughter	-0.52	-13.72	-0.05	-6.97	0.06	1.30	-0.74	-2.41	0.32	6.33	74%
Other Relatives	-0.49	-12.17	-0.05	-6.18	0.02	0.44	-0.74	-2.29	0.32	5.88	70%
Non Family Member	-0.47	-6.96	-0.02	-1.82	-0.03	-0.39	-0.10	-0.17	0.16	1.76	36%
Domestic Servant	-0.34	-7.31	-0.07	-7.44	0.01	0.20	-1.19	-3.10	0.07	1.17	47%
Collective Dwelling Res	-0.47	-6.96	-0.09	-6.84	-0.09	-1.20	-0.97	-1.77	0.52	5.75	55%

OBS.: a) Small numbers correspond to t-statistics b) Constant and seasonal dummies omitted

D - Partial Correlation Signs Between Macro Variables and Mean Earnings
By Sectors of Activity

Universe : Occupied - Labor Earnings

(Period : 1983 to 96 - Data in Logs)

	Unemployment Rate		Inflation Rate		Real Exchange Rate		Real Interest Rate		Minimum Wages		R ²
Services	-0.37	-10.99	-0.05	-7.62	-0.10	-2.62	-0.75	-2.75	0.29	6.40	66%
Commerce	-0.46	-12.61	-0.05	-7.89	-0.07	-1.56	-1.06	-3.59	0.28	5.80	70%
Public Sector	-0.42	-9.63	-0.06	-6.98	0.06	1.22	-1.05	-2.99	0.22	3.82	59%
Construction	-0.51	-13.04	-0.05	-6.52	0.04	0.78	-0.93	-2.95	0.24	4.59	69%
Manufacturing	-0.25	-7.69	-0.04	-7.01	0.01	0.26	-0.62	-2.39	0.32	7.40	67%
Mining	-0.30	-5.58	-0.03	-2.76	0.01	0.23	-0.35	-0.81	0.23	3.29	43%
Other	-0.30	-5.95	-0.03	-2.78	-0.06	-1.04	-1.27	-3.11	0.31	4.53	46%

OBS.: a)Small numbers correspond to t-statistics b) Constant and seasonal dummies omitted

E - Partial Correlation Signs Between Macro Variables and Mean Earnings
By Working Class

Universe : Occupied - Labor Earnings

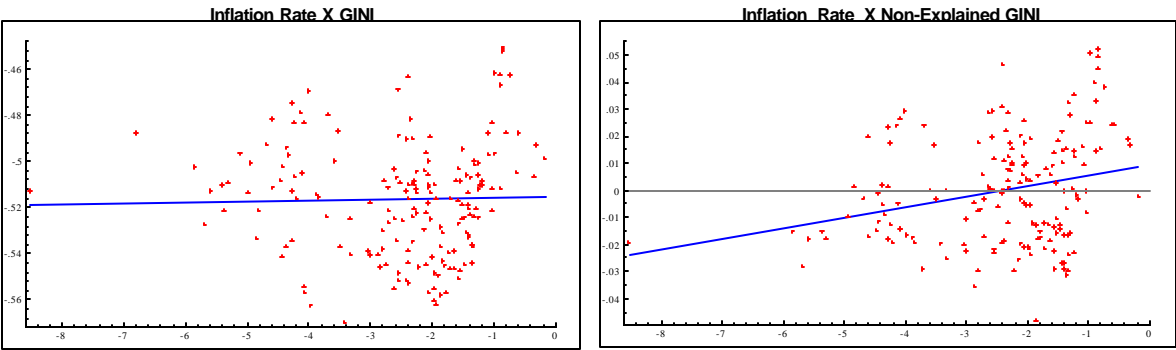
(Period : 1983 to 96 - Data in Logs)

	Unemployment Rate		Inflation Rate		Real Exchange Rate		Real Interest Rate		Minimum Wages		R ²
Formal Employees	-0.24	-7.56	-0.05	-7.64	0.06	1.58	-0.73	-2.87	0.30	7.03	69%
Informal Employees	-0.42	-11.71	-0.05	-7.84	-0.04	-0.95	-0.99	-3.44	0.16	3.40	64%
Self-Employed	-0.62	-16.56	-0.05	-7.05	-0.24	-5.51	-0.98	-3.27	0.23	4.68	77%
Employer	-0.59	-13.63	-0.05	-6.04	-0.31	-6.21	-0.72	-2.07	0.35	6.13	72%

OBS.: a)Small numbers correspond to t-statistics b) Constant and seasonal dummies omitted

Graphs 7.2

A - CORRELATION PATTERNS BETWEEN INFLATION RATE AND GINI



B - CORRELATION PATTERNS BETWEEN REAL INTEREST RATE AND GINI

