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Distributive effects of Brazilian structural reforms

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DEPARTAMENTO DE ECONOMIA

PUC-RIO

TEXTO PARA DISCUSSÃO

Nº. 406

**DISTRIBUTIVE EFFECTS OF BRAZILIAN
STRUCTURAL REFORMS ***

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** IPEA

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SUMÁRIO

RESUMO

ABSTRACT

1 - INTRODUCTION

2 - PORTRAITS OF REFORMS AND INCOME DISTRIBUTION

2.1 - Analysis of Reforms.....

2.1.1 - Economic Background

2.1.2 - Stabilization.....

2.1.3 - Trade Opening

2.1.4 - Trade Opening

2.2 - Temporal evolution of income distribution

2.2.1 - Income Concepts and Units of Analysis.....

2.2.2 - Income Concepts and Units of Analysis.....

2.3 - Income Distribution Decompositions

2.3.1 - Gross Rates of Contribution

2.3.2 - Marginal Rates of Contribution.....

2.3.3 - Gross and Marginal Contributions: Robustness Analysis .

2.4 - The Impact of the Reforms on the Riches

2.4.1 - Aggregate Absolute Impact.....

2.4.2 - Profile of the Impact of the Reforms on the Riches.....

2.4.3 - Exercises on Inequality Decomposition.....

2.4.4 - The Top 10%.....

2.4.5 - University Graduates.....

2.4.6 - Rates of Return to Schooling

3 - DYNAMIC ASPECTS OF INCOME DISTRIBUTION

3.1 - Reforms, Stabilization and Income Distribution

3.1.1 - An Updated Assessment of Inequality

3.1.2 - PME's Longitudinal Aspect and Inequality Comparisons .

3.1.3 - Other Distributive Impacts of Stabilization.....

4 - CONCLUSIONS.....

REFERENCES

Este artigo visa mensurar a evolução da distribuição de renda e seus determinantes durante o período de reformas econômicas. O artigo é dividido em duas partes : a primeira, e principal parte do artigo, explora relações de longo prazo entre reformas e distribuição de renda usando técnicas padrões de decomposição. A segunda parte explora essas relações em uma maior frequência.

A principal estratégia empírica encontrada na parte de longo prazo do artigo é estabelecer comparações entre características das reformas institucionais citadas e aspectos da distribuição de renda em diferentes pontos no tempo. O contraste entre o quadro antes e depois das reformas permite interpretações da relação causal entre reformas e resultados distributivos. Essa parte utiliza a Pesquisa Nacional por Amostra de Domicílios (PNAD) para os anos de 1976, 1985, 1990, 1993 e 1997.

A fim de determinar períodos chaves em termos de implementação da reforma, utilizamos índices de reformas institucionais encontrados na literatura. As duas principais mudanças institucionais observadas no caso brasileiro foram a abertura da economia e a estabilização. Os dois principais pontos identificados na implementação de reformas no Brasil foram 1990 e 1994.

A segunda parte do artigo explora Pesquisa Mensal do Emprego (PME) para extrair relações entre movimentos de variáveis distributivas, de um lado, e reformas econômicas, por outro. Esta análise nos permite qualificar os efeitos da estabilização de 1994 na distribuição de renda. Primeiro, tem vantagem dos maiores graus de liberdade oferecidos pela PME em comparação com a PNAD para escolher períodos antes e depois da estabilização como base para a comparação da distribuição de renda. Por exemplo, a PME permite comparar o momento antes do lançamento do plano de estabilização com o final de 1998, incorporando os efeitos adversos dos choques externos que ocorreram recentemente na economia brasileira. Segundo, o fato da PME acompanhar os mesmos indivíduos por curtos períodos do tempo permite qualificar a natureza das mudanças observadas na desigualdade. Em particular, o aspecto longitudinal da PME permite separar os efeitos da menor taxa de inflação na variabilidade temporal da renda daqueles exercidos sobre as medidas de desigualdade *stricto sensu* (e seus componentes entre e intra grupos).

O principal resultado encontrado é que a queda pós-estabilização das medidas de desigualdade é 2 a 4 vezes maior medidas em bases mensais (tradicionalmente utilizada no Brasil) do que quando utilizamos a renda média de 4 meses. Outra forma de encontrar esses efeitos da estabilização nas medidas de desigualdade é notar que grande parte da queda da desigualdade é atribuída ao componente intra-grupos na medida de desigualdade mensal. De um modo geral, o principal ponto encontrado é que grande parte da queda da desigualdade mensal da renda pode ser creditada a redução da variabilidade da renda e não a queda da desigualdade da renda permanente.

This paper aims at measuring the evolution of income distribution and its determinants during the period of economic reforms. The paper is divided in two parts: the first and main part of the paper explores long-run relations between reforms and income distribution using standard decomposition techniques. The second part explores these relations at a higher frequency.

The main empirical strategy pursued in the long-run part of the paper is 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. This part uses National Household Surveys (PNAD) for the years of 1976, 1985, 1990, 1993 and 1997.

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

The second part of the paper explores PME¹ 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 stabilization on income distribution. First, it takes advantage of the higher degrees of freedom provided by PME in comparison with PNAD to choose dates before and after stabilization for comparing income distribution. For instance, PME allows to measure the moment previous to the launching of the stabilization plan and compare it with the end of 1998, incorporating the effects of the adverse external shocks that hit recently the Brazilian economy. Second, the fact that PME follows the same individuals across short periods of time allows to qualify the nature of the changes observed in inequality. In particular, the longitudinal aspect of PME allows 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).

The main result found is that post-stabilization fall of inequality measures is 2 to 4 times higher on a monthly basis (traditionally used in Brazil) than when one uses mean earnings across four months. Another way of looking at these effects of stabilization 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 stabilization may be credited to a reduction of earnings volatility and not to a fall in permanent earnings inequality.

¹ Pesquisa Mensal do Emprego

1 – INTRODUCTION

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

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

Complementarily, 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, stabilization boom and external crisis). It is not a trivial exercise to capture 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 rather sharp increase in labor productivity (i.e. whether the increased labor costs or the increased exposure to competition).

This paper attempts to measure the evolution of income distribution and its determinants during the period of economic reforms. Our point of departure is to establish 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 reforming gets momentum in the country. Fernando Henrique Cardoso 1995-98 first term administrative record will be known as a period of consolidating stabilization 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 fall of 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 in Brazilian distributive variables are so prominent that they can not be left out of the analysis.

The paper is divided in two parts: in the first part, long-run 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 allows for tentative interpretations of casual 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 indexes of institutional reforms found in the literature (Morley et al (1999) and Lora (1997)) and other types of evidence (section 2.1). The main reforms measured are related to the following fields: trade, labor, tax, financial, capital account and privatization. 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 PNAD² household surveys to construct aggregate inequality measures (section 2.2) and to apply standard decomposition techniques (section 2.3). 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 stabilization, are assessed.

In the end of the first part of the paper, we attempt to study the impact of the economic reforms on the riches (section 2.4). First, we analyze 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 paper explores PME³ 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 stabilization on income distribution (section 3.1). First, it takes advantage of the higher degrees of freedom provided by PME in comparison with PNAD to choose dates before and after stabilization for comparing income distribution. For instance, PME allows to measure the moment previous to the launching of the stabilization plan and compare it with the end of 1998, incorporating the effects of the adverse external shocks that hit recently the Brazilian economy. Second, the fact that PME follows the same individuals across short periods of time allows to qualify the nature of the changes observed in inequality. In particular, the longitudinal aspect of PME allows 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).

² Pesquisa Nacional por Amostra de Domicílios

³ Pesquisa Mensal do Emprego

As usual, the paper ends with a summary of the main conclusions (section 4). This section may be used as an executive summary.

2 – PORTRAITS OF REFORMS AND INCOME DISTRIBUTION

This Section assesses the long-run impacts of reforms on income distribution in Brazil. It performs 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 casual relations between implemented reforms and distributive outcomes. We start 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.

2.1 - Analysis of Reforms

2.1.1 -. Economic Background

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

In the early 1990's two major changes have taken place: the opening of the economy and the launching of a successful stabilization plan in 1994. The structural changes introduced by the trade liberalization-cum-stabilization are so significant to explain the macroeconomic environment and the dynamic of other reforms implementation that it is inevitable to focus the present analysis on these events.

2.1.2 - Stabilization

Since at least the beginning of the 1980s inflation became the central policy issue in Brazil. Three major stabilization efforts were 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 hit the Brazilian economy in September, 1997 (Asian crisis), September, 1998 (Russian crisis) and the January, 1999 exchange rate fluctuation.

The Real Plan of 1994 had at least two major differences in comparison with previous plans. First, a very successful process of “de-indexation” 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 and the nominal exchange rate established a ceiling for prices, at least in the tradable sector.

The opening of the economy and the appreciation of the Real are two central elements in what is so far seen as a very successful stabilization effort. Trade liberalization helped the stabilization and, at the same time, the government considers it as a key element in the new development strategy.

2.1.3 - Trade Opening

Apart from stabilization, 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 1980's, from the pressures to produce trade surpluses. Since the early 1990's 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 closeness of the economy and the active trade and industrial policies of the 1980's were an hindrance to price stability and sustained growth.

The debt crisis of the 1980's imposed a severe external constraint on the Brazilian economy. The drastic reduction of foreign credit and the increase in interest services on the 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 billion (1986) and US\$ 19 billion (1988). On average, between 1985 and 1994, it surpassed US\$ 10 billion. Trade surpluses were roughly sufficient to balance the current account until 1994.

Trade liberalization starts formally in the late 1980's but more effectively in the early 1990's. 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 stabilization strategy. The government deliberately let the

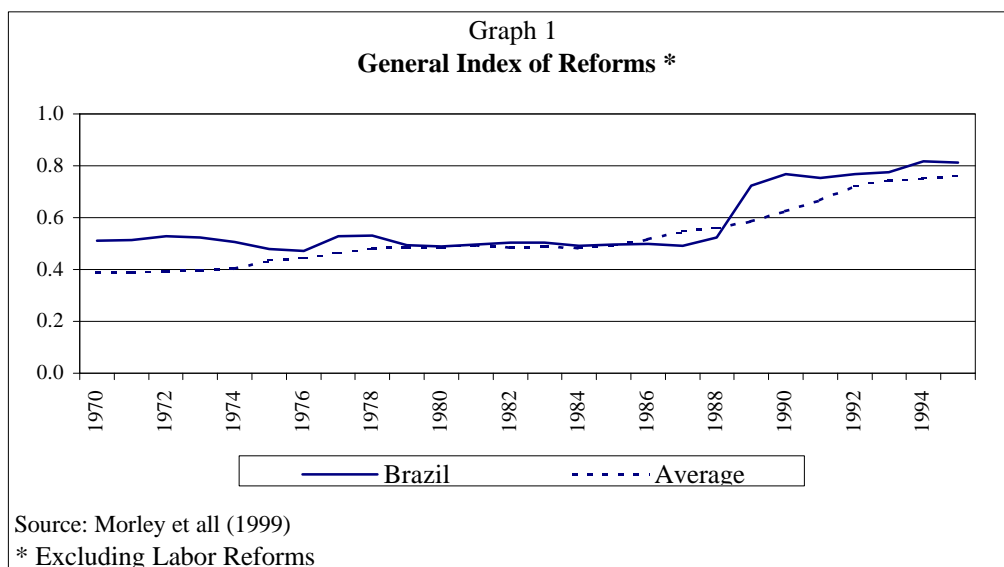
nominal exchange rate appreciate in order to increase the competitive pressure on the prices of tradable goods.

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 roughly 150% between 1992-3 and 1995-6 and imports of consumption goods increased 300%. In the period 1993-95 GDP grew around 15%: comparing both rates gives an idea of the increase in the import coefficient.

2.1.4 - Dating Reforms

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

These indexes provide a good comparative view of specific countries and present a good perspective of the main relative trends. Graph 1 presents the simple average relative to five reforms (it excludes labor reforms). Brazil was more liberalized than other Latin American countries in the region at the beginning of the series, but its process of reforming 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 jump. 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 weights to the different reforms considered, while some aspects of reforms are clearly more important. Trade liberalization 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 incorporates these restrictions into the analysis Brazil would be less liberalized before 1990 and the size of the jump observed in this year would be magnified.

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

A final related problem is that the general index also does not consider the inflationary environment and its pervasive effects on income distribution. The 1987-94 period was characterized by high and unstable inflation rates, which produced decisive influences on economic behavior and institutions. As Table 1 shows, annual inflation rates that were 475% in 1991, reached a peak of 2489% 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 1996^{4 5}. Once again, the result

⁴ Perhaps the most beneficial consequence of stabilization is that real earnings temporal variance of logs measured at an individual level across four consecutive months falls from 0.1363 in 1994 to 0.106 in 1996 (table 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 1). In this sense, inflation greased the wheels of the labor 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 stabilization was to augment the demand of labor reforms that would reinstate the level of wage flexibility lost.

would be to neutralize at least in part the jump towards liberalization 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.

Table 1
Stabilization

	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 rates¹	3.86	0.41	20.03	1994	CPI - IBGE
Temporal real earnings variability²	0.1206	0.1060	0.1363	1994	PME Longitudinal
Nominal wage rigidity³	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

In summary, our perception is that once the analysis takes into account the end of quantitative restrictions on international trade occurred in 1990, the labor 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.

2.2 - 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 in 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.

The *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 is conducted by IBGE - Instituto Brasileiro de Geografia e Estatística 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 referred changes in the questionnaire

demands some compatibility efforts and imposes imperfections in the comparisons across time.

2.2.1 - 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 coefficients and the fact that it allows for incorporating null incomes into the analysis justifies 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.

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

* NH = Normalized by working hours.

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

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

2.2.2 - Temporal Evolution of Inequality

Tables 2.A and 2.B present the Theil-T and the Gini coefficient during the 1976-97 period across the different pairs of population-income concepts.

Table 2

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 Hrs	0.846	0.772	0.854	0.831	0.809
Economically Active - All Income Sources	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	1976	1985	1990	1993	1997
Occupied - Labor	0.595	0.590	0.600	0.596	0.578
Occupied - Labor Income Normalized by Hrs	0.610	0.608	0.615	0.610	0.602
Economically Active - All Income	0.603	0.595	0.605	0.601	0.583
Active Age - All Income	0.609	0.604	0.618	0.600	0.587
Total - Per Capita All Income	0.616	0.590	0.607	0.599	0.595

Source:

The analysis of the temporal evolution of the 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 economic active population) falls from 0.825 to 0.72.

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

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 shows a mild upward movement. This contrast can be partially credited to the increase in female participation in labor markets, as the next section shows.

The 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 2.1, the period of reforms 1990-97 can be further divided into two subperiods.

iii) the 1990-93 period is characterized by the combination of high inflation with 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-labor 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 cohorts in labor markets at the beginning of the decade, which compensates partially the effects of increased female participation observed in previous years.

iv) The 1993-97 period is characterized by the combination of successful price stabilization 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 pair 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, the 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 stabilization on income distribution. We will return to these issues in section 3.1 of the paper.

2.3 - 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 went through various changes in the last 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, utilization, and return of different factors of production and personal characteristics on the other, we perform a standard inequality decomposition exercise⁷:

- 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.

⁷ A good reference in this respect is Ramos (1993).

The first term of expression (1) corresponds to the between groups component while the second term corresponds to the 'within groups' component. Table 3 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 3 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 localization (demographic region and population density). Table 3 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 criteria 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 three first columns of table, we see that the between group component explains 34.7% ($0.243/0.699$) of the total Theil-T index of 0.699.

The last three columns of Table 3 presents 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).

Table 3

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

2.3.1 - Gross Rates of Contribution

The gross decomposition of the Theil index summarizes 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 with higher contribution to total inequality. The explanatory power of both variables increased substantially during the whole period under analysis (Table 4A): 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.

The gender classification presents the lower gross contribution rate for total inequality and decreased almost monotonically 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.

A 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 a more stable behavior, with a small decrease in its explanatory power between 1976 and 1997, from 5.9% to 5.4%.

2.3.2 - 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 choose 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 4B.

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%, reaches 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 reaches a value of 73.8% in

1993, well below the 80% 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 magnify the ‘within’ groups components). We will return to this point in section 3.1. For now we will not consider 1993 in the analysis of Table 4.B.

The marginal explanatory power of schooling (by far is 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 were 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 in this level in 1997.

Table 4

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

In summary, the 1990-97 period - characterized 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 at the same level, in the extreme points of the series.

2.3.3. Gross and Marginal Contributions: Robustness Analysis

Table 5 allows 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 for working hours shows that the explanatory power attributed to gender, race and age reduces drastically (specially gender) once the effects of partial working hours is taken into account.

Table 5

RATES OF CONTRIBUTION THEIL-T - 1997
GROSS RATES

Population Concept	Occupied	Occupied	Economically A	Active Age	Total - Per Capita
Income Concept	Labor NH1	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 NH1	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

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 decrease 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 increase 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.

2.4 - The Impact of the Reforms on the Riches

2.4.1. Aggregate Absolute Impact

In Brazil the 10% richest individuals hold 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 the individuals at the top of the income distribution.

In order to evaluate how the riches were affected during the post-reform period 1990-97, we take the per capita income level roughly at the 90% percentile for 1997. More precisely, we take individuals with per capita income above R\$ 500,00 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 6. This Table shows that there was an initial reduction (33%) in the number of riches 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 unionized workers – coupled to an aggressive but short-lived administrative reform which affected public servants. The freezing of 80% of the means of payment (M4) affected more intensely the wealthy groups.

Table 6

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

During the second part of the reform period 1993-97, there was a 23% increase in the number of riches, but for the whole 1990-97 period the number of riches 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 riches 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 of 1997. It goes down sharply in 1993 to 10.57% and finally it recovers approximately half of the loss incurred in the 1990-93 period, reaching 12.99% in 1997.

2.4.2. Profile of the Impact of the Reforms on the Riches

Table 7 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 garbage 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 indices⁸ 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 riches (or 62%, if we take into account their distance to the wealth line). These statistics were quite similar in 1990 indicating that reforms did not affect the spatial distribution of the wealth in Brazil.

⁸ We use FGT poverty indices, using the degree of poverty aversion equals to 0, 1 and 2 that is P⁰, P¹ and P², 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

Table 7
WEALTH PROFILE - 1997
Wealth Line : R\$ 500,00

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

Source: PNAD - IBGE

WEALTH PROFILE - 1997

Wealth Line : R\$ 500,00

Head of the Household	Sub-Groups	Total Population	Average Per Capita Earnings	P0 (%)	P1 (%)	P2 (%)	Population (%)	Contribution to Total Wealth		
								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
Enterprise 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

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

As expected, the rich are over-represented among those with a dependency ratio equals 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 ceded places as well as among those living on own house without land property rights.

Access to public services such as water, sanitation, electricity and garbage collection is nearly universal among the rich but not so for the non-rich groups of the 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 riches 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 education while among the riches this share corresponds to 44%.

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 riches this statistic raises to 54%. In other words, most of the riches 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 riches were in 1997 are over-represented in the public sector, services and among employers. The increase of the degree of overrepresentation among employers is the most noticeable change.

2.4.3. Exercises on Inequality Decomposition

Following Sam Morley suggestions and based on his work (Morley (1999)), this sub-section 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 do this exercise in two ways: for the 10% richest and for the group with university level formation.

2.4.4. The Top 10%

Table 8.shows the details, which allow for the evaluation 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 Theil index ‘within’ group for the 10% richest 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.

Table 8

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

While the absolute contribution of the rich to total inequality is extremely high, there is not much evidence to suggest that it has increased over the period of the 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 movement 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 fell to 57.2% in 1997.

2.4.5. University Graduates

The contribution of university graduates is shown in Table 9. 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 labor 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, what should be reflected as a rise in the Theil indexes 'within' groups.

Table 9

Percent of Total Variance Explained by University Grads - Brazil

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

Source : PNAD - Morley (1999)

The rise in the contribution of university group to overall inequality was so great that it completely offsets favorable trends in the remainder of the population. If one looks at the Theil indexes ‘within’ group 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 getting bigger? 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 9 the reason is that the fraction of the labor 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 wishing a reduction in inequality. As Morley (1999, page 10) put, “As Brazil gradually improves its education profile, the percentage of university graduates in its labor force is going to rise. If nothing else changes, that improvement is going to increase inequality. Look again at the calculations for occupied labor 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 labor 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 labor 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 labor 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 favored 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.”

2.4.6. 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 high skilled workers generate ambiguous effects on the rates of returns to education (Tables 10 A and B).

Table 10

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

In the period 1990-97 the rate of return to primary and secondary education levels falls while the rate of return on university degree rises steeply. Overall,

calculations based on more desegregated categories show that the average rate of return to each additional years of schooling falls from 18% to 17%.

3 - Dynamic Aspects of Income Distribution

The second part of the paper 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 pre and post stabilization representative dates. At the same time, PME's longitudinal aspect allows us to refine the inequality decomposition exercises performed in section 2.3, with PNAD, thus qualifying the effects of the 1994 stabilization on income distribution. The remaining of this part aims at isolating the distributive effects of macro shocks and policies using standard time-series techniques.

3.1 - Reforms, Stabilization and Income Distribution

The Pesquisa Mensal do Emprego – PME - This monthly employment survey was performed in the six main Brazilian metropolitan regions by IBGE. It has covered an average of 40000 monthly households since 1980. PME presents detailed characteristics 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 allow us to construct also 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 on income distribution.

3.1.1. An Updated Assessment of Inequality

Despite of its geographical and income concepts limitations, PME is more suitable than PNAD to provide a detailed picturing of the effects of macroeconomic shocks (price stabilization 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 the PNAD-93 (dating from September) used in sections 2.2 and 2.3 is not the ideal proxy for the inequality

level previous to stabilization. PME is more suitable for this purpose. For example, the first line of Table 11A. shows that the Theil-T index for labor 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 indexes shown in the first line of Table 11B indicate that the values found for 1994 were 4.3% above the values found for 1993 (0.62 against 0.59).

Table 11

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

D

Population Concept - Income Concept	THEIL-T INDEX			GINI COEFFICIENT		
	1993	1997	1998	1993	1997	1998
Active Age Individuals - Month by Month	1.437	1.235	1.266	0.8021	0.7634	0.7688
Active Age Individuals- Mean Earnings	1.225	1.143	1.173	0.7599	0.7431	0.7490

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 a too optimistic view of the trends of the Brazilian income distribution and its relation with 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 Asian Crisis on the Brazilian income distribution. The first line of Table 11.A shows that the Theil-T index for labor 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 on Table 11.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 11C 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 predict⁹.

3.1.2. PME's Longitudinal Aspect and Inequality Comparisons

We have also decided to incorporate PME data because its longitudinal aspects provide relevant insights of what happened to inequality in Brazil in recent years, specially allowing for pre and post stabilization inequality comparisons. We used the micro-longitudinal aspect of PME in two alternative ways: first, the 4 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 11.A indicates that for the always occupied population the month by month Theil-T indexes fell from 0.709 in 1993 to 0.545 in 1997. The Gini coefficient time series in Table 11.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 Gini 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 11C and 11D.

⁹ The PNAD/98 data will only be available by the beginning of year 2000.

The greater fall of traditional inequality measures on a monthly basis in comparison to measures on a four months basis is explained by the fall of the individual volatility measures following the sharp fall of inflation rates observed in this period. In sum, stabilization 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 what inequality measures based on monthly measures would have suggested.

In summary, the post-stabilization 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 across 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 stabilization is to note that most of the fall in inequality measures is attributed to the within groups component, specially in the month by month inequality measures. Table 12 presents a desegregated view of these components for the population always occupied in four consecutive observations for changes between 1993 and 1997.

Table 13. summarizes this information in terms of the gross and the marginal contribution of different groups characteristics. For example, in the case of month by month income concept presented in part B of table 13, during 1993 the sum of the marginal contributions of 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 correspond to a 34.3% increase of relative contributive power to total inequality. In the case of the corresponding measures based on mean earnings across 4 months presented in table 13 part A, the relative rise of explanatory power is 12%. These results seems 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 stabilization may be credited to a reduction of earnings volatility and not to a fall in the permanent income inequality (or *strictu senso* inequality).

Table 12

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

Table 13

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

3.1.3. Other Distributive Impacts of Stabilization¹⁰

Apart from reducing the volatility of earnings as discussed in the previous subsection, stabilization 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 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 construction material, for example. As inflation increased over the 1980's, 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%) to the low income families than to the middle and high income families (1%).

¹⁰ This sub-section summarizes the results found in Amadeo and Neri (1997).

Changes in relative prices. The Real Plan is part of the family of “exchange-rate based stabilization” plans in which the exchange rate plays an important part in imposing a ceiling for the prices of tradable goods. The prices of the non-tradable 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 tradable sectors and in favor of the non-tradable sectors. Low income workers are concentrated in some of the non-tradable sectors notably personal and social services. In the labor market, they are concentrated among the informal wage earners and the self-employed. In the 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.

4 - Conclusions

This paper aimed at measuring the evolution of income distribution and its determinants during the period of economic reforms. The paper was divided in two parts: the first and main part of the paper explored long-run 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 paper 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 indexes of institutional reforms. The two main institutional changes observed in the Brazilian case were the opening of the economy and stabilization. The two turning points identified in the implementation of reforms in Brazil were 1990 and 1994.

On the inequality side, in the period 1976-90 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 shows a slight upward movement.

1990-97 is the most interesting period, due 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

The period 1990-97 can be further divided into two subperiods. The 1990-93 subperiod is characterized by the combination of high inflation with 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-labor income concepts

falls. The 1993-97 subperiod is characterized by the combination of successful stabilization 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 stabilization.

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 localization (demographic region and population density).

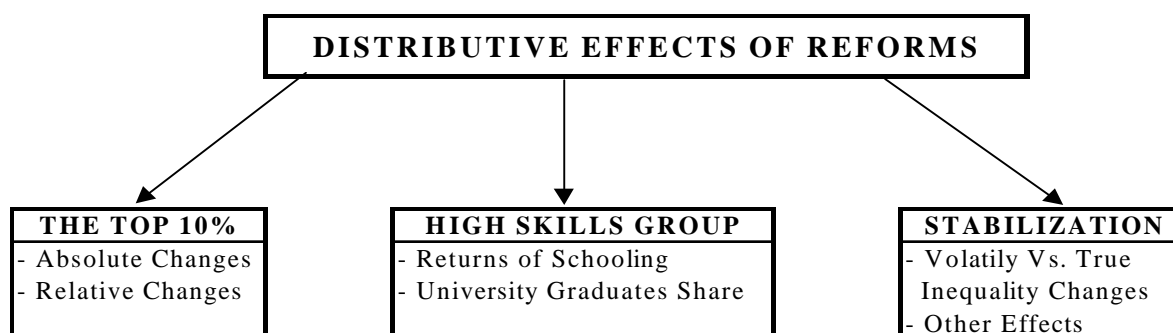
The gross decomposition of the Theil index summarizes the relative importance of the between groups term for different criteria used in total inequality. Among all the variables considered, years of schooling and working classes contribute most for total inequality. The explanatory power of both variables 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 get an idea of the marginal impact of each variable once the other classifications are considered, we choose 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 remain at these levels in 1997.

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

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



First, we attempted to study the impact of the economic reforms on the riches. 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 at the group of 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 the reforms. In 1990-93 this contribution in the case of the economically active population has risen 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 school group and the rest of the labor 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 the rich group income). This last statistic was 53% in 1990, indicating a sharp effect of the reforms on the composition of the riches, favoring 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 emphasized here is the effect of stabilization on inequality measures, specially those operating through changes in the volatility of individual income. We used the micro-longitudinal aspect of PME in two alternative ways: first, the 4 consecutive observations of the same individuals were treated independently. Second, we took earnings average across four months

before inequality measures were calculated. The difference in levels between month by month and average across four months inequality measures is explained by the variability component of individual earnings across the four month period.

The main result obtained is that the fall of monthly inequality measures observed after the fall of inflation in 94 drastically overestimates the fall of inequality based on mean earnings across four months: monthly based Theil-T indexes 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 to four month based measures is explained by the fall of the individual volatility measures observed produced by the sharp fall of inflation rates observed in this period.

In summary, the post-stabilization fall of inequality measures is 2 to 4 times higher on a monthly basis (traditionally used in Brazil) than when one uses mean earnings across four months. Another way of looking at these effects of stabilization 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 stabilization may be credited to a reduction of earnings volatility and not to a fall in permanent earnings inequality.

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