Income Distribution in Brazil: An Evaluation of Long Term Trends and Changes in Inequality Since the Mid-1970s

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Abstract

The paper analyzes changes in the Brazilian size distribution of income based on decennial Census data (1960-1970-1980) and annual household surveys data (from 1976 to 1990). The objective is to identify to what extent economic policies and macroeconomic performance contributed to the observed record. There is evidence of an almost continuous worsening of the income distribution over the three decades analyzed, but particularly so between 1960 and 1970. The long term trend does not seem to be affected by economic performance, although the stagnation of the 1980s has led to absolute income losses for all individuals except those in the top percentile. Short term behavior, on the other hand, seems to be influenced by economic performance: there is evidence that growth enhances equity, whereas high inflation has the opposite effect. A decomposition analysis highlights the importance of education in explaining inequality, but points to changes in the structure of the labor force as the major mechanism in accounting for changes in inequality since the mid-1970s. The results also show that the income effect is much more relevant than the allocation effect in the period analyzed. This evidence is against an explanation à la Kuznets for the observed deterioration of the income profile since the late 1970s, as opposed to the experience of the 1960s.

INCOME DISTRIBUTION IN BRAZIL: AN EVALUATION OF LONG TERM TRENDS AND CHANGES IN INEQUALITY SINCE THE MID-1970s[1]

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1. INTRODUCTION.

The relationship between income inequality, economic growth and economic policy is admittedly a very complex one, as witnessed by the substantial amount of both theoretical and empirical work that has been devoted by economists and other social scientists in attempting at clarifying the relevant issues involved. Brazil represents, in this respect, a useful case study as it provides evidence of very pronounced changes in inequality and performance over a short time period. Before the late 1960s, however, lack of adequate data made it difficult to meet the challenges posed by the explanation of one of the more extreme income concentration profiles in the contemporary world.

When the issue is looked at in historical perspective one observes surges of interest corresponding to points of time when new Demographic Census data become available. More recently research on the distribution of income in Brazil has been enhanced by the availability of data from the household surveys conducted by IBGE, the official statistical agency. This source of information (PNAD-Pesquisa Nacional por Amostra de Domicílios) permits systematic analyses of changes in the size distribution of income on an annual basis. Recent work based on the PNADs emphasizes the role played by a few socio-economic variables in explaining inequality.[4] Besides being preoccupied with the explanation of changes in inequality, many of these studies also share a concern with linking the observed record with economic policy and performance.[5]

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[4]Longitudinal analyses have not been pursued so far. See, however, Barros, Sedlacek and Varandas [1990]. On social mobility and income distribution in Brazil see Pastore [1986], and Barros, Ramos, and Reis [1992].

[5]A very partial list would include: Bonelli and Sedlacek [1989,1991], Ramos [1990] and Barros et allii [1992].

This paper is a contribution in the same direction. Its objective is to evaluate long term trends and analyze changes in the income profile since the mid-1970s in order to identify relevant variables and to explain - or, at least, infer on - how economics policies and macroeconomic performance contributed to the observed record. The remaining of the text is organized as follows. Section 2 presents, as a background, a brief survey of long term trends in inequality in Brazil. Section 3 summarizes theoretical models on income distribution found in the literature and how they have been used to interpret the Brazilian record. Section 4 presents results on income inequality since the mid-1970s and explores possible links between inequality and economic policies and performance. Section 5 contains the results of decomposition exercises devised to identify variables that have influenced the observed pattern of income inequality through time. The final section presents a summary of findings and concluding remarks.

2. LONG TERM TRENDS IN INEQUALITY.

Well-founded empirical research on income inequality in Brazil began only in the late 1960s,[6] stimulated by the availability of data on individual incomes from the 1960 Demographic Census. The comparison of the 1960 and 1970 Census results allowed: (i) the analysis to take into account all incomes - i.e., not only wages - of a much larger sample of individuals than before; and (ii) comparison over a longer period. Eventual measurement differences that may have occurred at the time soon gave way to a much broader consensus on one essential fact: Brazil had experienced from 1960 to 1970 what could by any standards be considered an astonishing increase in income inequality. The Gini coefficient, for instance, which had already reached very high levels in 1960, according to international comparisons (a value of nearly 0.50) increased full 7 points over the decade to 0.57 in 1970.

The fact that all studies which dealt with the measurement of income inequality from 1960 to 1970 reached this same conclusion[7] made it possible to shift the focus to the causes and interpretation of the phenomena behind the figures. In particular, a heated debate on the factors responsible for the observed record took place soon after

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[6]Fishlow [1972] is the first reference here. Previous studies based on the distribution of wages in manufacturing had been motivated by the effects of the so-called "corrective inflation" of 1964-65 upon income concentration given the wage legislation passed in the mid-1960s. The substitution of the original legislation in 1968 was not sufficient to counter the fact that wages near the legal minimum lost purchasing power relatively to higher wages during the decade as a whole.

[7]For instance, Hoffman and Duarte [1972], Hoffman [1973], Langoni [1973] and Fishlow [1973].

the 1970 Census results became available[8] disputing the explanation of why all indices of income concentration had increased between 1960 and 1970.

When the 1980 Census results became available researchers found out that, considering end-point data, the distribution of income had become more concentrated between 1970 and 1980 as well. Changes between 1970 and 1980 were, however, much less pronounced than during the previous decade. Partial evidence from the yearly PNADs allowed for some qualifications to this pattern within the 1970s, though. The thrust of the evidence, however, was inescapable: when considered from its extremes, the 1970s witnessed another increase in income inequality levels.

As the 1991 Census results are not yet available, it is not possible to compare the 1980s as a whole to the two previous decades based on the same kind of information. The annual PNADs, however, are a good source of data on income concentration during the 1980s. A summary of the evidence over periods of approximately the same length combining Census and PNAD results since 1960 is shown below.

Table 1: Selected Indicators of Income Distribution of the Economically Active Population (with non-zero incomes)

Deciles	1960* %Y	1970* %Y	1980* %Y	1979** %Y	1990** %Y
Lowest 20%	3.5	3.2	3.0	2.9	2.3
Next 20%	8.1	6.8	5.8	6.6	4.9
Next 20%	13.8	10.8	9.0	10.1	9.1
Next 20%	20.2	17.0	16.1	17.6	17.6
Upper20%	54.4	62.2	66.1	62.8	66.1
Top 10%	39.7	47.8	51.0	46.8	49.7
Top 5%	27.7	34.9	34.9	33.8	35.8
Top 1%	12.1	14.6	18.2	13.8	14.6
Gini	0.500	0.568	0.590	0.580	0.615
Theil-T	0.470	0.644			
R1/40 ***	1.048	1.460	2.068	1.453	2.012

* Demographic Census (1960 and 1970 from Langoni [1973] tables 3.5 and 3.6; 1980 from Bonelli and Malan [1984]) ** IBGE Household Surveys (PNAD). Note that these are not directly comparable with Census results. *** R1/40 is the ratio of the income share of the top 1% to that of the lowest 40% of the population.

[8]The debate opposed adepts of an explanation based on the theory of human capital (Langoni [1973]) and a broadly self-defined "structuralist" group (see below). An analytical survey of the controversy can be found in Bacha and Taylor [1978]. Many contributions are found in Tolipan and Tinelli [1975].

Despite methodological differences in the definition of incomes among demographic censuses and between censuses and yearly household surveys, the long term evidence on the evolution of the income distribution in Brazil points unequivocally to a worsening of inequality.[9] Combining evidence from Census and PNAD data leads to the conclusion that the worsening in the 1980s was as important as in the 1970s.[10]

Another important long term aspect relates to absolute income changes and inferences on welfare that may be made from them. Although the information from ordinary Lorenz curves shows unambiguously that inequality increased, our results also show that there are important differences in terms of absolute income gains. Thus, the construction of the generalized Lorenz curves (i.e., Lorenz curves "weighted" by the respective mean income of each income strata) allows the conclusion that the pattern of the 1960s and 1970s changes in the 1980s. The left panel in Figure 1 shows that all groups experienced income gains between 1960 and 1970 and, again, 1970 to 1980. In the 1980s, however, this does not happened. The right panel shows that although all income groups have experienced positive income gains from 1981 to 1986, the movement between this last year and 1990 is such that not only one observes losses but the 1990 curve is even dominated by the 1981 curve - indicating a worsening in the distribution of income and in the social welfare of the population.

This suggests that, although relative income gains have favored the richest groups in the population both in the 1970s and in the 1980s, welfare gains (if one accepts income as a proxy of welfare) were widespread in both decades. Over the "lost decade" of the 1980s, however, there was not only concentration of income but absolute incomes decreased as well. The only exception is the top percentile of the EAP with non-zero income.

FIGURE 1

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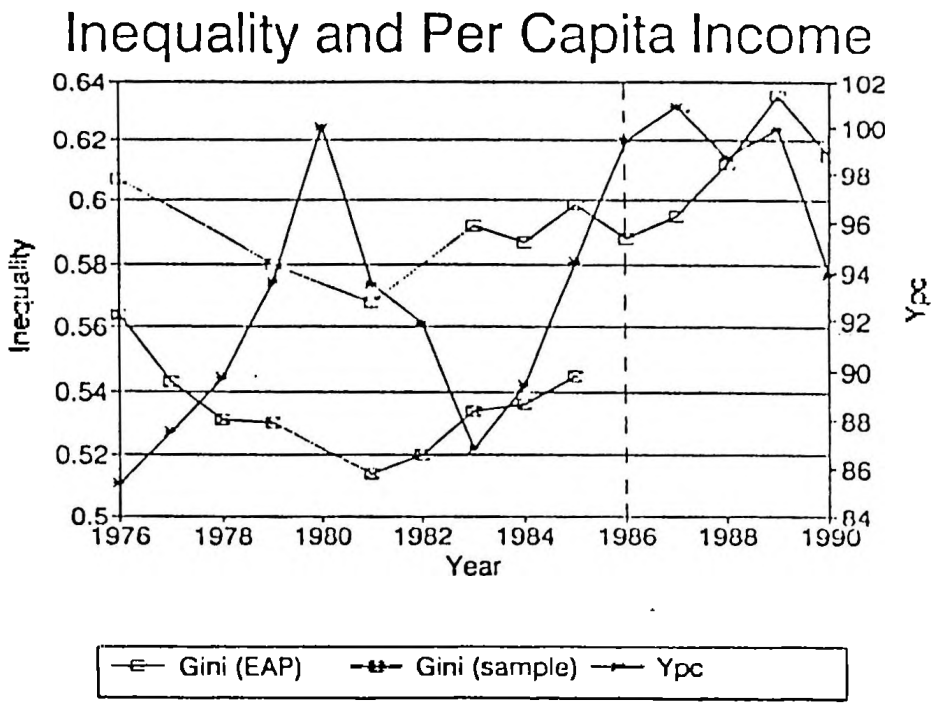
[9]It should be pointed out that the increase in the Gini coefficient between 1970 to 1980 nearly disappears when members of the EAP with zero incomes are included. In fact, since the proportion of this group relative to the total decreased between 1970 and 1980, the Gini coefficient in this case increases only slightly from 0.607 to 0.612 (Denslow Jr. and Tyler [1983], Table 4, p.15). A comparable change between 1960 and 1970 is from 0.557 to 0.607 according to Langoni [1973].

[10]The household distribution of income also deteriorated in the 1980s: the Gini coefficient rose from 0.588 in 1979 to 0.603 in 1990. The trend within the 1980s is the same whether we use the individual or the household distribution. See Hoffmann [1992], Table 2.

FIGURE 1


Inequality and Per Capita Income
Inequality
0.64
0.62
0.6
0.58
0.56
0.54
0.52
0.5
Ypc
102
100
98
96
94
92
90
88
86
84
1976
1978
1980
1982
1984
1986
1988
1990
Year
Gini (EAP)
Gini (sample)
Ypc

What is puzzling from the long term evidence on income concentration is the fact that inequality increased almost independently from macroeconomic conditions and economic policies. Both the 1960s and the 1970s were characterized, as a whole, as periods of growth and high employment. Compared to them, the dismal experience of the 1980s stands in sharp contrast. Changes in inequality, however, have been of approximately the same magnitude in the 1970s and in the 1980s - at least as far as end-point data are concerned.

In this context, it is worth pointing out that the observed long term increase in concentration took place amidst an environment of educational expansion. The question that naturally comes to mind is how to reconcile this long term evidence regarding inequality change with the substantive schooling upgrade of the labor force. The explanation offered by human capital theorists for income concentration in the 1960s - that economic and technological development shifted the demand for skilled labor upwards - does not seem to apply to the 1980s when the country barely grew at all. Before exploring this point in more detail we turn next to a theoretical digression and show how different ideas have been used to explain the pattern of inequality in Brazil.

3. ALTERNATIVE EXPLANATIONS OF CHANGES IN THE SIZE DISTRIBUTION OF INCOME

There are, on theoretical grounds, two main groups of ideas that have been used to analyze the size distribution of income.[11] On the one hand one finds theories that relate individual incomes to characteristics reflecting individual abilities of agents following rational choices. The theory of human capital, emphasising the role of educational variables in explaining inequality, is the most widely accepted one in this group. Agents allocate their time to education based on individual preferences and returns associated with different educational levels attained so as to maximize the present value of their well being over the life cycle. Therefore, in a society characterized by equal opportunities of access to education and perfect information, income inequality essentially reflects individual choices and preferences of economic agents as well as the stage in thei life cycle.[12] Recognizing the existence of imperfections that may prevent individuals from following their market oriented rational choices, economic policy could and should promote equal access to education as a way of ameliorating the gap between the desired and actual distributions of education and, indirectly, of income. Moreover, expanding education may contribute to reduce inequality

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[11]See Ramos and Reis [1991] for a comprehensive survey. We neglect here the stochastic theories of income distribution.

[12]Important qualifications emphasized by the theory but neglected in empirical applications are variables related to family background and innate abilities of individuals. Most empirical studies also neglect the role of family wealth and do not consider the direction of causality between income and education.

as eventual unbalances between supply and demand are eliminated and quasi-rents associated with previous scarcity of qualified labor disappear.

The applicability of these theories to the experience of developing and underdeveloped countries is handicapped by the fact that these countries lack many institutions and environments found in the developed world. Thus, for instance, LDCs are conspicuously known by the existence of imperfect or incomplete markets, difficulties of access to information, high degree of monopolist/oligopolist behavior in many markets, imperfect communication among economic agents, sectors and regions and so on. The non-restrict applicability of models based on optimizing behavior by rational profit-seeking agents operating in competitive product and labor markets results, therefore, in a piece of fiction in many LDCs.

On the other hand there is a set of models that aims at explaining the size distribution of income by exploring the ideas of:

(i) segmentation and other market imperfections (theories of "internal labor markets", dualism in the labor market and job competition). In the former case, sector specific and regional variables have a say in explaining inequality - besides education itself - as the costs of labor turnover and the bargaining power of organized labor tend to influence the functional progression of workers. In the latter, wages are determined by characteristics of jobs: the marginal product of labor is not only determined by the degree of human capital previously attained but also by factors specific to the occupations themselves.

(ii) institutional factors, such as the approaches which emphasize the role of the minimum wage and economic policies in determining the wage structure and, therefore, the distribution of income. The influence of the minimum wage in explaining the pattern of inequality, in particular, has been object of dispute in the Brazilian debate.[13] Its importance arises from the fact that it can be seen either as a determinant of the wage structure (the so-called "efeito farol") or as a crucial instrument in protecting lower income earners.[14]

Many of the ideas in this second group have not been adequately formalized and integrated in analytical frameworks that could be used to model changes in the income profile, like optimizing models of imperfect information. The fact that the analyses here have been ad hoc does not imply that they are less relevant, though.

In a sense, the so-called Brazilian debate on income distribution reproduced these competing sets of ideas in their effort at explaining the increase in inequality observed

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[13]See Macedo [1980,1981], Souza and Baltar [1979] and [1980], Wells and Drobny [1982], Velloso [1988] and Reis [1989].

[14]In this respect, one would expect that the acceleration of inflation in the 1980s, particularly in its last half, would result in lower levels of income for those near the minimum and for unprotected earnings than for higher income social groups. The evidence to be presented below is not incompatible with such a view.

between 1960 and 1970. On the one hand we find variants of a human capital interpretation which attributed the change to two basic sets of factors:[15]

(i) classic changes in the distribution of income related to any process of economic development in a capitalist setting, such as the one experienced in Brazil - a Kuznets-type explanation based on compositional changes in the labor force;

(ii) temporary labor market disequilibria associated with a differentiated expansion of qualified labor demands facing short term inelastic supplies.

The analysis pointed to the conclusion that the observed increase of inequality was not only temporary but also inevitable and self-correcting in a growing economy. The appropriate expansion of the educational system and growth of supply of qualified (educated) labor would eventually eliminate the quasi-rents appropriated by the workers with more years of formal schooling, which constituted the basic source of the increase in inequality.[16]

Seeing from the vantage point of the early 1990s the hypothesis of labor market disequilibria due to differentiated labor demands according to education does not seem sufficient to explain why inequality did not decrease - i.e., why the education effect was not transitory, as predicted by the human capital theory. Of particular interest is the issue of how to reconcile this long term evidence on inequality with the huge increase of school enrollment at the university level observed since the late 1960s: given the reduction of growth rates experienced by the Brazilian economy, it is difficult to explain the increase in the rates of return to education in more recent years (Barros and Reis [1991], Ramos e Trindade [1991], Leal and Werlang [1991], Barros and Ramos [1992]).[17]

Competing views disputed the conclusions reached by the proponents of the human capital model and emphasized the effects of economic policies. Of particular importance were: the role played by wage policies under inflationary conditions and the non-neutrality of other economic policies adopted in the mid-1960s, importance of managerial wages and profits of firms, factors related to the cyclical evolution of manufacturing output and variables associated with the functioning of imperfect markets. As an alternative explanation, the critics identified the distribution between wages and profits (or other incomes) and the segmentation of labor markets as central variables.[18]

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[15]See Langoni [1973], Senna [1976], Castello Branco [1979].

[16]Thus, Langoni [1973], for instance, using the variance of logs as a measure of inequality, showed that 35% of the variation in inequality between 1960 and 1970 was due to changes in the educational composition of the labor force, 23% was due to changes in mean incomes of educational groups, and the remaining 42% to increased inequality within each educational group.

[17]See, however, the works by Lam and Levinson ([1990.a] and [1990.b]), who identified in cross section analyses a decrease in the returns to education for the younger cohorts.

[18]See, among others, Hoffman and Duarte [1972], Fishlow [1972,1973], Malan and Wells [1973] and Bacha and Taylor [1978].

Since an individual's income is the outcome of a complex process largely determined by his/her initial endowment of wealth, preferences and investment decisions taken over his/her life cycle as well as societal characteristics, a theory that fails to take into account any of these can provide at most a partial explanation of inequality levels and changes. Thus, by neglecting the importance of intergenerational transmissions of wealth the many existing theories leave unexplained one of the major sources of changes in income inequality.

Despite the wide variety of alternative explanations and qualifications, however, the role of specific characteristics of the labor force kept being recognized as of extreme importance. Given the strong empirical evidence which emphasizes the role of education, the theory of human capital continued to be adopted at least as an organizing device upon which subsequent researchers would build their models. Before turning to a more detailed exploration of these issues, however, we present some evidence on the relationship between inequality and economic performance in Brazil since the mid-1970s.

4. INEQUALITY AND ECONOMIC PERFORMANCE: THE RECORD SINCE THE MID-1970s.

The next table shows a set of inequality measures derived from the PNAD surveys from 1976 to 1990 for the EAP with positive earnings as well as for a sample of 18-65 year old urban males.[19]

From these results we conclude that: first, there is a clear downward trend from the beginning of the series to 1981; second, the movement is upward from 1981 to 1985, with the exception of 1984; third, the trend after 1986 is clearly increasing up to 1989; fourth, inequality unambiguously increased since the beginning of the 1980s as the accumulated Lorenz curve in 1990 is dominated by the 1981 curve;[20] fifth, the fact that the R 1/40 index varies so much suggestsy that we should look for changes occurring within the very extremes of the distribution in order to understand changes in the whole profile.[21]

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[19]See Appendix 2 for a brief description of this data set.

[20]See IBGE [1992].

[21]The R 1/40 index is a very sensitive indicator of income inequality that considers only the extremes of the distribution, but conforms to the pattern exhibited by both the Gini and Theil indices. Changes are much more visible, though. Its interpretation is very simple: a R 1/40 equal to one means that the average income of the individuals in the top 1% of the income profile is 40 times the average income of those located in the bottom 40%. Thus, one individual located in the lowest 40% of the distribution in 1990 would have to wait 80 months (6 years and 8 months) before accumulating an average income equal to the monthly average income of someone in the top 1%.

Table 2: The Evolution of Inequality (various indices) 1976-1990

Year	Gini (sample)	Gini (EAP)	Theil T (sample)	Theil L (sample)	R1/40 (sample)	R1/40 (EAP)
1976	0.564	0.607	0.709	0.556	1.394	
1977	0.543	(0.594)	0.607	0.511	1.054	
1978	0.531	(0.581)	0.571	0.488	0.966	
1979	0.530	0.580	0.560	0.486	0.957	1.453
1981	0.514	0.568	0.513	0.457	0.817	1.309
1982	0.520	(0.577)	0.527	0.465	0.832	
1983	0.534	0.592	0.565	0.496	1.000	1.549
1984	0.536	0.587	0.558	0.498	0.967	1.454
1985	0.545	0.599	0.584	0.521	1.047	1.628
1986		0.588				1.606
1987		0.595				1.662
1988		0.612				1.768
1989		0.635				2.318
1990		0.615				2.012

Sources: Gini, Theil T and Theil L from Ramos [1990]; Gini (EAP) from Bonelli and Sedlacek [1989,1991] up to 1989 and authors' estimate for 1990; R 1/40 is the ratio of income accrued by the top 1% divided by the share of the lowest 40%.

Concomitant with changes in inequality, the period since the mid-1970s also witnessed substantial variation in economic policy and performance. Are these movements related? One central question is whether or not short run output expansion contributes to reduce inequality. The literature on "labor hoarding" suggests that more skilled workers are more difficult to replace as a result of increasingly specific needs of firms, which leads to higher training costs. These expenditures act like quasi-fixed costs driving a wedge between wages and marginal product values - the higher the skills, the higher the quasi-fixed costs. This approach indicates that the lowest paid unqualified workers experience the largest wage cuts or unemployment in the downturn of economic activity, contributing to deteriorate the distribution of earnings. As economic activity recovers inequality should go down.[22]

To what extent do the pronounced changes in economic performance observed in Brazil since the mid-1970s conform to such a pattern? Or, in other words, is there a conflict between growth and distributive targets in the time span here considered? In addition to

[22]See Ramos [1990] for a discussion and references. An important qualification is that this hypothesis only applies to slowdowns that are not regarded as permanent: the rationale for not firing workers during down swings rests on the expectation that economic activity will soon pick up again.

that, can the macroeconomic policies adopted in Brazil during most of the 1980s be blamed for the observed deterioration of the income profile?

Obviously, we do not intend to provide definite and complete answers to these questions in the present context.[23] However, the evidence at hand is suggestive of positive answers to the first and third questions above - and a negative one for the second.

In order to explore these issues the following table and the accompanying figure show an indicator of economic performance (the index of per capita GDP) and the sign of yearly variations in the Gini coefficient[24] and per capita GDP. The table also shows the inflation rate for the month in which the PNAD survey was conducted.

The inspection of both the table and the figure suggest that changes in the last two columns are inversely related for most of the period, but particularly so up to 1986. Results after 1985-86 do not seem to conform to such a pattern. This coincides with the phase of increasing inflation towards hyperinflationary levels and the accompanying series of stabilization programs and "shocks" which characterized the second half of the 1980s. Thus, in 1987, for instance, one of the results of the so-called Bresser Stabilization Plan was the imposition of generalized losses upon wage earners, thereby contributing to an increase in inequality.

The results for 1989 - increased inequality coupled with growth, albeit small - are surprising.One of the features of the income data in 1989 is a (still unexplained) substantial increase in the average incomes for all income groups.[25] This comes as an unexpected result if one takes into account that monthly inflation rates were reaching all-time highs at the time, under conditions of nearly perfect indexation of wages and, especially, other incomes. The fact that inequality increased so much after 1988 suggests that individuals at the top of the income profile have been more capable of defending their earnings (through daily indexation, for example) than those at the bottom.

The relationship between inflation and inequality constitutes a very polemic issue that goes beyond the scope of the present work. Our purpose here is only to investigate for the existence of association between the relevant variables. What is apparent from the data is a change in the pattern of association between inequality and growth after 1986 - not coincidentally, when inflation rates began to soar.[26]

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[23]For lack of an adequate indicator we did not control for the intensity of labor union activity in the period analyzed. It is recognized that this is an important factor in influencing labor earnings, particularly since the mid-1970s.

[24]The change in the G series used in the Table comes from the second column in Table 2.

[25]See, for instance, Bonelli and Sedlacek [1991], Post-scriptum.

[26]The indication that the acceleration of inflation after 1986 may have altered the pattern of inequality change is reinforced by a simple exercise. The coefficient of correlation between monthly inflation rates and inequality indices (Gini) changes substantially when the last three years of the 1980s are included in the analysis: for

Table 3: GDP per capita, Monthly Inflation and Direction of Changes in the Inequality Index and in the GDP per capita series (1976-1990)

Year	GDP per capita [Y]	Inflation[%]	dG	dY
1976	85.4	2.9	n.a.	+
1977	87.5	2.8	-	+
1978	89.7	2.8	-	+
1979	93.6	5.1	-	+
1981	93.5	4.6	n.a.	-
1982	91.9	4.6	+	-
1983	86.8	11.3	+	-
1984	89.4	11.1	-	+
1985	94.4	10.1	+	+
1986	99.4	1.2	-	+
1987	100.9	7.2	+	+
1988	98.7	20.9	+	-
1989	99.9	36.3	+	+
1990	93.9	14.3	-	-

Sources: [Y] from IBGE - National Accounts (index number 1980 = 100); Inflation: change in consumer price index during the PNAD reference months (see Hoffmann [1992]).

FIGURE 2

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the 1976-86 period we found Rho=-0.29 (not significant at 20%); for the 1976-89 period we found Rho=0.71 (significant at 1%).

A non-parametric test was used to test for the existence of association between the direction of changes in inequality and income per capita.[27] A sign test was applied to the series on dG and dY in Table 3 for the direction of changes in the period 1977-1990. The results show a p-value of 0.19, leading to the rejection of the hypothesis of a negative association between the direction of changes in the two series. The same test applied to the period 1977-1986, however, results in a p-value of 0.07 (total of 8 observations, 7 "right" ones), lending statistical support to the hypothesis of a negative association. The association is blurred by the acceleration of inflation after 1986, though.

Whatever the reasons for these results the evidence is that, under normal conditions, growth and economic policy seem to have worked in the short run towards reducing inequality. This implies that growth can be a weapon against inequality and poverty: not only it results in overall gains via higher incomes but it may be associated with increases in the share of income held by the poorest strata of the population. A much more difficult job is to identify the most important underlying economic forces and variables - a task to which we now turn.

5. THE EXPLANATION OF INEQUALITY CHANGE: A DECOMPOSITION EXERCISE FOR 1977-1989 AND SELECTED SUB-PERIODS.

To what extent can changes in socio-economic characteristics of the labor force associated with macroeconomic performance be responsible for the observed changes in inequality? This section considers the role of four variables (education, age, sector of activity and position in occupation)[28] in the explanation of inequality at a point in time (sub-section 5.1, static decomposition) and in the explanation of inequality change over time (5.2, dynamic decomposition).[29]

5.1. The Static Decomposition

In this exercise we used the Theil T index to decompose inequality in two parts: the inequality between the socioeconomic groups of interest and the inequality within

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[27]The analysis replicates the work of Ramos [1990] on this point.

[28]See the Appendix 1 for the definition and description of level of aggregation for each of them.

[29]See the Appendix 1. Basic data from the PNADs of 1977, 1981, 1985 and 1989 and refer to a sample of 18 to 65 year old males, working 20 or more hours/week in urban areas. Only individuals with positive labor income have been included.

them. Results for the static decomposition using the Theil T index[30] for 1977, 1981, 1985 and 1989 are shown in Table 4, where both univariate (i.e., based on partitions of the population according to the groups of a single variable) and some multivariate (i.e., based on partitions according to the combination of two or more variables) decompositions have been performed.

Education stands out, by far, as the single variable which explains most of the inequality in each year, with an explanatory power ranging from 29% to 36% of total inequality. Position in occupation (the division of the labor force in employers, employees and self-employed) comes next (9 to 13%), followed closely by age. The variable "sector of activity" presents the lowest contributions, around 5%. The picture does not change when the marginal contribution of each variable to the overall inequality is considered, except by the fact that now age and position in occupation are at nearly the same level. Note that, when taken together, the four variables considered in the analysis explain over 50 % of the overall labor earnings inequality, as measured by the Theil T index.

Table 4: Explanatory Power in the Static Decomposition (% of T)

Variable	S77	M77	S81	M81	S85	M85	S89	M89
EDUC	31.6	27.0	36.2	19.5	34.2	27.2	29.4	23.7
AGE	8.2	8.6	8.8	8.8	9.3	9.0	8.3	7.5
POS	11.2	8.6	8.7	6.2	10.5	7.2	13.2	9.5
SET	5.0	4.3	7.4	5.1	6.3	3.9	4.9	4.5
EDUC+AGE	42.4		47.0		45.3		38.2	
EDUC+POS	42.2		42.6		42.7		40.3	
AGE+POS	17.0		16.3		18.2		19.4	
EDUC+AGE+POS	49.8		51.5		51.3		46.6	
EDUC+AGE+SET	45.4		50.4		48.0		41.6	
EDUC+POS+SET	45.5		46.6		46.2		43.6	
AGE+POS+SET	27.1		26.9		28.0		27.4	
EDUC+AGE+POS+SET	54.1		56.4		55.2		51.1	

EDUC:education; POS:position in occupation; SET:sector of activity.
St: gross explanatory power for year t.
Mt: marginal explanatory power for year t.

[30] T = Sum [1,n](a[i]b[i]log a[i]) = Sum [1,G](a[g]b[g]log a[g]) + Sum [1,G](a[g]b[g]T[g])
where T[g] is the Theil T calculated for group g, a[g] is the ratio between the average income of the g-th group and the mean income and b[g] is the share of the population in group g. See Ramos [1990].

The importance of education confirms results from previous studies.[31] Income (i.e., wage) inequality would be substantially reduced - in an amount between one third and one half - if the educational differentials were narrowed or, in the limit, eliminated. This finding stresses the importance and the potential role of policies focused on the improvement of the educational profile of the labor force in reducing inequality in Brazil.

5.2. The Dynamic Decomposition

The dynamic decomposition identifies changes in the composition and income profiles related to socioeconomic variables that can be associated with observed changes in the level of inequality.[32] The exercise was carried out for three time periods selected with the objective of taking into account both the overall economic performance and the behavior of inequality, as well as the whole 1977-1989 period: the first one (1977-1981) is characterized by a reduction of inequality and high annual growth rates of income during most of the period;[33] the second period (1981-1985) is marked by increasing income inequality and a recessive economic environment during most of the time (income per capita grew a meager 1% using end-point data, concentrated in 1984-85); the third period, from 1985 to 1989, witnessed a further deterioration of the distribution under a somewhat chaotic economic scenario, marked by the alternation of threats of hyperinflation and price freezes that affected the normal working conditions of the economy (income per capita, however, grew 5.8%).

Two observations clearly stand out from Table 5 when the complete model (with the four variables) is considered. First, nearly half (ranging from 42% to 52%) of the observed variation in the distribution of labor earnings can be traced back to changes in the composition of the urban male labor force according to education, age, sector of activity and position in occupation, together with changes in the groups income

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[31]See, for instance, Langoni [1973], Wajnman [1989], Ramos [1990] and Barros and Reis [1991]. Whatever the methodology used, or the period analyzed, a common feature of all these studies is the importance of educational attainment in explaining the observed pattern of income distribution.

[32]The Theil T allow us to decompose the change in inequality between two points of time in three parts that can be attributed to: (i) modifications in the groups relative sizes; (ii) changes in the socioeconomic groups relative incomes ; (iii) internal dispersions. In the Appendix 1, the composition or allocation effect corresponds to the variation induced in the inequality index I by modifications in the allocation of the population among groups (i.e., changes in the b's), with no direct changes in the group relative incomes (a's) . The income effect corresponds to the change in I induced by changes in group incomes (a's) without changing the group population shares (b's); the internal effect is the change in the inequality index caused only by changes in the group-level dispersions (the I's).

[33]Income per capita grew 6.9% between 1977 and 1981. Since 1981 was a year of domestic recession, a better choice of period would be 1976-80. Comparable data, however, is not available for this period.

differentials (see Appendix 2). Second, the allocation effect is irrelevant for the first two time periods, and of little importance both from 1985 to 1989 and for the whole 1977-1989 period. In all cases it is completely dominated by the income effect.

Table 5: Results of the Dynamic Decomposition
(% of variation in T)

Period and Variable	Alloc Effect	Income Effect	Gross Contrib.	M4
1977-81				
EDUC	-7.0	13.2	6.2	18.6
AGE	1.2	6.0	7.2	7.4
POS	-4.4	28.6	24.2	17.8
SET	8.2	-7.1	1.1	1.7
All Variables	-0.3	48.5	48.2	-
1981-85				
EDUC	3.9	16.6	20.5	13.4
AGE	-2.9	20.0	17.1	0.3
POS	-0.3	21.8	21.5	16.2
SET	3.4	2.0	5.4	-1.7
All Variables	-1.5	53.8	52.3	-
1985-89				
EDUC	-0.7	10.0	9.3	12.9
AGE	1.2	8.3	9.5	1.3
POS	9.6	13.4	23.0	18.8
SET	-1.4	4.2	2.8	6.3
All Variables	8.0	34.2	42.2	-
1977-89				
EDUC	3.6	11.4	15.0	10.8
AGE	-2.2	16.4	14.2	-1.2
POS	5.8	19.7	25.5	20.2
SET	-6.8	9.5	2.7	6.8
All Variables	5.9	38.1	44.0	-

Notes: M4 - Marginal contribution of each variable in the four-variable model; the Theil-T index decreased in the first period and increased in the remaining ones.

When the whole period is taken into account the four variables explain 44% of the total change in the distribution of earnings - the remaining 56% being due to changes within the groups formed by the variables considered. Of these 44% nearly 38% can be traced back to changes in the average incomes of the groups. Only 6% can be attributed to the allocation effect.

The importance of this second point is related to a possible Kuznetsian characterization of changes in the distribution of earnings in Brazil - a relevant aspect in the debate on the distribution of income that took place in the mid-1970s. According to the Kuznets-type models the allocation effect should be of considerable magnitude and at least more important than the income effect. This is clearly not the case since the late 1970s.

The evidence against an explanation à la Kuznets is reinforced by the analysis at sector level. The sector composition of the labor force is very stable over the time span of 12 years (see Appendix 2). Thus, it comes as no surprise that the allocation effect associated with sector-specific activity shown in Table 5 is very small. Moreover, its overall explanatory power is barely positive either in gross or in marginal terms.

The statistics by age group shown in the Appendix 2 reveal that the proportion of prime-age workers in the labor force increased slightly between 1977 and 1989. The share of younger workers went down and the share of older ones remained stable. At the same time there was a substantial increase in the wages of all age groups relative to the youngest ones. As a consequence, the overall allocation effect was negative, although small, and the income effect was positive. It is interesting to notice that all the explanatory power of the variable "age" disappears when the joint effects of education, sector allocation and employment are considered. Its marginal contribution is negligible, and even negative, meaning that changes in the age profile of the labor force not related to these variables were not relevant as far as distributional changes are concerned.

Changes associated with the variable "position in occupation" account for one-fourth of the variation in the Theil-T index over the 12-year period. Changes related to this variable outweigh changes due to education both in terms of distribution and relative income. The respective contribution is the highest one for all sub-periods analyzed. Position in occupation is a variable closely related to the structure of employment and can be regarded as a proxy for the degree of control over capital. Although its interpretation is not straightforward, the magnitude of the explanatory power of the variable points to the relevance of movements in the structure of employment. It also points to differences in the process of formation of earnings within the category as being relevant in understanding the mechanisms at work in the generation of changes in inequality.

In his seminal work for the 1960s Langoni [1973] put considerable emphasis on the role of education in the explanation of inequality change from 1960 to 1970. He observed that, despite an increase in the average level of schooling, the distribution of education became less egalitarian due to the marked expansion of universities relative to primary and intermediate schools. As this was not followed by narrowing income

differentials, there was a natural deterioration of the distribution of earnings. According to his interpretation the increased concentration should be viewed as a "self-correcting" problem: further increases in per capita income would eventually move the country away from the ascending part of the Kuznets curve and an additional educational upgrade would eventually lead to an improved distribution.

The results presented above are somewhat surprising in the sense that they reveal that schooling looses a good deal of its explanatory power both when compared to the static decomposition and with Langoni's results for the 1960s. When education was considered alone, changes related to allocation and differentials were responsible for 6.2% of the variation in total inequality between 1977 and 1981, 20.5% between 1981 and 1985, and 9.3% from 1985 to 1989. During 1977-1989 it accounted for 15%. Alternatively, in the four-variable model education had a marginal explanatory power ranging from 12.9% in the last period to 18.6 % in the first one - the average for 1977-1989 being 10.8%.

Looking at the results for 1977-81, however, the conclusion seems to be in line with Langoni's predictions. The conjunction of educational upgrade and economic growth resulted in declining inequality. Things start to get less clear in the 1980s - i.e., after 1981. The first half of the decade witnessed further improvements in the level of educational attainment of the labor force - but now in a context of virtual economic stagnation. In 1981-85 there was a widening of the income differentials related to education that heavily contributed to a deterioration in the degree of earnings inequality.[34] In the second half of the 1980s one finds a further widening of the income differentials in the presence of educational expansion, rising inequality, inflationary pressures and spasmodic income growth. It seems safe to conclude that, under these circumstances, the contribution of education to the distribution of income was mainly through offering a better access to mechanisms of protection against inflation.

When the whole period is considered one finds evidence of a substantial upgrade in the educational level of the labor force. The share of workers with less than intermediate schooling went down from 59% to 44% and the share of those that at least started attending high school increased from 19% to 29% (see Appendix 2). The combination of educational improvement modest growth (GDP per capita increased a meager 7%) and rising inequality replicates in a smaller scale the experience of the 1960s - but this time we do not find support for the interpretation that unbalances were self-correcting. In addition, education is not anymore the driving force behind changes in inequality and the allocation effect is of little importance.

We conclude that the level, distribution and returns to education have changed continuously in Brazil since the mid-1970s. The changes seem to be related to the evolution of inequality, but there is no consistent or systematic way by which education has affected the dynamics of income distribution.

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[34]There is some evidence (Ramos [1990]) that the labor hoarding hypotheses may provide a plausible explanation for this behavior.

6. FINAL COMMENTS: ECONOMIC POLICY, ECONOMIC PERFORMANCE AND THE EXPLANATION OF INCOME INEQUALITY.

The first, and perhaps more important, finding is the evidence of an almost continuous deterioration of the income distribution in the three decades for which data is available. Changes over the 1980s seem to have been on the same order of magnitude than changes in the 1970s. Nothing compares to changes observed in the 1960s, though. It is worth noting that this long term trend does not seem to be affected by changes in economic performance in the three decades analyzed.

In terms of income gains, however, the picture is somewhat different, as revealed by the generalized Lorenz curves: all income strata experienced income growth both in the 1960s and in the 1970s - although the gains for the richest individuals were highest in both decades. Over the 1980s, however, only the top percentile experienced income gains.

Short term trends, on the other hand, are associated with economic performance - at least, as far as the evidence from yearly household surveys indicates. There is evidence, based on such data, pointing to a negative relationship between changes in inequality and economic growth as measured by variations in per capita GDP. Therefore, there seems to be no conflict in the short run between the objectives of growth and equity. The persistence of high inflation in the second half of the 1980s blurs the relationship. In particular, we found evidence of a positive association between inequality and inflation.

The importance of the educational variable is highlighted in all decompositions performed - but particularly so in the static decomposition. When interpreting changes in inequality over time the role of education looses a lot of its explanatory power. In particular, the evidence from 1977 to 1989 reveals that the variable position in occupation is more important than education in accounting for changes in inequality. This provides an indication that changes in the structure of employment since the mid-1970s played a decisive role in influencing inequality, thereby deserving more attention.

The income effect is by far more relevant than the allocation effect for all variables considered in the dynamic decomposition: this means that changes in the income profiles are the driving mechanism behind inequality changes in all sub-periods examined, as well as in the whole 1977-1989 period. Reallocation of the labor force among the socio-economic groups - a factor of considerable importance in explaining income inequality changes in the 1960s - looses nearly all its explanatory power when the experience of the more recent years is analyzed. Therefore, a Kuznetsian characterization of the dynamics of income distribution in Brazil is not confirmed by the data since the mid-1970s.

The evidence against an explanation à la Kuznets is reinforced by the analysis at sector level, which shows that the sector composition of the labor force is very stable over the time span of 12 years since 1977. This explains why the allocation effect associated with sector-specific activity is small. In addition, its overall explanatory power is barely positive either in gross or in marginal terms.

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APPENDIX 1: A Note on the Methodology of decomposition

Assuming a partition of the population in G groups, a measure of inequality I is said to be decomposable when it can be written as: I= I(a[g],b[g],I[g]) = IB(a[g],b[g]) + Sum w(a[g],b[g])*I[g] (1) where a[g] is the ratio between the average income of the g-th group and the overall average income, b[g] is the proportion of the population in group g, and I[g] is its internal dispersion as measured by I. In the right side term, IB is the between groups inequality (i.e., the one that would prevail after a redistribution in the interior of each group, in such a way that all of its individuals would end up with the same income, with no change in the group average income), and the sum corresponds to IW, the within groups inequality (i.e., the remaining level of inequality after a redistribution that would equalize the average incomes of all G groups without changing their internal dispersion). Thus, if the population is classified according to, for instance, educational groups, the contribution of this stratification to the "explanation" of inequality can be measured by I , as this would be the reduction in inequality in the case the income differentials associated with education were eliminated (I , accordingly, reflects the inequality that is not related to education in this case).

APPENDIX 2: Data Base, Sample Selection and Aggregation.

Brazilian data on personal and family incomes are of unusually good quality. Household surveys conducted by IBGE, the Pesquisas Nacionais de Amostra de Domicílios (PNADs), have been applied yearly since the late sixties, with the exception of the Census years. The PNADs were initially implemented upon request of the United States Agency for International Development (USAID), in order to create a system of population statistics comparable to the ones existing in other countries as well as to provide information similar to that made available by the censuses in a more frequent basis.

The survey has passed through several changes since its inception, both in terms of geographical and informational range, but has essentially kept its present form since 1976. Some work aiming at "conformation" has to be done at times since then, but it can safely be stated that the data allows for consistent and comparable analyses of the Brazilian income distribution.

The surveys are rich in information on individual and family profiles and are aimed at making it feasible to trace back the social-economic development of the country. They have information on labor and total income, education, age distribution, gender, sectoral and regional allocation, activities, position in occupation, hours of work, unemployment, and many other variables of economic interest.

Sample Selection: In order to minimize problems involving self selection, temporal heterogeneity of the survey coverage and peculiarities in the process of earnings formation, the universe of analysis of the present study was limited to individuals: (i) participating of the labor force; (ii) not unemployed;(iii) males; (iv) between 18 and 65 years old; (v) working more than 20 hours per week; (vi) living in urban areas; (vii) having the attributes of interest clearly identified.

Aggregation: The evolution of the sample size is presented in Table A.1. The individuals in the sample were aggregated according to their educational level in the following categories: (1) illiterates - less than one year of schooling; (2) elementary school - 1 to 4 years of schooling; (3) intermediate school - 5 to 8 years of schooling; (4) high school - 9 to 11 years of schooling; (5) college education - 12 or more years of schooling. Concerning age the labor force was grouped according to five categories: (1) 18 to 24 years old; (2) 25 to 34 years old; (3) 35 to 44 years old; (4) 45 to 54 years old; (5) 55 to 65 years old. The classification according to sector of activity led to nine categories: (1) heavy industry, (2) light industry, (3) civil construction, (4) trade, (5) credit, (6) transports, (7) services, (8) public administration and (9) agriculture. Concerning position in occupation, an individual can be classified as an (1) employee, (2) self employer or (3) employer.

Table A.1
Sample Size by Year

Year	Sample Size
1976	56145
1977	70671
1978	77687
1979	64020
1981	74622
1982	80227
1983	79806
1984	80773
1985	84570
1986	43309
1987	45253
1988	44792
1989	46365
1990	47023

APPENDIX 2 : GENERAL STATISTICS

Table A2.1: Basic Statistics By Variable

		77			81			85			89		
Var	Cat	a	b	T	a	b	T	a	b	T	a	b	T
	1	0.41	0.13	0.35	0.43	0.12	0.30	0.39	0.11	0.30	0.36	0.10	0.51
	2	0.71	0.46	0.43	0.69	0.42	0.31	0.66	0.37	0.40	0.63	0.34	0.55
EDUC	3	0.91	0.23	0.44	0.86	0.23	0.36	0.80	0.26	0.43	0.74	0.27	0.53
	4	1.48	0.11	0.48	1.33	0.14	0.39	1.27	0.16	0.42	1.23	0.18	0.54
	5	3.36	0.08	0.35	3.15	0.09	0.29	3.08	0.10	0.33	3.08	0.11	0.46
	1	0.51	0.25	0.31	0.52	0.24	0.28	0.48	0.23	0.32	0.46	0.23	0.43
	2	1.06	0.31	0.52	1.05	0.32	0.40	1.01	0.33	0.45	0.97	0.32	0.58
AGE	3	1.21	0.22	0.55	1.25	0.23	0.50	1.33	0.23	0.57	1.31	0.24	0.65
	4	1.30	0.15	0.69	1.25	0.15	0.58	1.25	0.14	0.64	1.36	0.15	0.86
	5	1.15	0.07	0.79	1.04	0.07	0.68	1.05	0.07	0.77	1.08	0.07	0.95
	1	0.86	0.75	0.53	0.94	0.74	0.49	0.90	0.74	0.54	0.83	0.74	0.63
POS	2	1.04	0.20	0.54	0.85	0.21	0.42	0.91	0.20	0.52	0.95	0.20	0.59
	3	2.96	0.05	0.56	2.45	0.05	0.41	2.78	0.05	0.45	2.95	0.07	0.67
	1	1.11	0.14	0.49	1.28	0.14	0.40	1.19	0.13	0.50	1.09	0.14	0.54
	2	0.81	0.09	0.56	0.83	0.09	0.46	0.79	0.09	0.51	0.76	0.09	0.74
	3	0.67	0.15	0.46	0.61	0.15	0.40	0.55	0.12	0.49	0.57	0.12	0.58
	4	1.05	0.14	0.56	0.91	0.14	0.45	0.97	0.17	0.60	1.08	0.16	0.88
SET	5	1.89	0.03	0.45	2.02	0.03	0.40	1.89	0.04	0.42	2.14	0.03	0.43
	6	0.96	0.80	0.47	0.98	0.08	0.38	1.02	0.08	0.39	0.99	0.07	0.55
	7	1.13	0.16	0.56	1.12	0.18	0.56	1.06	0.19	0.63	1.12	0.21	0.77
	8	1.28	0.11	0.59	1.18	0.11	0.48	1.25	0.12	0.55	1.06	0.11	0.61
	9	0.74	0.10	1.14	0.73	0.08	0.78	0.76	0.09	0.83	0.79	0.07	1.02

a: relative average income; b: population share; T: internal inequality.
*: categories are defined in Appendix 1.