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Income Distribution in Brazil: an Evaluation of Long-Term Trends and Changes in Inequality since the Mid-1970s*

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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 to clarify the relevant issues involved.

Brazil represents, in this respect, a useful case study as it provides evidence of very pronounced changes in inequality and economic performance over a short time period. Prior to the late 1960s, however, lack of adequate data made it difficult to meet the challenge of explanaining one of the most extremely concentrated income profiles in the contemporary world. From then on 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 socioeconomic variables in explaining inequality.[1] Besides being preoccupied with the explanation of changes in inequality, many of these studies also share a concern for linking the observed

Longitudinal analyses have not yet 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).

record with economic policy and performance [see Bonelli and Sedlacek (1989 and 1991), Ramos (1990) and Barros *et alii* (1992)].

This paper is a contribution in the same direction. Its objectives are 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 — how economic policies and macroeconomic performance contributed to the observed record. The remaining of the text is organized as follows. Section 1.1 presents, as a background, a brief survey of long-term trends in inequality in Brazil. Section 1.2 presents results on income inequality since the mid-1970s and explores possible links between inequality and economic policies and performance. Section 1.3 briefly discusses the main features of a few models on income distribution found in the literature and how they have been used to interpret the Brazilian record. Section 1.4 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.

1.1 - Long-Term Trends in Inequality

Well-founded empirical research on income distribution in Brazil began only in the late 1960s,[2] stimulated by the data from the 1960 Demographic Census. The comparison of the 1960 and 1970 Census results broadened the investigation of the behavior of income inequality. The discussion about possible measurement differences soon gave way to a consensus on one essential fact: Brazil had experienced a large increase in income inequality from 1960 to 1970.

The fact that all studies which dealt with the measurement of income inequality from 1960 to 1970 reached this same conclusion made it possible to shift the focus to the causes and interpretation of the phenomena behind the figures [Hoffman and Duarte (1972), Hoffman (1973), Langoni (1973) and Fishlow (1973)]. In particular, a heated debate took place soon after the 1970 Census results became available. [Bacha and Taylor (1978) and Tolipan and Tinelli (1975)], 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

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2 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 workers earning near the legal minimum wage lost purchasing power relative to workers with higher wages during the decade as a whole.

concentrated between 1970 and 1980 as well, though the changes were much less pronounced than during the previous decade.

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 in Table 1.1.

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.[3] Combining evidence from

TABLE 1.1
Selected Indicators of Income Distribution of the Economically Active Population (with non-zero Incomes)
%

DECILES	1960[a]	1970[a]	1980[a]	1979[b]	1990[b]
		Y	Y	Y	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	n.a.	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	n.a.	n.a.	n.a.
R1/40 [c]	1.048	1.460	2.068	1.453	2.012

[a]Demographic Census [1960 and 1970 from Langoni (1973) Tables 3.5 and 3.6; 1980 from Bonelli and Malan (1984)].

[b]IBGE Household Surveys (PNAD). Note that these are not directly comparable with Census results.

[c]R1/40 is the ratio of the income share of the top 1% to that of the lowest 40% of the population.

3   It should be pointed out that the increase in the Gini coefficient between 1970 and 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).

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Census and PNAD data leads to the conclusion that the worsening in the 1980s was as important as in the 1970s.[1]

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 stratum) leads to the conclusion that the pattern of the 1960s and 1970s changed in the 1980s. The upper panel in Figure 1.1 shows that all groups experienced income gains between 1960 and 1970 and, again, from 1970 to 1980. In the 1980s, however, this did not happen. The lower panel shows that although all income groups experience positive income gains from 1981 to 1986, the movement between this last year and 1990 is such that not only does one observe 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 1960s and in the 1970s, welfare gains (if one accepts income as a proxy of welfare) were widespread in both decades.[2] Over 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.

What is puzzling from the long-term evidence on income concentration is the fact that the observed 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 substantial schooling upgrade of the labor force over time. As we will see below, in Section 1.4, the explanation offered by Langoni (1973) for the 1960s does not seem to apply to the 1980s when the country barely grew at all.

1.2 - Inequality and Economic Performance: the Record since the Mid-1970s

Table 1.2 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 years old urban males (see Appendix 2). From the results

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4   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).

5   Barros and Mendonça (1992) reach the same conclusion: the increases in income were large enough to offset the deterioration of the distribution. They emphasize, however, that welfare gains and poverty reduction would have been much greater had inequality not worsened.

figure 1.1
Generalised Lorenz Curves - Census
(EAP With Positive Income)
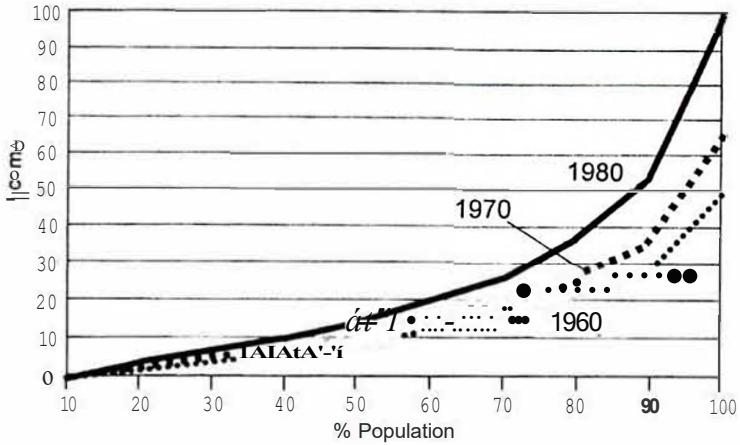
Generalised Lorenz Curves - PNADs
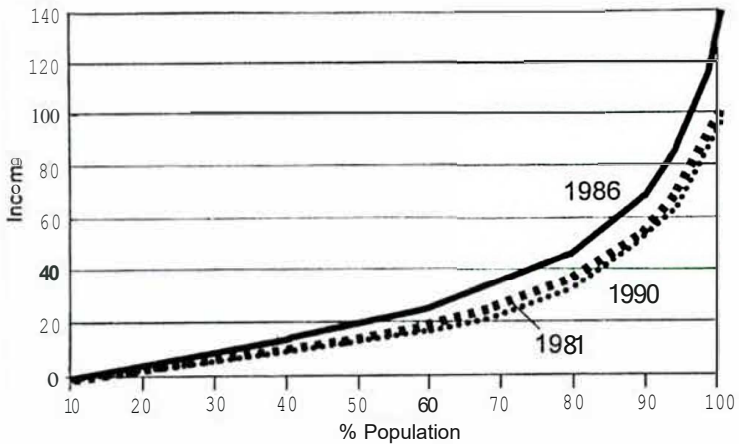(EAP With Positive Income)

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TABLE 1.2
The Evolution of Inequality (Various Indices) - 1976/90

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 and 1991) up to 1989 and author's estimate for 1990.

Note: R1/40 is the ratio of the share of income accrued by the top 1% divided by the share of the lowest 40%.

displayed there we conclude that: *a*) there is a clear downward trend from the beginning of the series to 1981; *b*) the movement is upward from 1981 to 1985, with the minor exception of 1984; *c*) the trend after 1986 is clearly increasing, up to 1989; *d*) inequality unambiguously increases since the beginning of the 1980s as the Lorenz curve in 1990 is dominated by the 1981 curve [see IBGE (1992)]; and *e*) there is a huge concentration of income in the top percentile, as revealed by the increase in R1/40 from 1.3 in 1981 to two in 1990.[6]

The period since the mid-1970s also witnessed substantial variation in economic policy and performance. An interesting point is whether or not short

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6   Its interpretation is very simple: an R1/40 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 almost seven years before accumulating an average income equal to the monthly average income of someone in the top 1%.

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run output expansion contributes to reducing inequality.[7] Do the pronounced changes in the distribution observed in Brazil since the mid-1970s conform an procyclical pattern? Or, in other words, is there a conflict between growth and distributive targets in this time span? Furthermore, 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 text.[8] 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, Table 1.3 and the accompanying Figure 1.2 show an indicator of economic performance (the index of *per*

TABLE 1.3
GDP *Per Capita*, Monthly Inflation and Direction of Changes in the Inequality Index and in the GDP *Per Capita* series - (1976/90)

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)].

7 The literature on "labor hoarding" suggests that the lowest paid unqualified workers experience the largest wage cuts or unemployment during the downturn of economic activity, contributing to a deterioration of the distribution of earnings. As economic activity recovers inequality should go down. 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.

8 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.

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Figure 1.2
Inequality and *Per Capita* Income
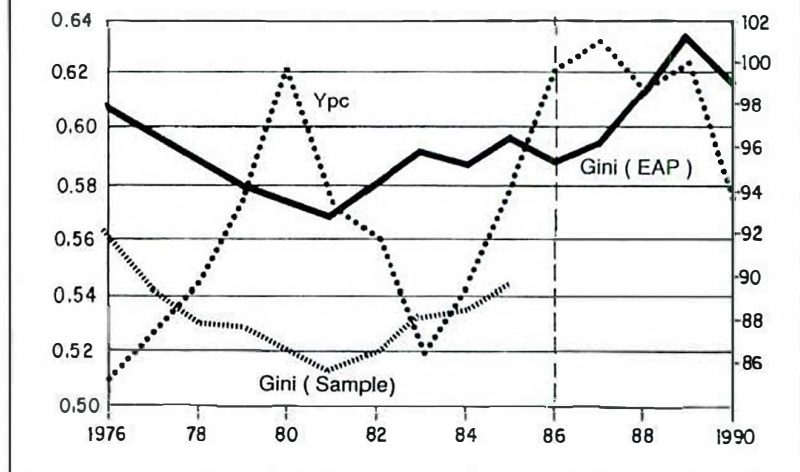
capita GDP) and the signs of yearly variations in the Gini coefficient[9] and *per capita* GDP. The table also shows the inflation rate for the month in which the PNAD survey was conducted.

An inspection of both the table and the figure suggests 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 a series of stabilization programs and "shocks" which characterized the second half of the 1980s.

The results from 1988 on suggest that those in the upper tail were able to protect their earnings more efficiently against inflation (through daily indexation) than those at the bottom of the distribution. [see Bonelli and Sedlacek (1991)]. The relationship between inflation and inequality, however, constitutes a very polemic issue that goes beyond the scope of the present paper. Our purpose here is only to search for the existence of association between the relevant variables. What is apparent from the data is a change in the pattern

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9 The change in the Gini coefficient series in Table 1.3 comes from the second column in Table 1.2.

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of association between inequality and growth after 1986 — not coincidentally, when inflation rates began to soar.[10]

A non-parametric test was used to test for the existence of association between the direction of changes in inequality and income *per capita* [Ramos (1990)]. A sign test was applied to the series on dG and dY in Table 1.3 for the direction of changes in the period 1977/90. 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 1977/86, however, results in a p-value of 0,07 (total of eight observations, seven "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 shows 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 used as a weapon against inequality and poverty: not only does it result 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 turn in Section 1.4.

1.3 - 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, emphasizing 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 access to education and perfect information, income inequality essentially reflects individual choices and preferences of economic agents, as well as the stage

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10 The idea 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 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%).

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

in their 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 reducing inequality as eventual unbalances between supply and demand are eliminated and quas-irents associated with previous scarcity of qualified labor disappear.

The applicability of these theories to the experience of developing countries is hindered by the fact that these countries lack many institutions and conditions found in the developed world: LDC are known, for instance, for the existence of imperfect or incomplete markets, difficulties of access to information, a high degree of monopolist/oligopolist behavior in many markets, imperfect communication among economic agents, sectors and regions, and so on. The application 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 LDC.

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

a) 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, besides education itself, have a say in explaining inequality, 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;

b) institutional factors, such as the approaches which emphasize the role of the minimum wage and other 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 an object of dispute in the Brazilian debate [see Macedo (1981), Marcedo and Garcia(1980), Souza and Baltar (1979 and 1980), Wells and Drobny (1982), Velloso (1988) and Reis (1989)]. 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.[13]

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12 An important qualifications emphasized by the theory but neglected in empirical applications is the inclusion of 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.

13 Many of the ideas in this second group have not been adequately formalized and integrated into 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.

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In a sense, the so-called Brazilian debate on income distribution replicated these competing sets of ideas in an effort to explain the increase in inequality observed between 1960 and 1970. On the one hand, we find variants of a human capital interpretation which attribute the change to two basic sets of factors [see Langoni (1973), Senna (1976) and Branco (1979)]:

a) 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;

b) temporary labor market disequilibria associated with a relatively large expansion of qualified labor demands and short-term inelastic supplies.

The analysis concluded that the observed increase of inequality was not only inevitable but also self-correcting in a growing economy. An 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.[14]

From the vantage point of the early 1990s, the hypothesis of labor market disequilibria due to differentiated labor demands according to educational level does not seem to explain why inequality did not decrease later. It is difficult to reconcile the continuous increase in inequality with the significant upgrade in schooling over the three decades.[15]

Competing views disputed the conclusions reached by 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 [see Hoffman and Duarte (1972), Fishlow (1972 and 1973), Malan and Wells (1973) and Bacha and Taylor (1978)].

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14 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.

15 The increase in the rates of return to education [Barros and Reis (1991), Ramos and Trindade (1991), Leal and Werlang (1991), Barros and Ramos (1992)] is particularly striking in the 1980s, given the collapse of economic rates at that time. See, however, the works by Lam and Levinson (1990a and 1990b), who identified in cross-section analyses a decrease in the returns to education for the younger cohorts.

As an individual's income is the outcome of a complex process largely determined by the initial endowment of wealth, preferences, and investment decisions taken over the 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 behavior. 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 continued to be 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.

1.4 - The Explanation of Changes in Inequality: a Decomposition Exercise

In this section we evaluate the relationship between inequality and the composition of the labor force according to socioeconomic variables, as well as between changes in inequality and changes in this composition. The exercise considers the role of four variables (education, age, sector of activity and position in occupation) in the explanation of inequality at a point in time (Subsection 1.4.1, static decomposition) and in the explanation of changes in inequality over time — Subsection 1.4.2, dynamic decomposition (see Appendix 1).

1.4.1 - The Static Decomposition

In this exercise we used the Theil T index to decompose inequality into two parts: the inequality between the socioeconomic groups of interest and the inequality within them. The Theil T can be written as:

$$T = \sum_{i=1}^{n} a_i \cdot b_i \cdot \log(a_i) = \sum_{g=1}^{G} a_g \cdot b_g \cdot \log(a_g) + \sum_{g=1}^{G} a_g \cdot b_g \cdot T_g$$

where the a's are the ratios of the average incomes of the respective groups to the overall mean income, the b's correspond to the population shares and T_g is the Theil T within group g. The first term on the right-hand side is the inequality between groups, and the second is the inequality within groups.

The results for the static decomposition applied to 1977, 1981, 1985 and 1989 are shown in Table 1.4. Both univariate (based on partitions of the population according to the groups of a single variable) and some multivariate

TABLE 1.4
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
SECT	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+SECT	45.4		50.4		48.0		41.6	
EDUC+POS+SECT	45.5		46.6		46.2		43.6	
AGE+POS+SECT	27.1		26.9		28.0		27.4	
EDUC+AGE+POS+SECT	54.1		56.4		55.2		51.1	

Note: Educ: education; Pos: position in occupation; Sect: sector of activity/St:gross explanatory power for year t.

Mt: marginal explanatory power for year t.

(based on partitions according to the combination of two or more variables) decompositions have been performed.

Education stands out clearly as the 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 into employers, employees and self-employed) comes next (9 to 13%), followed closely by age. Sector of activity presents the lowest contribution, around 5%. The picture does not change when it comes to marginal contributions, except for the fact that now age and position in occupation are at nearly the same level. Last, but not the least, note that, when taken together, the four variables considered in the analysis explain over 50% of the overall inequality.

The importance of education confirms results from previous studies.[16] Wage inequality would be substantially reduced — by one third to one half — if the educational differentials were narrowed or, in the limit, eliminated.

16 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.

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.

1.4.2 - The Dynamic Decomposition

The dynamic decomposition breaks down the *changes* in inequality into three components related to: *a*) modifications in the groups' relative sizes; *b*) changes in the groups' relative incomes; and *c*) variations in the internal dispersions.[17]

The exercise was carried out for three time periods characterized by different combinations of economic performance and behavior of inequality: the first one (1977/81) is marked by a reduction of inequality and high annual growth rates of income during most of the period;[18] the second period (1981/85) is characterized by increasing income inequality and a recessive economic environment during most of the time;[19] the third period, 1985/89, 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 functioning of the economy (income *per capita*, however, grew 5.8%).

Two observations clearly stand out from Table 1.5 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 (allocation effect), together with changes in the groups' income differentials (income effect). 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 1977/89 period. In all cases it is completely dominated by the income effect.

When the period is considered as a whole 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 this 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.

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17 See Appendix 1. The first term is denominated allocation effect, the second is the income effect, and the third is the internal effect.

18 Income *per capita* grew 6.9% between 1977 and 1981. Since 1981 was a year of domestic recession, a better choice of period would have been 1976/80. Comparable data, however, is not available for this period.

19 Income *per capita* grew a meager 1% using end-point data, concentrated in 1984/85.

TABLE 1.5
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
SECT	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
SECT	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
SECT	-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
SECT	-6.8	9.5	2.7	6.8
All variables	5.9	38.1	44.0	-

Notes: (1) M4: marginal contribution of each variable in the four-variable model.

(2) The Theil T index decreased in the first period and increased in the remaining ones.

The importance of this second point is related to a possible Kuznetsian portrayal of changes in the distribution of earnings in Brazil — a relevant aspect in the debate 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 such an interpretation is reinforced by the analysis at the sector level. The sector composition of the labor force is very stable over the time span of 12 years (see Appendix 2), and so it comes as no surprise that the allocation effect associated with sector-specific activity shown in Table 1.5 is very small. Moreover, its overall explanatory power is barely positive both in gross and 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.[20]

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, outweighing the changes due to education both in terms of distribution and relative income. Furthermore, its contribution is the highest one for all subperiods 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 each category as being relevant in understanding the mechanisms at work in the generation of changes in inequality.

The results presented in Table 1.5 are somewhat surprising in the sense that they reveal that schooling looses a good deal of its explanatory power when compared both to the static decomposition and 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 1977/89 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 1977/89 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. The picture becomes less clear in the 1980s. 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.[21] In the second

20 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.

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

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 better access to mechanisms of protection against inflation.

Considering the period as a whole, 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, and rising inequality replicates, on a smaller scale, the experience of the 1960s — but this time we do not find support for the interpretation that imbalances were self-correcting. In addition, education is no longer 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 in which education has affected the dynamics of income distribution.

1.5 - Final Comments: Economic Policy, Economic Performance and the Explanation of Income Inequality

The first important result 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 as changes in the 1970s. Nothing compares to changes observed in the 1960s, though. Moreover, this long-term trend does not seem to be affected by changes in economic performance in the three decades analyzed.

In terms of *absolute* income gains (or welfare), 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 very top percentile experienced income gains.

Short-term trends, on the other hand, are associated with economic performance. There is evidence 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.

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The educational variable is important 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. 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 indicates 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 periods examined. Reallocation of the labor force among the socioeconomic groups — a factor of considerable importance in explaining income inequality changes in the 1960s — looses nearly all its explanatory power when the experience of more recent years is analyzed. Therefore, a Kuznetsian characterization of the dynamics of income distribution in Brazil is not supported by the data since the mid-1970s.

The evidence against an explanation $à$ la Kuznets is reinforced by the analysis at the 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 in both gross and in marginal terms.

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:

$$I = I \left[a_g, b_g, I_g \right] = IB \left[a_g, b_g \right] + \sum W \left[a_g, b_g \left| x \right. I_g \right.$$

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.

On the right-hand side, IB is the between-groups inequality (*i.e.*, the one that would prevail after a redistribution within 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).

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Thus, if the population is classified according to, for instance, educational groups, the contribution of this stratification to the "explanation" of inequality — its explanatory power — can be measured by IB/I, as this would be the reduction in inequality in the case the income differentials associated with education were eliminated (the within-groups inequality, 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 por Amostra de Domicílios (PNADs), have been applied yearly since the late sixties, with the exception of the Census years. The survey has passed through several changes since its inception, in terms of both geographical and informational range, but has essentially kept its present form since 1976. Some work aiming at conformity has to be done at times, but it can safely be stated that the data allows for consistent and comparable analyses of the Brazilian income distribution.

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 for the decomposition exercise was limited to individuals: a) participating in the labor force: b) not unemployed; c) males; d) between 18 and 65 years old; e) working more than 20 hours per week; f) living in urban areas; e g) having the attributes of interest clearly identified.

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 — one to four years of schooling; (3) intermediate school — five to eight years of schooling; (4) high school — nine 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; and (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) transportation; (7) services; (8) public administration; and (9) agriculture.

Concerning position in occupation, an individual was classified as an (1) employee, (2) self employer or (3) employer.

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The table summarizes the relevant information for each of these disaggregations.

Basic Statistics by Variable

VAR.	CAT.	1977			1981			1985			1989		
		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
SECT	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 this Appendix.

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