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Pro–Poor Growth and Social Programmes in Brazil

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Abstract: From a methodological point of view, this paper makes two contributions to the literature. One contribution is the proposal of a new measure of pro-poor growth. This new measure provides the linkage between growth rates in mean income and in income inequality. In this context, growth is defined as pro-poor (or anti-poor) if there is a gain (or loss) in the growth rate due to a decrease (or increase) in inequality. The other contribution is a decomposition methodology that explores linkages between growth patterns and social policies. Through the decomposition analysis, we assess the contribution of different income sources to growth patterns. The proposed methodologies are then applied to the Brazilian National Household Survey (PNAD) covering the period 1995-2004. The paper analyzes the evolution of Brazilian social indicators based on per capita income exploring links with adverse labour market performance and social policy change, with particular emphasis on the expansion of targeted cash transfers and devising more pro-poor social security benefits.
Keywords: Inequality; Poverty; Growth; Pro-Poor Growth; Social Policy
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Resumo: Este artigo faz duas importantes contribuições metodológicas para a literatura. Uma contribuição é a proposta de uma nova medida do crescimento pró-pobre, no sentido de aumentar a ponderação daqueles com menor renda. Esta nova medida permite uma ligação direta entre as taxas de crescimento na renda média e na desigualdade de renda em termos de mudancas de bem estar. Neste contexto, o crescimento é definido como pró-pobre (ou antipobre) se existir um ganho (ou perda) na taxa de crescimento de bem estar social devido a um aumento (ou uma queda) na desigualdade. A outra contribuição é uma metodologia de decomposição da contribuição de diferentes fontes de renda do mercado de trabalho e mudanças nas políticas sociais expressas na unidade de medida que interessa, qual seja mudanças de bem estar social. As metodologias utilizadas são aplicadas a Pesquisa Nacional por Amostra de Domicílios (PNAD) analisando a evolução dos indicadores sociais brasileiros baseados na renda per capita de 1995 até 2004, explorando ligações com inovações observadas nas políticas sociais, especial ênfase na expansão de programas focalizados e condicionados de transferência de renda e do desenho de benefícios previdenciários mais voltados aos de menor renda.
Palavras-Chave: Desigualdade, Pobreza, Crescimento Pró-Pobre, Política Social
Area: Economia Social e Demografia Econômica
JEL: D31; I32; N36; O15; J21; I38

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Pro-Poor Growth and Social Programmes in Brazil[*]

I.   Introduction

The Brazilian experience has been quite peculiar in the sense that structural reforms, and in particular trade liberalization, started comparatively late, only a few years ago. Whereas other countries in Latin America started opening their economies in the early or mid-1980s, the same process started in Brazil only in the early 1990s. The same happened with inflation control: while Mexico started its stabilization process in the mid-80s and Argentina in the early 1990s, Brazil achieved successful price stabilization only after 1994.

Brazil is the country in the world that presented the highest inflation in the period 1960-1995. From at least the beginning of the 1980s, curbing inflation became the focus of public policy in Brazil. Successive macroeconomic packages and three major stabilization efforts have been attempted since then: the *Cruzado* Plan in 1986, the *Collor* Plan in 1990 and the *Real* Plan in 1994. Only the *Real* Plan was successful in bringing down and controlling inflation. The *Real* plan belongs to the 'exchange-rate based stabilization' type of plans that led to consumption booms instead of recessions but the need to support an overvalued exchange rate for stabilization purposes increased the fragility of the Brazilian economy to the waves of external shocks that hit it such as Mexican (1995), Asian (1997) and Russian (1998) crises.

The 1999 Brazilian devaluation crisis triggered important changes in the macroeconomic and social policies that can be still observed today, such as: i) the adoption of floating exchange rates; ii) the adoption of inflation targets; iii) the implementation of the Fiscal Responsibility Law binding all government levels and state enterprises alike[1] but with an increase in the size of the tax burden of about 10 percentage points of GDP from 1995 onwards, reaching around 38 percent in the end of 2005. One also has to bear in mind that there was very high real interest rates and an expansion of public expenditure that contributed to the rise in the Brazilian public debt that reached more than 50 percent of GDP and to the slow growth trend assumed.

On the social front, minimum wages rose 75 percent in real terms from the beginning of 1995 to 2004 – and 100 percent until 2006. The minimum wage is also the numéraire of several cash transfers policies indexing benefits and eligibility criteria, in particular social security benefits. In 1995, social security expenditure already accounted for 50 percent of Brazilian social expenditure and 11 percent of GDP. In 1998, there was a change in social security income policies with progressive benefits adjustments but it was not particularly noticed because it did not require any reform or constitutional change. From 2000 onwards, with the creation of the Poverty Eradication Fund, there was gradual adoption of programmes emanating from central government to municipalities which had lower Human Development Index levels. The expansion of targeted and conditional cash transfers such as the *Bolsa-Escola,* and now the *Bolsa Família,* aimed to combine compensatory and structural components. The availability and expansion of safety nets from 2001 onwards generated a pro-poor impact in many instances. The social effects of the new generation of income policies were not fully assessed because changes in social security benefit passed largely unnoticed and the diffusion of targeted cash transfers was gradual and relatively recent.

During the last 25 years, changes in social indicators based on per capita income such as inequality, poverty and social welfare have reflected the marked volatility of the Brazilian macroeconomic environment: until 1994 the source of instability was the rise and failure of successive stabilization

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[1] The *Lei de Responsabilidade Fiscal* represents a milestone in the new public finance regime at the different levels of the state. It constitutes a key element in accomplishing enduring fiscal adjustment by restricting public expenditure to the budget approved for the year in question.

attempts, while from 1995 onwards the main source of instability was the arrival (and the departure) of external crisis, but at the same time increasingly expanding and targeted cash transfers cushioned the social consequences of the high instability and low growth trends observed.

As is generally claimed, there is a strong association between growth and poverty reduction in Brazil. Whether growth translates into significant poverty reduction depends upon numerous factors such as inflation, external shocks, unemployment, minimum wages, social programmes etc. One of the most important factors influenced by all others is the degree of inequality in the country. Studies have found that poverty is more responsive to growth when the distribution of income and assets is more equal. In this context, a more equal society will grow faster. Brazil has been notoriously known as one of the countries with the highest income inequality in the world (DFID 2003, Li et al 1998, Psacharopoulos 1991). After its steep rise in the 1960s, Brazilian income inequality has been high and stable between 1970 and 2000 (Langoni 1973, Bacha and Taylor 1978, Hoffman 1989, Bonelli et al. 1989, Barros et al. 1992, Ramos 1993, Barros et al. 2000). In recent years, however, inequality has been on the decline. High inequality in the country would have prevented the economy from growing faster. It is imperative to emphasize that a combination of economic growth and income distribution would lead to a more rapid and effective solution to poverty reduction.

This paper proposes and applies to Brazil a growth and a pro-poor growth account methodology that explains how intense and regressive were the changes observed in different income sources found in the Brazilian National Household Survey (PNAD), with particular emphasis on social security benefits and conditional cash transfers. We calculate the ratio between the additional fiscal cost and the benefit in terms of pro-poor growth of expanding the main public cash transfer programmes in the period studied at. The final objective is to reveal the contribution of each income component discussed above to total per capita growth and to pro-poor growth.

We focus our empirical analysis on the period of relative price stability but frequent external crisis from 1995 to 2004, whose results – we believe - are more structural, less explored in the literature and more reliable. The deflation process of nominal incomes during a sharp inflationary transition such as those frequently observed before 1995 is rather complex and uncertain, the choice of specific price indexes and associated weights and lags involves arbitrary decisions that affect the average level of real incomes. Since incomes are nominally adjusted, received and spent at different moments, inflation also affects inequality measures in spurious ways. In other words, it is not only causality that explains the coincidence between the peaks of inflation and inequality that happened in Brazil in 1989 and 1994 but measurement error as well.

The period starting in 1995 misses out the labour market boom and poverty reduction that were both observed after the *Real* plan stabilization. On the other hand, it captures the income inequality reduction of the 2001-2004 period which brought Brazilian inequality to its lowest levels in the last 25 years. After the peak of the so-called unemployment crisis of the second half of the nineties, there was some recovery of the labour market, specifically in terms of formal employment. The role played by different labour market variables on changes observed in the level and distribution of per capita income will be studied later in this paper. Another key factor to be studied is the adoption and expansion of a new regime of income policies - without dismantling the old regime - based on the expansion of new targeted cash transfer programmes financed by the central government.

This paper is organized in the following manner. Section II is devoted to the derivation of pro-poor growth rate that adjusts for inequality. Section III outlines empirical aspects of calculating the pro-poor growth rate using household surveys. Section IV develops a decomposition methodology to link pro-poor growth with labour market characteristics. While section V describes trends in growth, inequality and poverty, section VI discusses economic, institutional and social fluctuations in Brazil. Sections VII and VIII present the empirical results for pro-poor growth rates and the decomposition method, respectively.

Based on a Shapely decomposition, section IX looks at the contribution of main components to growth patterns. Similarly, section X investigates the contributions of different non-labour income sources to growth. While section XI discusses demographic trends in Brazilian society, section XII concludes the study.

II.   Pro-poor growth rate

Suppose x is the real income of an individual, which is a random variable with density function $f(x)$, then the real mean income of the population is defined as[2]

$$\mu = \int_0^\infty xf(x)dx \tag{1}$$

A county's performance in average standard of living can be measured by the growth rate γ given by

$$\gamma = \Delta Ln(\mu) \tag{2}$$

Economic growth has an impact on each individual in a different manner. Following Kakwani and Pernia (2000), growth can be defined as pro-poor (or anti-poor) if the benefits of growth go to the poor proportionally more (or less) than to the non-poor. Thus, a pro-poor growth decreases inequality whereas an anti-poor growth increases inequality. The pattern of growth can be described by two factors: (i) the growth rate in mean income defined by γ and (ii) how inequality changes over time. To formulate poverty reduction policies, it is important to look at the distributive pattern of economic growth and not just at the growth rate in mean income.

To understand the pattern of economic growth, we have to link economic growth with changes in income distribution. To achieve this objective, we need to specify a social welfare function, which gives a greater weight to utility enjoyed by the poor compared to utility enjoyed by the non-poor. Suppose $u(x)$ is the utility function, which is increasing in x and concave, then we can define a general class of social welfare function as

$$W = \int_0^\infty u(x)w(x)f(x)dx \tag{3}$$

where $w(x)$ is the weight given to the utility of the individual with income x. The main problem with this social welfare function is that it is not invariant to the positive linear transformation of the utility function. Following Atkinson's (1970) idea of equally distributed equivalent level of income, we can get a money-metric social welfare function denoted by x^* from (3) as

$$W = u\left(x^*\right) = \int_0^\infty u(x)w(x)f(x)dx \tag{4}$$

where x^* is the equally distributed equivalent level of income which, if given to every individual in the society results in the same social welfare level as the actual distribution of income.

To make pro-poor growth operational, we need to specify $u(x)$ and $w(x)$. The most popular form of the utility function is the logarithmic utility function which, given by $u(x) = log(x)$, is increasing and concave in x. In this study we adopt the logarithmic utility function not only because of its popularity but also

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[2] The real income is the nominal income adjusted for prices. The prices can vary across regions and over time. The determination of real income will depend on both regional price indices and consumer prices indices, which vary over time.

because of its attractive features such as decomposability of growth rate in terms of some labour market characteristics. We will discuss this decomposition methodology in the next section.

The weighting function $w(x)$ should capture the relative deprivation that is suffered by the poor relative to the non-poor in society; the greater the deprivation suffered by an individual with income x, the greater should be $w(x)$. Thus, $w(x)$ should be a decreasing function of x. Further, total weight given to all individuals should add up to unity, which implies

$$\int_0^\infty w(x)f(x)dx = 1 \tag{5}$$

A simple way to capture relative deprivation is to assume that an individual's deprivation depends on the number of persons who are better off than him/her in society. Such a weighting scheme is given by

$$w(x) = 2[1 - F(x)] \tag{6}$$

where $F(x)$ is the distribution function. This function implies that the relative deprivation suffered by an individual with income x is proportional to the proportion of individuals who are richer than this individual. It can be verified that $w(x)$ in (6) is a decreasing function of x and satisfies equation (5).[3]

Substituting $u(x) = log(x)$ and $w(x)$ from (6) in (4) gives the social welfare function:

$$log(x^*) = 2\int_0^\infty [1 - F(x)]log(x)f(x)dx \tag{7}$$

which provides the basis for empirical analysis presented in this paper. It will be useful to write (7) as

$$log(x^*) = log(\mu) - log(I) \tag{8}$$

where

$$log(I) = 2\int_0^\infty [1 - F(x)][log(\mu) - log(x)]f(x)dx \tag{9}$$

where I is a new measure of inequality. Taking first difference in (8) gives

$$\gamma^* = \gamma - g \tag{10}$$

where $\gamma^* = \Delta log(x^*)$ is the growth rate of money-metric social welfare x^*, $\gamma = \Delta log(\mu)$ is the growth rate of mean income μ and $g = \Delta log(I)$ is the growth rate of inequality as measured by I. This equation describes a growth pattern which provides the linkage between growth rates in the mean income and income inequality.

γ^* is the proposed measure of pro-poor growth rate. If g is positive, then growth is accompanied by an increase in inequality. In this case, we have $\gamma^* < \gamma$ and thus, there is a loss of growth rate due to the increase in inequality. If g is negative, this implies that growth is accompanied by a decrease in

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[3] Note that this weighting scheme is also implicit in the Gini index, which is the most popular measure of inequality.

inequality. In this case, $\gamma^* > \gamma$, which suggests that there is a gain in growth rate due to the decrease in inequality. Growth is defined as pro-poor (or anti-poor) if there is a gain (or loss) in growth rate.

III.   Calculating pro-poor growth rate from household surveys

This study utilizes the Pesquisa Nacional por Amostra de Domicilios (PNAD, the Brazilian Annual National Household Survey) from 1995 to 2004. Each household survey contains a variable called the weighting coefficient (WTA), which is the number of population households represented by each sample household. The sum of the WTAs for all sample households provides the total number of households in the country. A population weight variable (POP) can be constructed by multiplying the weighting coefficient (WTA) by the household size. The sum total of the (POP) variable for all sample households provides an estimate of the total population in the country. The total population estimate for Brazil was calculated as equal to 148.11 million for 1995, which increased to 173.71 million in 2004.

Using the (POP) variable, one can easily calculate the relative frequency that is associated with every sample household. Suppose f_{it} is the relative frequency associated with the ith household at year t. If x_{it} is the per capita real income of the ith household at year t, then the mean income of all individuals in the country at year t can be estimated as

$$\mu_t = \sum_{i=1}^{n} f_{it} x_{it} \tag{11}$$

which was estimated for every year between 1995 and 2004. We then estimate the growth rate of the mean income at year t as

$$\gamma_t = \Delta \log(\mu_t) \tag{12}$$

To compute the social welfare function defined in (7), we need an estimate of the probability distribution function $F(x)$. An unbiased estimate of $F(x)$ for the ith household at year t is given by[4]

$$p_{it} = \sum_{j=1}^{i} f_{jt} - f_{it} / 2 \tag{13}$$

when households are arranged in ascending order of their per capita real income x_{it}. Substituting (13) into (7) gives a consistent estimate of money-metric social welfare x_t^* as given by

$$\log(x_t^*) = 2 \sum_{i=1}^{n} f_{it} (1 - p_{it}) \log x_{it} \tag{14}$$

which gives an estimate of pro-poor growth rate at year t as

$$\gamma_t^* = \Delta \log(x_t^*) \tag{15}$$

Growth will be pro-poor (anti-poor) at year t if γ_t^* is greater (less) than γ_t.

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[4] This equation makes a continuity correction, which is estimated by obtaining an unbiased estimate of F(x).

## IV.   Trends in Growth, Inequality and Poverty

For this study, we have chosen per capita real income as a welfare indicator. Per capita real income is defined as per capita nominal income adjusted for prices, which vary across regions and over time (Ferreira et al. 2003). Per capita real income and money-metric social welfare shows a sharp disparity between both variables per capita real mean income and per capita social welfare reflects a high level of inequality in Brazil over the period. However, the good news is that the disparity between the two indicators has narrowed in the recent years. This indicates a fall in inequality in Brazil over the past years. Table 1 presents growth rates of per capita real income and per capita social welfare. The results reveal that the trend in per capita real income has been declining at an annual rate of 0.63 percent over 1995-2004. Hence, the actual growth rate of per capita real income has been almost stagnant. This unimpressive performance in per capita real income worsened even further in the second period 2001-2004, when per capita real income fell at an annual rate of 1.35 percent.

Table 1: Growth rates of per capita real income and social welfare

Period	Actual growth rate	Pro-poor growth rate	Gain(+)/loss(-) of growth
1995-96	1.59	-5.95	-7.54
1996-97	0.65	4.42	3.77
1997-98	0.97	5.07	4.10
1998-99	-5.15	-2.53	2.63
1999-2001	0.76	-2.17	-2.94
2001-2002	0.11	8.98	8.87
2002-2003	-6.12	-9.64	-3.52
2003-2004	3.56	14.11	10.55
1995-2004	**-0.63**	**0.73**	**1.36**
1995-2001	**-0.30**	**0.10**	**0.40**
2001-2004	**-1.35**	**3.07**	**4.42**

Source: authors' calculation

Figure 1: Growth rates of per capita real income and social welfare
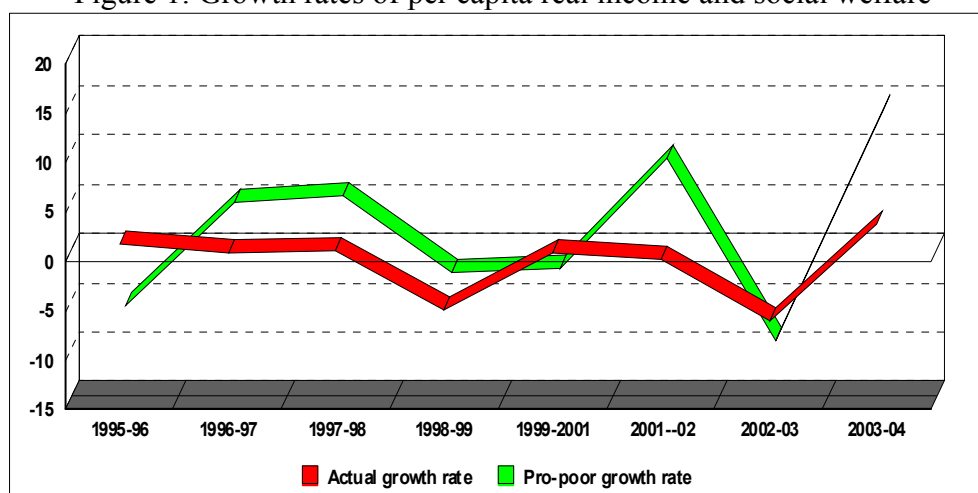
This pessimistic picture, however, tends to disappear if growth is evaluated in terms of social welfare adjusted for inequality, which is called the pro-poor growth rate in the table. This is a more relevant concept for evaluating a country's performance in relation to its standard of living. In the first period

(1995-2001), the trend in the pro-poor growth rate, although positive, was only 0.10 percent, which cannot be regarded as a good performance but the trend in the growth rate in the second period (2001-2004) increased to 3.07 percent, which is an exceptionally good performance.

The last column of Table 1 is obtained by subtracting the actual growth rate from the pro-poor growth rate. Gains in growth rates imply a decline in inequality, while losses in growth rates imply an increase in inequality. Substantial gains in growth rates are quite noticeable in the second period, 2001-2004. There have been gains in growth rates equivalent to 4.42 percent per annum because of falling inequality in the 2000s. By contrast, the gains had been merely 0.40 percent per year in the first period, 1995-2001. Thus, in the second period, the poor were able to benefit proportionally much more from growth than in the first period. This growth pattern has led to an unprecedented reduction in inequality in Brazil.

All in all, the Brazilian experience exhibits an interesting pattern between growth in per capita real income and poverty: while per capita real income has declined over the period, poverty has also fallen. This is an interesting case that does not support a *priori* the notion that a positive (or negative) growth leads to a decrease (or increase) in poverty. More importantly, the negative growth during the period, 1995-2004, was pro-poor in the sense that the poor made positive gains in their incomes despite the fact that average incomes declined. Thus, there was a sharp decline in inequality over the period which offset the adverse effect of the negative growth on poverty.

V.   Contribution of Income Sources to Growth

The separation of per capita total income into labour and non-labour components allows us to capture the main sources of the total growth patterns assumed. As we have previously seen for the 1995-2004 period, total income average growth was -0.63 percent while labour income grew at an average rate of -1.49 percent; and, non-labour income grew at an average rate of 2.64 per annum. However, in order to see the contribution of different income sources to total income - as we have done for the labour market components - it is not sufficient to gauge the growth rates of different component ratios, but also to take into account the relative weights of each income source in total income. This point also applies to pro-poor growth and to the inequality aspects of social welfare. The interaction between the high non-linearity of these last two concepts and the additive nature of income sources create some difficulties. As a result, a Shapely decomposition was used to obtain each income source contribution to pro-poor growth, which is explained in the Appendix. In general, the contribution of a given source to the total growth of a particular social welfare concept is positively related to its initial weight and to its relative rate of growth in the same period. In Table 2, we present the rates of growth and the contributions to the rates of growth of total income, together with its labour and non-labour components.

In 1995, labour income amounted to 82.1 percent of total income, while the remaining 17.9 percent referred to non-labour. However, the main sources of growth, and in particular pro-poor growth sources, relied on the latter. As shown in Table 2, the fall of total income of -0.63 percent per year in the overall 1995-2004 period can be decomposed into the adverse labour income contribution of -1.17 percent per year and the contribution of non-labour income of 0.54 percent per year.

Table 2: Growth rates and contributions to growth by income components

Period	Growth rates			Contributions to growth rates		
	Labour income	Non-labour income	Total income	Labour income	Non-labour income	Total income
Actual growth						
1995-2004	-1.49	0.86	-0.63	-1.17	0.54	-0.63
1995-2001	-1.30	1.00	-0.30	-1.02	0.72	-0.30
2001-2004	-2.05	0.70	-1.35	-1.59	0.24	-1.35
Pro-poor growth						
1995-2004	-0.73	1.46	0.73	-0.60	1.33	0.73
1995-2001	-0.97	1.07	0.10	-0.74	0.84	0.10
2001-2004	0.97	2.10	3.07	0.61	2.46	3.07
Inequality						
1995-2004	0.76	0.60	1.36	0.57	0.79	1.36
1995-2001	0.32	0.08	0.40	0.28	0.12	0.40
2001-2004	3.02	1.40	4.42	2.20	2.22	4.42

Source: authors' calculation

In turn, differences in pro-poor average annual growth rates are somewhat smaller as can be seen from Table 2: total social welfare increased 0.73 percent; labour income declined by 0.73 percent and non-labour income increased by 1.46 percent. The weight of labour income in social welfare in the initial period 1995 was 83.9 percent, which is even higher than in the case of average total incomes. Its contribution to total social welfare growth in the whole period was -0.60 percent per annum, i.e. about half of its contribution to average income growth. Conversely, non-labour income's share of the social welfare growth was 1.33 percent per year, making it an important factor in determining the positive social welfare trend assumed in the 1995-2004 period.

Focusing on individual periods, the contribution of labour income to average annual growth changed from -1.02 percent in 1995-2001 to -1.59 percent in 2001-04. The track record of labour income's contribution to pro-poor growth is better than its contribution to growth per se: -0.74 percent in 1995-2001 and 0.61 percent in 2001-04. Likewise, non-labour's income share of pro-poor growth also surpasses its effects on average income growth in both periods. Note that from 1995 to 2001, non-labour's income impact on pro-poor growth rose from 0.84 percent per year to 2.46 percent per year in the 2001-2004 period.

Both labour and non-labour incomes have contributed to a decline in total inequality. During the 1995-2001 period, it was the labour income that had a higher contribution to the inequality reduction: 0.28 and 0.12 percent due to the labour and non-labour income, respectively. In total, the reduction in inequality amounts to a gain in growth rate by only 0.40 percent. In the second period (2001-04), the gain in growth rate due to a fall in inequality was 4.42 percent, which is substantially greater than the corresponding figure for the first period (1995-2001). Of the gain of 4.42 percent, 2.20 percent was contributed by the labour income and 2.22 percent by the non-labour income. Thus, the contribution of non-labour income to the inequality reduction was slightly higher than that of labour income despite the fact that the share of labour in total income was much higher than that of non-labour income. This suggests that the non-labour income has been more pro-poor than the labour income in the second period.

VI.   Decomposing the Contribution of Non-Labour Incomes

This section aims to assess the contribution of different types of non-labour income sources to the total growth of different welfare concepts, through a decomposition scheme of these income sources impacts.

Special attention is paid to incomes mostly directly affected by social policies, such as social security benefits and other non-labour income sources that include cash transfers from social programmes and capital income - which turns out to be underestimated in PNAD data. The remaining sources of non-labour income such as rents and private transfers (remittances, donations, child maintenance support, etc) are part of what is called non-social income.

Table 3: Growth rates by non-labour components

| Period | Labour income | Non-labour income | | | Total income |
		Social security	Other non-labour	Non-social income	
Actual growth					
1995-2004	-1.49	3.25	5.77	-2.43	-0.63
1995-2001	-1.30	4.69	0.73	-1.23	-0.30
2001-2004	-2.05	0.86	13.26	-3.69	-1.35
Pro-poor growth					
1995-2004	-0.73	3.12	29.94	1.43	0.73
1995-2001	-0.97	2.56	25.50	4.41	0.10
2001-2004	0.97	3.90	35.21	-1.97	3.07
Inequality					
1995-2004	0.76	-0.13	24.17	3.86	1.36
1995-2001	0.32	-2.13	24.77	5.64	0.40
2001-2004	3.02	3.04	21.94	1.72	4.42

Source: authors' calculation

Table 3 presents trends in growth rates by non-labour income components. The results reveal that while social security has contributed to a rise in inequality during the 1995-2004 period, the others – including other non-labour income and non-social income – have been attributed to a fall in inequality during the same period. Interestingly, in the 2001-04 period all three non-labour income components made a positive contribution to the reduction in inequality.

Table 4 explains the net contributions of each non-labour income component to growth patterns and inequality reduction. The results are obtained from the Shapely decomposition method (see Appendix). According to the table, other non-labour income has been the dominant net contributor to a reduction in inequality over the decade 1995-2004. Its net contribution is particularly high in the latter period 2001-04. While non-social income appears to play a smaller role in reducing inequality, the net impact of social security has been quite important. During the first period (1995-2001), the net effect of social security resulted in an increase in inequality. Its net contribution on inequality was greater than the net contributions by the other two components. Nevertheless, the sum of net contributions by the other two sources had offset the net contribution by social security. As a result, inequality of the non-labour income in the first period showed a slight fall by 0.12 percent.

Table 4: Explaining contributions of growth rates by non-labour income components
(based on Shapely decomposition)

| Period | Labour income | Non-labour income | | | Total income |
		Social security	Other non-labour	Non-social income	
Actual growth					
1995-2004	-1.17	0.54	0.06	-0.07	-0.63
1995-2001	-1.02	0.75	0.01	-0.04	-0.30
2001-2004	-1.59	0.17	0.16	-0.10	-1.35
Pro-poor growth					
1995-2004	-0.60	0.40	0.88	0.04	0.73
1995-2001	-0.74	0.34	0.38	0.12	0.10
2001-2004	0.61	0.48	2.00	-0.03	3.07
Inequality					
1995-2004	0.57	-0.14	0.82	0.11	1.36
1995-2001	0.28	-0.41	0.37	0.16	0.40
2001-2004	2.20	0.31	1.84	0.07	4.42

Source: authors' calculation

VI.1   Non-Social Income

Non-social income fell at an average rate of -2.43 percent per year in the 1995-2004 period, but it had a sharper decrease in the second period (-3.69 percent) than the rate of -1.23 percent per year observed in the first period (Table 2). In spite of the negative growth, non-social income has contributed to a fall in inequality over the decade. Its effect on the inequality reduction had been much greater in the first period compared to the second period; 5.64 percent (in 1995-2001) against 1.72 percent (in 2001-04).

Nevertheless, the net contribution of non-social income to overall growth performance was rather small given its growth rates. As shown in Table 16, the net effect of non-social income on inequality reduction was just 0.11 percent between 1995-2004; its magnitude fell to 0.07 percent in the 2001-04 period from 0.16 percent in the 1995-2001 period.

VI.2   Social Security Benefits

Social security is the main component of social income in Brazil, and second only to labour earnings among all income sources collected by PNAD. In 2004, it amounted 19.55 percent of all income sources and 92.5 percent of social income. Social security benefits information includes a contributory Pay as You Go system and non contributory benefits, both subject to discretionary income policies from the government. The average growth rate of per capita social security benefits was 3.25 percent per year from 1995 to 2004 (Table 2). The average growth rate of social security in the first period was much higher than in the second period, 4.69 percent against 0.86 percent. However, rapid growth in social security has resulted in an increase in inequality in Brazil over the 1995-2004 period. Its adverse impact amounted to an increase of inequality by 2.13 percent in the first period. Yet the impact of social security income on inequality was reversed when its growth slowed down: it led to a reduction in inequality by 3.04 percent in the second period. A similar story emerges from the results reported in Table 4.

Given the dominance of the public transfer aspect in this income aggregate, it is useful to observe the ratio of pro-poor growth to total growth contribution. This can be interpreted as an elasticity that shows

how many public resources (measured by their share of total income) are translated into social welfare, a type of cost-benefit analysis. The corresponding elasticity of pro-poor growth with respect to total growth (i.e. its fiscal cost) both explained by social security rose from 0.45 in the 1995-2001 period to 2.82 in 2001-2004, demonstrating a marked improvement in the ability of social security benefits targeting the poorest segments of Brazilian society.[5] After 1998 the government adopted the new policy of setting higher adjustment rates to lower social security benefits. In the entire 1995-2004 period, this elasticity amounts to be 0.74. This elasticity allows comparing to what extent different types of public transfers reach the poor.

VI.3   Other Non-labour Income

Other non-labour income sources include very different types of incomes, ranging from cash transfer programmes such as the *Bolsa-Família* to capital income such as flows derived from interest rates paid on government debt. The pro-poorness aspects of these items are expected to be very different, despite the fact that both are not only subject to public policy choices but are mostly mediated by the state[6], as well. Interest income is largely underestimated by PNAD data, hence this income concept is largely explained by public cash transfer programmes such as *Bolsa-Família*.

According to Table 3, the other sources of non-labour income aggregate have grown at an annual rate of 5.77 percent in the whole period from 1995 to 2004, presenting very diverse patterns across sub-periods. They increased on average 0.73 percent in the first period 1995-2001, but this growth has accelerated considerably in the 2001-2004 period to 13.26 percent, reflecting the expansion of the conditional cash transfer programmes.

Table 3 also assesses the impact of other non-labour income source on inequality reduction. This income source has attributed to a reduction in inequality by 24.17 percent per year in the 1995-2004 period. This favourable effect on inequality can be explained by the fact that cash is aimed at the poorest sectors of the population. The effect on inequality reduction of this income component has reduced to some extent, falling from 24.77 percent in the 1995-2001 period to 21.95 percent in the 2001-2004 period. This suggests that the impact of cash transfers has become slightly less pro-poor in the second period.

As we have seen, to measure the contribution of the expansion of cash transfer programmes from 2001 onwards, it is not sufficient to gauge its relatively high growth rates. Instead, its relative weight among different non-labour income sources must also be considered. In Table 16, the net contribution of other non-labour income to total growth per year during the 1995-2004, 1995-2001 and 2001-2004 periods was 0.06, 0.01 and 0.16, respectively. This means that the role of cash transfers to explain income growth is quite small. But by the same token, the impacts of other income sources on the fiscal budget deficit were also relatively mild.

According to Table 4, the net contribution of other non-labour income source to inequality reduction outweighs the contributions made by the other two income components. In the overall 1995-2004 period, it was responsible for 0.82 percent of the fall in inequality. Similarly, its net contribution was 0.37 percent of the fall in inequality in the 1995-2001 period and then increased to 1.84 percent of the inequality fall. This indicates that other non-labour income sources constitute a key determinant of the reduction in inequality in Brazil over the period.

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[5] One possibility is to divide the information on social security benefits in two regimes: one with benefits equal to one minimum wage, the constitutional floor, and the rest. Neri (1998, 2001) followed this approach and showed that around 60% of social security benefits amounted to one minimum wage while 80% of social security income accrued to benefits above this level. Each additional real spent adjusting the social security benefits floor resulted in 4.5 times more poverty reduction than a uniform adjustment to all benefits.

[6] The public debt is the main source of interest gains earned by Brazilian households.

The elasticity of the contribution to pro-poor growth of a particular income transfer with respect its contribution to total growth is useful to guide policies aimed at the poorest groups in the Brazilian society. The corresponding other non-labour income sources elasticity was 14.66 during the 1995-2004 period which is much higher than the one found for social security benefits. Each percentage point in the share of government transfers in this item bought 19.8 times more pro poor growth in other non-labour income than in social security benefits, this is result is consistent with the evaluation of codional cash transfers done in Brazil and elsewhere (Lindert et al. 2005, Barros 2005, Hoffman 2005, Soares 2006, Bourguignon et al. 2003, Skoufias et al. 2001, Coady et al. 2004, Suplicy 2002).[7]

In sum, other non-labour income sources have played a dominant role in pro-poor growth pattern assumed while having a minor contribution to total growth and to the Brazilian fiscal accounts. It seems that a small increase in government cash transfers programmes had a high impact on poor people's living conditions.

VII.   Demographic Trends

The main transfers in terms of social income such as social security and cash transfers are aimed at specific age groups. Social security benefits attempt in principle to smooth living conditions specifically in the old age, while the new generation of cash transfer programmes in Brazil is mostly focused on children and teenagers. Labour income is also predominantly earned by non-elderly adults. There are however exceptions for cash transfers programmes included in the other source of non-labour income that attempt to provide income to other age groups such as the continuous assistance benefit (BPC) for the old and the disabled or unemployment insurance that benefits mostly adults. Non-social income accrues to individuals in very diverse age groups. To make things more complex, these programs are mixed in different income concepts. One way to check the levels and trends of how total incomes affect different age groups in different ranks of the society is to compare per capita growth rates of these groups in the population with their respective pro-poor growth rates.

We have divided the population in three age groups and calculated the levels and trends of the following variables:
- Per capita children and young teenagers in household, aged between 0 and 15 years.
- Per capita adults in household, aged 16-64 years.
- Per capita elderly in household, aged from 65 years and over.

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[7] The cash transfer elasticity of pro poor growth decreased from 38 in the 1995-2001 period to 12.5 percent in 2001-2004, showing a loss in the pro-poorness of cash transfers but in the last period it is still 4.43 higher than the value the elasticity found for social security benefits.

Table 5: Demographic trends (%)

Period	Unadjusted			Inequality adjusted		
	Per capita child	Per capita adults	Per capita elderly	Per capita child	Per capita adults	Per capita elderly
1995	0.347	0.596	0.057	0.393	0.541	0.036
1996	0.337	0.605	0.058	0.382	0.551	0.040
1997	0.333	0.608	0.059	0.378	0.554	0.039
1998	0.325	0.615	0.060	0.372	0.560	0.037
1999	0.318	0.620	0.062	0.365	0.567	0.036
2001	0.309	0.630	0.062	0.356	0.576	0.033
2002	0.301	0.635	0.064	0.348	0.582	0.035
2003	0.294	0.640	0.066	0.341	0.588	0.042
2004	0.290	0.643	0.067	0.338	0.591	0.034
Trend 1995-2004	**-1.96**	**0.83**	**1.66**	**-1.64**	**0.96**	**-0.67**
Trend 1995-2001	**-1.94**	**0.90**	**1.37**	**-1.60**	**1.00**	**-2.03**
Trend 2001-2004	**-2.05**	**0.70**	**2.59**	**-1.81**	**0.90**	**2.31**

Source: authors' calculation

Table 5 shows that in 1995, children and young teenagers group represented 34.7 percent in average household and the corresponding figure goes up to 39.3 percent when we use the inequality-adjusted weighting scheme. This implies that it is more likely to find a child in the lowest per capita income ranks of Brazilian society than elsewhere. Furthermore, the average annual growth rate of the population below 16 years of age in the 1995-2004 period has been -1.96 percent while its inequality-adjusted growth rate has been -1.64 percent. This implies a declining trend in the number of children in average household, but with a much slower decline among poor households. On the other hand, the number of adults in household shows an increasing trend. These findings suggest that cash transfer programmes relating to children can be further expanded because of the increase in the number of working population in Brazil.

The situation is opposite in all aspects for the old-age group. The share in the total population is higher than that using inequality-adjusted weights and this gap has increased over the decade. Inequality-adjusted per capita elderly was represented 3.6 percent in average household in 1995. In the 1995-2004 period, an annual growth rate of per capita elderly has been 1.66 percent against its inequality-adjusted growth rate of -0.67 percent. Overall, elderly population in Brazil is on the increase. This trend in turn puts pressure on the cash transfer programmes targeted at the elderly. The good news, however, is that the increase in elderly population among the poor appears to be slower than elderly among the non-poor. Hence, sustainability of cash transfer programmes for elderly in the long-term calls for a targeting strategy in such a way that poor elderly receive greater benefits from the programmes compared to non-poor.

VIII. Conclusions

From the methodological point of view, this paper makes two important contributions to the literature. One contribution is its proposal for a new measure of pro-poor growth. This new measure provides the linkage between growth rates in the mean income and income inequality. In this sense, growth is defined as pro-poor (or anti-poor) if there is a gain (or loss) in growth rate due to the decrease (or increase) in inequality. The other contribution is to develop a decomposition methodology exploring linkages between growth patterns and social policies. Through this decomposition, we assess the contribution of different non-labour income sources to growth patterns, with particular emphasis on the expansion of targeted cash transfers and devising more pro-poor social security benefits. These components are all translated into per capita growth in mean incomes and inequality adjusted incomes. The paper provides a growth and a pro-poor growth account exercise.

For empirical analysis, the study has used the Brazilian National Household Survey (PNAD) from 1995 to 2004. The paper has analyzed the evolution of Brazilian social indicators based on per capita income exploring links with adverse labour market performance and social policy changes, in particular the expansion of targeted cash transfers and devising more pro-poor social security benefits. The description of these social indicators depends on two main dimensions: i) who was affected by shocks perceived in the labour market and changes observed in social policies? In particular, to what extent did these innovations affect more the poorest segments of the Brazilian society?; and ii) to what extent did the crisis affect labour income vs. other income sources such as official cash transfers, social security benefits or private incomes?

The general answer to these questions is that labour earnings of the upper segments of Brazilian society were the epicentre of the economic crisis. Although per capita income fell during the 1995-2004 period, it cannot be referred to as a 'poverty crisis'. While labour markets were quite adversely affected, incomes derived from social security, and other government transfers played a crucial role cushioning the consequences of macro shocks observed, specifically among the poorest segments of Brazilian society.

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Appendix:
Shapely Decomposition to Explain Contributions of
Income Components to Pro-Poor Growth

Suppose there are four income components, which include:

X_{1t}: Per capita labour income at year t
X_{2t}: Per capita social security income at year t
X_{3t}: Per capita cash transfers at year t
X_{4t}: Per capita non-social income at year t

Total per capita income at year t is thus the sum of individual four income components. Thus we can write

$$X_t = X_{1t} + X_{2t} + X_{3t} + X_{4t}$$

Suppose $\log(x^*(X_t))$ is the logarithm of social welfare at year t calculated on the basis of total per capita income X_t, which can be calculated from equation (14). Then the growth rate of social welfare at year t is given by

$$\gamma_t^* = \log(x^*(X_t)) - \log(x^*(X_{t-1})) \tag{A.1}$$

The Shapely decomposition can be used to calculate the contribution of each income component to the growth rate of social welfare of the total per capita income X_t as

$$\gamma_t^* = \gamma_t^*(C_1) + \gamma_t^*(C_2) + \gamma_t^*(C_3) + \gamma_t^*(C_4) \tag{A.2}$$

where , $\gamma_t^*(C_i)$,where i varies from 1 to 4, is the contribution of the ith income component to growth rate of total welfare. Thus (A.1) is the proposed decomposition method which can be used to analyze the net contribution of each income component to growth rate of welfare. This equation can also be utilized to analyze contributions of each income component to growth in total inequality. Using the Shapely decomposition, we can write the net contribution of each income component to growth rate of total welfare as follows:

$$\gamma_1^*(C_1) = \frac{6}{24}\left[\log x^*(X_{1t} + X_{2t} + X_{3t} + X_{4t}) - \log x^*(X_{1t-1} + X_{2t} + X_{3t} + X_{4t})\right]$$

$$+\frac{2}{24}\left[\log x^*(X_{1t} + X_{2t-1} + X_{3t} + X_{4t}) - \log x^*(X_{1t-1} + X_{2t-1} + X_{3t} + X_{4t})\right]$$

$$+\frac{2}{24}\left[\log x^*(X_{1t} + X_{2t} + X_{3t-1} + X_{4t}) - \log x^*(X_{1t-1} + X_{2t} + X_{3t-1} + X_{4t})\right]$$

$$+\frac{2}{24}\left[\log x^*(X_{1t} + X_{2t} + X_{3t} + X_{4t-1}) - \log x^*(X_{1t-1} + X_{2t} + X_{3t} + X_{4t-1})\right]$$

$$+\frac{2}{24}\left[\log x^*(X_{1t} + X_{2t-1} + X_{3t-1} + X_{4t}) - \log x^*(X_{1t-1} + X_{2t-1} + X_{3t-1} + X_{4t})\right]$$

$$+\frac{2}{24}\left[\log x^*(X_{1t} + X_{2t-1} + X_{3t} + X_{4t-1}) - \log x^*(X_{1t-1} + X_{2t-1} + X_{3t} + X_{4t-1})\right]$$

$$+ \frac{2}{24} \left[\log x^* \left(X_{1t} + X_{2t} + X_{3t-1} + X_{4t-1} \right) - \log x^* \left(X_{1t-1} + X_{2t} + X_{3t-1} + X_{4t-1} \right) \right]$$

$$+ \frac{6}{24} \left[\log x^* \left(X_{1t} + X_{2t-1} + X_{3t-1} + X_{4t-1} \right) - \log x^* \left(X_{1t-1} + X_{2t-1} + X_{3t-1} + X_{4t-1} \right) \right]$$

Analogous expressions are found for $\gamma_2^*(C_2), \gamma_3^*(C_3) and \gamma_4^*(C_4)$. Similar expressions Similarly, we can calculate the contribution of each income component to growth rate of total per capita income:

$$\gamma_t = \gamma_t(C_1) + \gamma_t(C_2) + \gamma_t(C_3) + \gamma_t(C_4) \tag{A.3}$$

Subtracting (A.3) from (A.2) gives the contribution of each income component to inequality of total per capita income.

$$g_t^* = g_t^*(C_1) + g_t^*(C_2) + g_t^*(C_3) + g_t^*(C_4) \tag{A.4}$$