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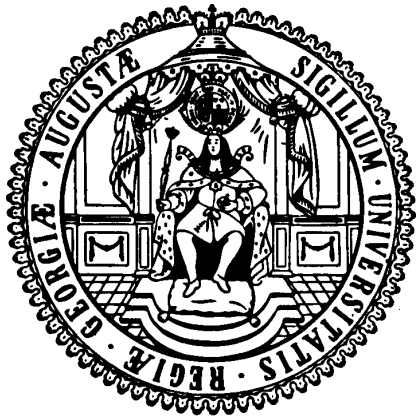

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THE IMPACT OF BRAZIL'S TAX-BENEFIT SYSTEM ON INEQUALITY AND POVERTY [1]

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Abstract

The Brazilian government raises an amount of taxes that represents 35% of GDP and spends more than two-thirds of this on social programmes. These shares are in pair with the OECD averages and well in excess of Latin America averages. However, while the tax-benefit system in OECD countries notably reduces market inequality, in Brazil the government has not been able to significantly alleviate inequality and poverty. This paper investigates the impact of the government budget, particularly taxes and cash transfers, on income distribution in Brazil, and evaluates its efficiency and effectiveness in reducing inequality and poverty. The analysis also illustrates how microsimulation is a useful and powerful method for evaluating the impact of policy on income distribution.

JEL: H22, H23, C81,

1. INTRODUCTION

Despite raising an amount of taxes equivalent to 35 per cent of the country's GDP and spending about seventy per cent of that on social programmes – close to the OECD average spending, as a proportion of GDP, and well above the average in other Latin American countries –, the Brazilian government has not been able to significantly alleviate inequality and poverty. In fact, Brazil's income distribution remains one of the world's most unequal, and a large share of its population still lives below the poverty line.

Brazil is an exception to the observed international pattern, where high income inequality is generally associated with low levels of tax revenue as a proportion of GDP. In Figure 1, we notice that the United Kingdom and Spain, for example, with a similar tax burden to that of Brazil, have a much lower income inequality as indicated by the Gini coefficient. On the other hand, Mexico and Chile, with Gini coefficients close to that for Brazil, have a much lower tax burden.

To an extent, the relatively low Gini coefficients of developed countries reflect the impact of their tax-benefit systems. Evidence for this has been provided, for instance, by studies that use microsimulation techniques to simulate the redistributive effect of

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the tax and benefit systems of those countries.[2] Thus, as Atkinson (2000) emphasises, accounting for the redistributive impact of the government budget is crucial when looking for explanations of the level of income inequality.

This paper is concerned with the impact of the Brazilian government's budget, particularly taxes and transfers, on the extent of personal income inequality and poverty. Our analysis uses BRAHMS, a tax-benefit microsimulation model that provides detailed information on taxes and benefits paid and received by individuals and/or households in a representative sample of the Brazilian population.

The paper is structured in five sections. After this introduction, section 2 discusses the method used in this paper, microsimulation modelling. Section 3 briefly describes the main features of the Brazilian tax-benefit system, while section 4 presents the data and main procedures used in our calculations. Section 5 presents and discusses the results. Section 6 concludes.

2. THE MICROSIMULATION APPROACH

In order to evaluate the redistributional impact of the Brazilian tax-benefit system, one needs information about how taxes and benefits operate at the individual level. Because the necessary information is often not available in survey data, it is necessary to simulate these variables. For this we use a tax-benefit microsimulation model. In this section we consider the steps necessary to create a tax-benefit model.[3]

2.1. Microsimulation Modelling

Due to the great diversity observed among the population and the complexity of the Brazilian tax-benefit system, the redistributive analysis of the impact of social and fiscal policies requires that a high level of disaggregation be used in order to capture in fine detail their effects on the various types of individuals, families and households. Ultimately, it is the social and economic diversity typically found in the national populations that determines how economic agents will be affected by the tax and benefit rules. On the other hand, as different social programs interact with each other and with the tax system, it is crucial to take explicitly into account the interdependencies within the whole tax-benefit system. The lack of analytical tools that properly focus on the poor and the neglect of the issue of how the programs are to be financed are major reasons why social and economic policies fail to significantly reduce poverty.

Typically hypothetical families have been used to examine the operation of taxes and benefits and impact of reforms. For example the OECD uses this method to calculate the *Tax Position of Average Workers*. Although a useful method for illustration purposes and for comparison across countries, the approach is not very satisfactory for looking at tax-benefit policy in a country as usually families which are considered "typical" form in fact only a very small proportion of the population. It is desirable therefore to look at the population as a whole using representative micro-datasets.

An approach that follows this method is microsimulation modelling. Recent advances in information technology and the availability of large-scale datasets have allowed and

[2] See, for example, EUROMOD (2004).
[3] In this paper we draw upon model development lessons learned by a number of the authors as part of the EUROMOD project and described in Immervoll and O'Donoghue (2001).

stimulated the development of these models. Microsimulation models are computer programs that calculate tax liabilities and benefit entitlements for individuals, families or households in a nationally representative micro-data sample of the population. The model calculates each element of the tax-benefit system in the legal order so that interactions between different elements of the system are fully taken into account. Calculations for each individual, family or household are weighted to provide results at the population level.

By incorporating the interactions of different elements of the tax-benefit system and by taking full account of the diversity of characteristics in the population, this approach allows a very detailed analysis of the revenue, distributional and incentive effects of the individual policy instruments and the system as a whole. In particular, they give a great deal of flexibility to analysts. For example:

- They simulate policy instruments that may not already exist in the micro-datasets on which they are based. As micro-data is not necessarily collected every year and may take time for the data to be available to researchers, microsimulation models can be used to simulate more up to date policy rules.

- Therefore they have the capability of looking at the incidence of existing policy on an existing population and can examine the efficiency of anti-poverty measures in actually reducing poverty.

- As a simulation mechanism, they are also well placed to look at the incentive impact of existing policy. Although the model framework described here is a static framework, it is possible to measure the pressures on behaviour such as marginal tax rates and replacement rates[4].

- The primary advantage of microsimulation models however is that they can simulate policy reform. They can thus be used to compute the first round revenue effects of reforms. Also, containing both social protection programs and taxation instruments, models of this kind can look not only at changes to social policy programs but also examine different methods of financing.

- The first round distribution of resulting winners and losers, particularly with reference to particular target populations, can also be found.

- Capturing the heterogeneity of government law, they can examine the interaction of different policy instruments.

- Incorporating micro-data, they can also be used to look at the distributional impact of policy reform. Thus it is possible to see how reforms are incident on households of different incomes, examine horizontal redistribution by focusing, for example, on families with children, the elderly or the sick. Exploiting the hierarchical nature of households, they can also focus in gender dimensions by looking at within household sharing and the impact of government policy.

- The user-friendly nature of such models makes them suitable for a variety of uses and users, both governmental and non-governmental, informing the debate of social

[4] See for example, O'Donoghue and Utili (2001), who study both the distributional and incentive effects of the impact of reforms targeting low wage workers in Europe.

and economic policy, and making policy decisions more transparent in terms of their impacts on the population.

The use of microsimulation models therefore, can greatly contribute to improved design and efficacy of policies (as argued, for instances, in Atkinson et al., 2002). The models provide a powerful aid to policy design and assessment, allowing users to consider how expenditure aimed at certain targeted groups is to be financed, how social spending is distributed among the population, and how fiscal and social policies impact on the different groups of the population. Thus, working with a microsimulation model, policy designers and analysts can simulate changes in the existing tax-benefit system, performing "what if" experiments and examining their distributional and revenue implications (Redmond, Sutherland and Wilson, 1998). For example Piachaud and Sutherland (2000) recently used a microsimulation model to examine the policies necessary for the UK government to meet its poverty reduction targets.

However the development of microsimulation models is quite a difficult and expensive process. It involves the construction of a software environment to handle the data, policy simulation and output routines. The transformation and matching of existing micro-datasets into definitions and structures required to simulate tax-benefit laws and the translation of the law itself into a computational framework are quite time consuming. The latter is a very large task as instruments are often very complicated, with particular exemptions for different classes of individual or income source. Also the diverse policy instruments, having often been developed by different governmental organisations within government, may follow different logic and interact in peculiar ways.[5] Another important expense is the actual updating of the model. Government policy tends to change year on year and population structures can change too due to the number of unemployed in recessions or through demographic changes. Hence in order for the model to become out of date, efforts need to be made to update the model, both the data and the rules, in regular intervals. As a result of the expense, although a number of Western countries and institutions have utilised this technique, there is still not widespread use in emerging economies. Yet it could be argued that the benefits of these techniques could be relatively more important in emerging countries because of the greater proportions in poverty and because of their poorer public finance positions, with greater need being required in the design of effective government policy.

2.2. Microsimulation Modelling in Developing Countries

One of the issues this paper must consider is the fact that circumstances, systems and data may not necessarily be the same in developed economies, where the technique has been utilised, and in emerging economies. Atkinson and Bourguignon (1990) carried out a study of the lessons of tax-benefit modelling in OECD countries for emerging economies. They found that although often more difficult to implement, simulating tax-benefit systems for these countries should "lead to a comprehensive, powerful and yet simple instrument for the design of an efficient redistribution system adapted to the specificity of developing countries". Focusing on Brazil as a case study, they found that much of the redistribution in the existing Brazilian system in the 1980's relied on instruments that were less important in OECD countries. For example, indirect taxes, subsidies and the provision of targeted non-cash benefits such as public education and subsidised school meals were found to be more important. Instruments more important

[5] Ironically one side-effect of using tax-benefit models in a country is to help to streamline the actual tax-benefit code itself as government analysts prefer instruments which they can program more easily.

in OECD systems and often the main instruments in tax-benefit models (personal income taxes, social insurance contributions and pensions), were largely confined to the modern sector in Brazil and thus of less importance to policy makers. Nevertheless they argued that sufficient data existed at the time to simulate many of the Brazilian specific instruments in addition to the "classic" ones. They stressed however that merging of data from different datasets may be necessary for this purpose. As a consequence of recent advances in the analysis of related data-sets (see Deaton, 1998) as well as improvements in the availability of data for less developed countries, the use of tax-benefit modelling techniques needs no longer be limited to countries where such models have been in use for some time.

Atkinson and Bourguignon's paper set the scene for the construction of tax-benefit models for less developed countries. The objective of our study is to go beyond this and actually focus more on the practical issues of constructing a tax-benefit model by reference to the precise rules of the tax-benefit systems and the detail of the available micro-data.

2.3. The Design of a Microsimulation Model

A microsimulation framework adopts a hierarchical view of a country's tax-benefit system. In modelling a country's system, it is desirable to match the "real" system's hierarchy as closely as possible so that the logical representation provides a good intuitive equivalent of the original.

Each tax-benefit system is made up of individual policies. These are elementary collections of tax-benefit instruments. Examples for a policy are Income Tax, Social Insurance Contributions or Social Assistance Benefits. The policy spine is a list of policies indicating the sequence by which they are applied in the tax- benefit system. For example, if social insurance contributions are tax deductible, then the entry Social Insurance Contributions would have to appear *before* Income Tax. This is because the model needs the amount of social insurance contributions as a prerequisite to calculating income tax. On the other hand, if social assistance benefits depend on after tax income, then the entry Social Assistance Benefits would have to appear *after* Income Tax since income tax is a necessary input for calculating social assistance benefits.[6] At the lowest level is the tax-benefit module, which performs the calculation of a certain part of the tax or benefit (e.g., a deduction, or applying a rate schedule to a tax base) on each fiscal unit. Only the modules contain actual tax-benefit rules. The other levels of the model are necessary to structure these rules and apply them in the correct sequence.

A modular structure allows one, as the model develops, to create a library of modules.[7] These can be used as "building-blocks" so that when it is necessary to incorporate a new tax or benefit instrument, it will often not be necessary to program any new tax-benefit rules. Instead, it may be possible for existing modules to be used. They can be re-arranged in any order necessary. A high level of parameterisation ensures that the same modules can be used for a multitude of different purposes.

[6] In a few cases, it might be desirable to deviate from a purely linear sequence of policies. If there are optional policies, which the tax payer/benefit recipient can choose from, it would be necessary to simulate all the individual options (e.g., individual or joint taxation) and then apply some rule for choosing between them (e.g., by assuming a decision which would maximise disposable income).

[7] In a national model one builds up a library of historic instruments and reforms that were experimented with.

Concepts that a user may want to change in the model and thus should be parameterised for ease of use include:

- Updating of dataset to year of simulation. As the year of the dataset may not necessarily be the same as the year of simulation (the year policy rules are taken from), it will be necessary to update the dataset to account for differences in the intervening period. For this purpose external information will be needed. Updating which may be required include allowance for inflation/income growth by variable or allowance for changing population structure by altering the weights.

- The definition of the fiscal unit (e.g., individual, household, married couple, families with children - including the definition of a "child") which is relevant for the module,

- Income concepts (e.g., the definition of taxable income, "means" for a means-tested benefit, etc.). In order to simulate the effect of widening the tax base or of incorporating new policies in a particular income concept such as disposable income, users may want to alter with ease the definition of these concepts.

- All relevant amounts (such as thresholds, limits, allowances, rates, number of tax bands, etc.) necessary for applying the relevant tax or benefit rules should be parameterised to enable non-structural policy reforms to be simulated with ease.

Behavioural Response

As a static modelling framework, the model only measures the day after effect. However it is clear that reforms may have a behavioural response. For example the introduction of the *Bolsa Escola* program in a number of Brazilian cities which gives cash benefits to poor families whose children continue on in school until 14, saw school dropout rates decrease and school attendance increase (Schiefelbein, 1997). Thus the cost of the program would have been higher than a static analysis would have indicated. Incorporating dynamic processes like this would be beyond the scope of an initial stage of construction of a microsimulation model. It would require extra algorithms to be coded in the framework and in addition, *a priori*, the micro-behavioural information required would not have been available for a reform of this kind. However, as an alternative, sensitivity analyses could be carried out. It would be possible for analysts to vary the proportion of those eligible for the new instrument. Routines of this kind are analogous to the implementation of marginal tax-rate calculators. On this point some effort may also be necessary to specify appropriate definitions of marginal tax calculations in the framework for a Brazilian perspective.

Validation

Once the tax-benefit system has been coded, the data are passed through the model. At this stage, one discovers whether all the variables required by the model algorithms have in fact been included in the dataset and whether they are in the correct format. Once this works, one must determine whether all the interactions between the simulated components operate correctly. The validation process is therefore one of the largest components in building a microsimulation model.

Typically the first stage in this process is to compare the output of the model for sets of hypothetical households against manually calculated taxes and benefits. Although the

rules may in fact be correctly coded, simulated aggregates may not necessarily match official aggregates. The next stage of the validation process is therefore to compare the aggregate outputs against those in official statistics. Useful external sources of data for validation include official figures, other studies, other survey data, existing models, etc.

3. OVERVIEW OF THE BRAZILIAN TAX-BENEFIT SYSTEM

This section briefly describes the main instruments of the Brazilian transfers and tax systems.[8]

3.1. Transfer System

The Brazilian social protection system is strongly based on contributory, social insurance benefits, while means-tested social assistance programmes occupy a marginal position. Pensions alone account for about 83% of total cash transfers to households, or about 11 per cent of GDP – a percentage above the OECD average, despite Brazil's much younger population. The main cash benefits can be briefly reviewed as follows.

Pensions

The Brazilian public pension system comprises a general regime for private sector workers and multiple special regimes for civil servants at different levels of government. These regimes are mandatory and of the pay-as-you-go type.

Pension regime for private sector workers

The scheme for private sector workers pays retirement benefit under two main circumstances. The first is the old-age pension, which is paid to male (female) urban workers aged 65 (60) who have contributed for at least 15 years. Alternatively, retirement benefits are paid to those who accumulated 35 (for men) and 30 (for women) years of contribution, without age limit requirements.

It should be noted that rural workers are only required to provide evidence of 15 years of rural activities to be eligible for a minimum pension at age 60 (for men) or 55 (for women), whether or not they have previously contributed to the system. In fact, rural pensions can be considered as part of social assistance, because they are essentially non-contributory.

Pension benefits are subject to a ceiling and a floor. The ceiling is equivalent to the same cap that applies to contribution rates (1,869.34 reais, in 2003). The floor is equal to the official minimum wage (240 reais, in 2003). Currently, about 60 per cent of all benefits are equal to the social security floor, including almost all rural workers' pensions. In January 2004, nearly 18 million pension benefits were granted, 37 per cent of which being paid to rural pensioners.

[8] The information provided in this section was compiled from the following sources: OECD (2004), Ministry of the Economy (2005) and the Ministry of Social Security's statistical database (www.mpas.gov.br).

Pension regimes for civil servants

Special schemes for civil servants exist at different levels of government. These schemes differ slightly from each other in terms of contribution rates, but in almost all cases they are significantly more generous than the scheme for private sector workers. For instance, under the civil servants regime, male workers retiring at the age of 60 (55 for female workers), with 35 years of contribution (30 for female workers), are entitled to pensions equal to 100 per cent of their last salary, without a cap.[9]

In fact, while private sector pensions average less than two minimum wages, public sector pensions in the federal government are, on average, seven times higher. Overall, in January 2004 the civil servant regimes together paid pensions to nearly 3 million former civil servants (about 14 per cent of total retirees), and accounted for about 40 per cent of total pension expenditure.

Annual bonus for pensioners

All pensioners, both in the private sector and in the civil service, receive the annual bonus, an extra payment equal to their monthly pension.

Contributory means-tested benefits

These benefits are paid to insured private sector workers. Entitlement is subject to an individual income test, irrespective of the economic condition of the household in which the person lives. This kind of benefit amounts to about 5 per cent of total cash transfers. The contributory means-tested benefits are:[10]

Unemployment insurance (s*eguro desemprego*)

The maximum amount of this benefit in 2003 was 449.04 reais (a little below two minimum wages) per month. Each unemployed worker may receive the benefit for up to five months. In 2003 the number of recipients of unemployment insurance was about 5.0 million people.

Salary bonus (a*bono salarial*)

This benefit consists of a yearly payment – equal to the monthly minimum wage – made to formal-sector workers with a monthly salary lower than two minimum wages. The programme benefited a total of 5.6 million workers in 2003.

Child benefit (salário família)

This benefit, amounting in 2003 to 13.48 reais per children under fourteen years of age (or disabled of any age), is paid to employees who earn 429.00 reais or less. This programme covered approximately 6.0 million workers in 2003.

[9] A reform enacted in 2003 reduced the replacement rate for civil servants, but the new rule only applies to entrants.

[10] Other contributory (but not means-tested) benefits are maternity and sick leave and accident insurance, which are not analyzed in this study due to lack of data to simulate them.

Non-contributory means tested benefits

These are income support programmes, totalling about 6 per cent of total cash transfers in 2003.

Old-age and disability assistance benefits

These benefits consist of the payment of a minimum wage per month to those who are over 65 or disabled, with per capita household income below one-quarter of the minimum wage. The combined number of beneficiaries of these programmes was above 2.3 million people in 2003.

Bolsa-Família

This is a conditional income transfer programme targeted to poor households. It resulted from the amalgamation in later 2003 of four federal social assistance benefits (*Bolsa-Escola, Bolsa Alimentação, Cartão Alimentação* e *Auxílio-Gás*). Entitlement to this programme involves school attendance (for children and youths) and prenatal and primary care (for pregnant women and children under six years of age). In 2004 the number of beneficiaries exceeded 5.0 million households. As the average benefit is modest (about 71 reais per month per household), the programme's share of overall cash transfers is quite small (less than 3 per cent).

3.2. Tax System

Brazil's tax revenue represented 35 per cent of GDP in 2003, a ratio close to the OECD average. Income tax (combining the personal and corporate systems) raises about 20 per cent of total tax revenue. Although the income tax records do not allow us to completely separate personal tax revenue from corporate tax revenue, it is estimated that personal income tax revenue accounts for about half of total income tax revenue. Payroll taxes contribute to 24 per cent of total tax revenue. Taxes on goods and services (of the value added type) respond for nearly one-third of the total tax burden, and property taxes for 3 per cent. The remainder of tax revenue (about 20 per cent) is mainly raised by turnover taxes.

In its present version the microssimulation model used in this work simulates only the personal income tax and the employee's social security contribution, which we briefly describes below.

Employee's social security contribution

Private sector employees' marginal contribution rates to the social security system ranges from 7.6 to 11.0 per cent, subject to a cap. In effect, for salaries above the cap (1.869,34 reais per month), the marginal employee contribution rate falls to zero.[11] There is a special contribution scheme for rural workers, based on the commercialization of agricultural products (for those who do commercialise their production). However, this scheme has covered only about 14 per cent of rural pensions' expenditure.

[11] Employers contribute a flat 20 per cent rate regardless of the cap.

For civil servants, contribution rates vary among government levels. At the federal level, employees contribute with a flat 11 per cent rate, whereas states levy a contribution ranging from 6 to 14 per cent.

It is worth noting that in 2003 less than one-half of the labour force contributed to the social security system. The combined deficit of the publicly managed social security schemes is about 5 per cent of GDP, which is financed out of taxes based on turnover.

Personal Income Tax

Personal monthly income was taxed in 2003 according to the following rate schedule: an exemption threshold (approximately equivalent to 4.4 minimum wages) and two marginal tax rates, 15 per cent and 27,5 per cent. The main tax reliefs built into the income tax system are the deductions for each dependent person, public and private insurance contributions, and educational and medical expenses. Alternatively, there is the option of a standard general deduction, equivalent to 20 per cent of taxable income. Given the relatively high effective exemption threshold, only about 23 per cent of the Brazilian economically active population might be subject to the payment of income tax.

4. SIMULATING BRAZIL'S TAX-TRANSFER SYSTEM

In this study we implement a prototype tax-benefit microsimulation model for Brazil, the Brazilian Household Microsimulation System (BRAHMS). The model simulates household sector taxes and cash transfers based on the 2003 household survey *Pesquisa Nacional por Amostra de Domicílios* – PNAD. The PNAD is the main microdata source of demographic and socio-economic household characteristics in Brazil. It is a nationally representative rural-and-urban survey covering all Brazilian regions with the exception of the North region's rural area. PNAD's sample size is quite large, including 133,255 households and 384,834 individuals.

The information on pension receipts is taken directly from the PNAD. The data does not allow us to separate pensions paid to former civil servants from pensions paid to former private employees, or even those contributory pensions from the old-age assistance benefit. Thus our analysis takes these three types of pensions in aggregate. While for the incidence analysis conducted in this study it is not necessary to simulate these transfer instruments, future analysis of potential reforms will require this. However as is common in static microsimulation models, the simulation of contribution-based old age pensions is often difficult due to a lack of data on past income and years of contribution.

BRAHMS simulates the annual bonus, the unemployment benefit, the wage bonus, the family benefit and the *Bolsa-Escola* programme.[12] The *Bolsa-Escola* programme was the most important of the four income support schemes that were grouped together in the *Bolsa Família* programme in later 2003, and was the only one for which the PNAD provides information on its effective incidence, thus allowing us to avoid making the

[12] A set of social expenditure items that so far have not been included but which are often relatively more important in developing countries is non-cash social spending, such as health and education benefits. This is especially important for households outside the modern sector as they are often excluded from coverage of social security benefits. This is another future development of this model.

strong assumption that all the households that satisfy the eligibility criteria actually receive the benefit.[13]

As there is no direct information in the PNAD for the personal income tax and the social security contribution, BRAHMS also simulates their values applying the legislation of the tax system to each individual or family in the PNAD microdata set. The estimates were then compared to available administrative data and adjusted to better reflect the effective incidence on these taxes.

5. RESULTS

In this section we use the BRAHMS model to describe the incidence of different types of government transfers and taxes on households. To do this, we use a set of income concepts. The starting point is *initial income*, which is the total annual income of all members of the household before the deduction of taxes or the addition of any social benefits. Cash benefits are added to initial income to obtain *gross income*. Personal income tax and employee social security contribution are deducted from gross income to give *disposable income*.

Table 6 presents some socio-economic characteristics of the Brazilian households by decile group. This information may help to better understand the results about the incidence of taxes and benefits.

4.1. Total Redistribution

As said in section 1, the relatively low levels of income inequality of developed countries found in Figure 1, to an extent, reflect the impact of their tax and benefit systems.[14] By contrast, Brazil has not been able to use tax and transfers policies effectively to reduce income inequality. This is illustrated in Table 1, which summarises the estimated impacts of cash transfers and direct taxes on the distribution of income in Brazil. It shows that the richest 10% of households (according to per capita gross income) receive 46% of all initial income. This compares with only 0.8% for households in the bottom decile group.

The distribution of gross income, which includes government cash transfers, shows a very similar pattern as the distribution of initial income. In particular, the top decile's share remains virtually the same (45.8%), while the share appropriated by the first decile remains unchanged at 0.8%. Note that there is a small increase in ratio of the income share of the top 20% to the share of the bottom 20%, from 23.1 to 23.8.

The third column of Table 1 shows that the personal income tax and the employee social security contribution, altogether, reduce the share of the richest 10% to 44.1% but leave unchanged the share of the poorest 10% (0.8%). This effect reflects the fact that almost all personal income tax revenue (97%) and about 36% of social security contributions are collected from the top income decile, while the average burden of direct taxes on the first decile is insignificant (see Table 2).

4.2. Progressivity of Individual Instruments

[13] The *Bolsa-Família* programme was not simulated because it was not captured in the 2003 PNAD data. The programme was implemented in October 2003, while the PNAD data were collected taking September 2003 as the month of reference.
[14] See, for instance, Beer et al. (2001).

In this section, we consider the redistributive effect and the progressivity of the individual instruments of the tax-benefit system. We use measures based on the Lorenz Curve to examine the degree of redistribution and progressivity.[15] The Lorenz Curve for pre-tax market income (L_M) is simply a graph of the cumulative population share versus the cumulative income for the population ranked by order of their income. The Gini coefficient is a standard index of inequality, defined in equation (1):

$$G_M = 1 - 2\int_0^1 L_M(p)dp \qquad (1)$$

where p is the cumulative population share and $L_M(p)$, the Lorenz Curve at point p.

A population with no income inequality would have a Lorenz Curve of 45° and therefore a Gini of 0. If Lorenz Curve 1 lies completely outside curve 2, then it is possible to say that population 1 has greater inequality than population 2, with $G_1 > G_2$. However if the Lorenz Curves cross, it is not possible to make inequality comparisons without using further value judgments.

The index used here to measure redistribution is the Reynolds-Smolensky index, which is defined as the difference between the Gini coefficients for "base" income (defined here as initial income M) and post-instrument income (M'), defined in equation (2):

$$L = G_M - G_{M'} \qquad (2)$$

Progressivity is a measure of the difference between the level of redistribution of an instrument relative to an instrument with the same revenue effect but where the effect is proportional to income. It is therefore a measure of the incidence of an instrument. In this paper we use the Kakwani index of progressivity, which is the difference between the concentration index C for the instrument T in question and the Gini for initial income:

$$K = C_T - G_M \qquad (3)$$

The index C_T is similar to the Gini measure, being derived from a type of Lorenz curve, called concentration curve, in which the individuals are ordered according to their initial incomes, and the proportion of the population is related to the corresponding proportion of the instrument incident on those individuals (tax paid or transfer received).

If policy instruments are based on characteristics other than income, then income units may have a different order of incomes before and after the operation of the instrument. For example pensions are targeted at households with elderly people and so households with elderly people will receive subsidies while other households will not. This type of redistribution is known as horizontal redistribution. Changes in the order of income units in a distribution will result in the Lorenz curve of post-instrument income being different from its concentration curve. The Atkinson-Plotnick reranking index is the measure of horizontal equity we use, defined as:

$$P = (G_{M'} - C_{M'})/2G_{M'} \qquad (4)$$

[15] The methods described here are standard methods for examining the degree of redistribution and progressivity in tax-benefit system (see, for example, Palme, 1996, and Creedy, 1997).

The concentration index, $C_{M'}$, involves ranking by M and the Gini inequality index, $G_{M'}$, involves ranking by M', so that an absence of re-ranking implies that P = 0 (Creedy, 1997).

The redistributive effect of a policy instrument depends upon the size of the instrument and the progressivity or degree of targeting. For example, a well-targeted low value instrument may have a lower degree of redistribution than a poorly-targeted high value instrument.

The average amounts of taxes paid by each household decile group are shown in Table 2. Although the income tax is usually at the centre of the tax policy debate in Brazil, one can observe that the burden of payroll taxes is greater for all household groups, except for the top decil. Personal income tax is important only to the households in the top decile group, representing, in average, 7.2% of their gross income.

In Table 3 we decompose the amount of the redistribution due to each of the instruments. We consider first how targeted expenditure is utilising the Kakwani progressivity index. Reflecting progressivity patterns found throughout the world, personal income taxes are the most progressive of the direct taxes, with a Kakwani index of 0.146. Overall, as shown in Table 2, the burden of social security contribution borne by households is higher than the income tax burden, except for the top decile group. This reflects the fact that there is a ceiling in the contribution of private employees. Thus social insurance contributions are progressive but less so (0.009) than the personal income tax system. One should note that the low level of social security contribution in the first deciles reflects the fact that there is a sizeable proportion of informal workers in these income groups.

Combining the size of the instruments (column A) with the knowledge we have about their progressivity (column B), we can determine how redistributive each instrument is. Personal income taxation although of relatively low importance, has the highest redistributive effect among the direct taxes, driven primarily by the strength of the progressivity effect.

Concerning the transfer system, Table 3 shows that pensions are the most important category at 25% of initial income, with all other benefit types being less than 2,1% of initial income. Each of the transfer types is proportionally more targeted at the poorest deciles. However we must note that the ranking measure used by these statistics is initial income, in other words income before transfers and taxes. The inclusion of the transfers in household income may move a poor household measured on this income up the income distribution. We see this effect in the Atkinson-Plotnick reranking index, where pensions induce the largest reranking of households of any instrument. When we rank by gross income as the case in Table 2, we can see that the targeting of pensions is reduced or even eliminated by this reranking.

The annual bonus and unemployment benefits are the next biggest transfer categories. Reranking is much lower. The wage bonus is the least targeted transfer. On the other hand, the *Bolsa Escola* instrument, because it is not restricted to households in the formal sectors, is very targeted, with Kakwani index of 1.031.

Turning to the redistributive impact of the instruments, we see that on the whole redistribution is quite small, reducing inequality by about 6% points. Most of this is

driven by the pension system. However as per the discussion above, we note the degree of reranking due to the system.

4.3. Comparison with Other Countries

How does the redistribution observed in Brazil compare with redistribution in other countries? In this section we contrast redistribution in Brazil with that observed in fifteen countries of the European Union.

Table 5 shows the Gini coefficient for the initial and disposable income concepts for the sixteen countries considered. The size of the levelling of income distribution through the benefit and tax system can be measured by means of the Gini coefficient. The difference between the Gini coefficients of the different income concepts is indicative of the degree of redistribution inherent in the difference between incomes. We notice that the reduction in the Gini coefficient due to the tax-benefit system is much smaller in Brazil than in the EU countries. In the latter, the Gini coefficient is reduced, on average, in 37%, from 0.52 to 0.32, whereas in Brazil the Gini coefficient is reduced in only 10%, from 0.63 to 0.56. Even the EU country with the lowest redistribution, Italy, has triple the reduction in Brazil.

4.4. Poverty Efficiency of Benefits

Although the reduction of income inequality is one of the objectives of taxation and transfer systems, a more focused objective is the reduction of poverty. Here we consider how effective Brazilian transfer instruments are at reducing poverty. In Table 4 we describe a number of measures (see Weisbrod, 1970; Beckerman, 1979) of the poverty efficiency of transfers in Brazil compared with means-tested instruments in Southern European countries, as reported in O'Donoghue et al. (2003), for each of the schemes mentioned before. Figure 3, due to Beckerman (1979), describes the impact of transfers on disposable income. The measures we use to examine the target efficiency of social assistance are based on this diagram.

- The first measure is Vertical Expenditure Efficiency (VEE), meaning the share of total expenditure going to households who are poor before the transfer and is equal to $(A + B)/(A + B + C)$ from Figure 3.

- The next indicator is the Poverty Reduction Efficiency (PRE), defined as the fraction of total expenditure allowing poor households to reach the poverty line without overcoming it and is defined as $(A)/(A + B + C)$.

- The Spillover index (S) is a measure of the excess of expenditure with respect to the amount strictly necessary to reach the poverty line, $(B)/(A + B)$. Combining, we can see that the VEE (1 - S) = PRE.

In fact, these three measures are not sufficient to evaluate how good a transfer system is in fighting poverty: A transfer program could be very efficient in reaching the poor, but its amount could be too low to produce a significant increase in the living standards of the beneficiaries. We thus need another indicator, the Poverty Gap Efficiency (PGE), which shows how effective a cash benefit is in filling the poverty gap, $A/(A+D)$. The measures compare the effectiveness of instruments in closing the pre-transfer poverty gap, defined in terms of disposable per capita income before transfers, and with the poverty line given by half the minimum wage (120.00 reais, equivalent to 63,8% of median post-transfer disposable per capita income).

Table 4 reports the target efficiency results for Brazil and for the Southern European countries. The Brazilian instruments can be divided into two groups, (i) contributory benefits: pension, annual bonus, unemployment benefit, salary bonus and child benefit; and (ii) *Bolsa-Escola*, which is an assistance benefit.

In the first group, the poverty efficiency is low. In fact only 17% of pension expenditure reduces poverty, with the remaining proportion bringing people who would be below the poverty line above the poverty line or in the case of 48% of the instrument going to households above the poverty line even in the absence of the instrument. Efficiency is also low for the wage bonus, with over two-thirds of the benefit going to people above the poverty line. For the unemployment benefit, the focus on the poor represents 39% of the expenditure with the benefit. The child benefit is the most efficient among the contributory benefits, with about half of its expenditure reducing poverty.

The *Bolsa-Escola* exhibits a high degree of targeting, with PRE of nearly 80%, indicating that it is an efficient anti-poverty instrument. However because this instrument is relatively unimportant in terms of expenditure, they reduce poverty by less than pensions despite the low targeting of the latter.

6. CONCLUSIONS

This study offers additional evidence to the conclusion reached by Chu et al. (2002) that the redistributive effects of tax-benefit systems in developing (and transition) countries are much less expressive than those observed in developed countries. In the case of Brazil, however, the problem cannot be associated to a low tax-to-GDP ratio, but to the fact that social spending bears little relation to need. This is particularly true of social security pensions, which are concentrated on the most well-off households. Although assistance programs like *Bolsa Escola* are well focused on the most vulnerable population, the budget devoted to these programs is still a minuscule share of total social spending.

Many researchers and policy-makers in Brazil have argued that the tax side of the budget should play a more significant redistributive role. However, the predominance of indirect taxes and the way the progressivity of the personal income tax interacts with the highly unequal income distribution render the tax system a poor redistributive tool. Furthermore, experience has shown that the most affluent groups have managed to benefit most from tax breaks and allowances or indeed from any opportunity for tax reduction (or evasion) provided by the tax legislation in Brazil.

In a society as unequal as the Brazilian one, political economy considerations should be central to any proposal intended to improve the way tax and benefits are distributed amongst its population. Our view is that the tax-benefit system should be as simple and transparent as possible, with the expenditure side of the budget as the fundamental redistributive instrument – primarily through the provision of basic services and well-targeted direct transfers to households. We think that the visibility and understanding of the tax and benefit system is a key condition to motivate and empower people to demand, through the democratic process, more effective redistributive policies.

In this paper in addition to the policy implications of this study, we have also addressed a number of potential technical modelling developments that are desirable and as such create an agenda for future work:

1. In order to aid future policy reform analysis, it would be desirable to extend the number of instruments simulated in the model to include as many benefit instruments as is technically possible. This would allow analysts to evaluate benefit design changes.

2. Part of the revenue raised by some of the taxes included in the present study is used to finance government services that have an important effect on household living standard, such as health and education. However, this study has focused on the impact on current monetary incomes. A more comprehensive approach, simulating non-cash welfare services, would result in a more significant impact of the Brazilian tax-benefit system on the welfare of the lower income groups.

3. As the most important revenue source, indirect taxation is a large potential area for reform and analysis. However because our data source, the PNAD, does not incorporate expenditure information, imputation from other sources is required. It is planned to include indirect taxes in our model by statistically matching household expenditure information from other surveys into our base survey.

REFERENCES

Amsberg, J. von et al. (2000) "A Focalização do Gasto Social sobre a Pobreza no Brasil", in R. Henriques (org.) *Desigualdade e Pobreza no Brasil*. Rio de Janeiro: IPEA.

Atkinson A.B. and F. Bourguignon (1990) "Tax-benefit Models for Developing Countries: Lessons from Developed Countries", Ecole Normale Superieure, *DELTA Working Paper* 90-15, Paris.

Atkinson A.B., F Bourguignon, C O'Donoghue, H Sutherland and F Utili (2002) "Microsimulation of Social Policy in the European Union: Case Study of a European Minimum Pension", *Economica*, vol. 69, No. 274.

Baldini, M., C. O'Donoghue, D. Mantovani (forthcoming) "Modelling the Redistributive Impact of Indirect Taxes in Europe: An Application of EUROMOD", *EUROMOD Working Paper* No. 7/01, Microsimulation Unit, University of Cambridge, Cambridge.

Barros, R. P. and M. Foguel (2000) "A Focalização dos Gastos Públicos Sociais e Erradicação da Pobreza no Brasil", in R. Henriques (org.) *Desigualdade e Pobreza no Brasil*. Rio de Janeiro: IPEA.

Beckerman W. (1979) "The Impact of Income Maintenance Payments on Poverty in Britain, 1975". *Economic Journal*, vol. 89.

Beer, P. et al. (2001) "Measuring Welfare State Performance: Three or Two Worlds of Welfare Capitalism", Luxembourg Income Study Working Paper No. 276, Maxwell School of Citizenship and Public Affairs, Syracuse University, New York.

Chu, K. et al. (2000) "Income Distribution, Tax, and Government Social Spending Policies in Developing Countries", Working Paper No. 214, World Institute for Development Economics Research, The United Nations University, Helsinki.

Creedy, J. (1997) "Evaluating Income Tax Changes and the Choice of Income Measure", Department of Economics, University of Melbourne, Research Paper No. 577.

Deaton, A (1998) *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*. Washington, D.C.: World Bank.

EUROMOD (2004) "Distribution and decomposition of disposable income in the European Union", Euromod Statistics on Distribution and Decomposition of Disposable Income, Microsimulation Unit, Department of Applied Economics, University of Cambridge, available at http://ww.econ.cam.ac.uk/dae/mu/emodstats/DecompStats.pdf

Ferrera M. (2001) "Targeting Welfare in a "Soft" State: Italy's Winding Road to Selectivity". In: N. Gilbert (ed.) *Targeting social benefits. International Perspectives & trends*. New Brunswick, New Jersey: Transaction Publishers.

Immervoll H. and C. O'Donoghue (2001) "Towards a Multi-Purpose Framework for Tax-Benefit Microsimulation". *EUROMOD Working Paper* No. 2/01, Microsimulation Unit, University of Cambridge, Cambridge.

Lakin, C. (2001) "The Effects of Taxes and Benefits on Household Income, 1999-2000", *Economic Trends*, No. 569, April, Office for National Statistics, United Kingdom.

Levy, J. V. et al. (2002) *Orçamento Social da União - 2000*, Secretaria de Política Econômica, Ministério da Fazenda, Brasília.

Meerman, J. (1979) *Public Expenditure in Malaysia: Who Benefits and Why*. New York: Oxford University Press.

Ministry of the Economy (2005) *Orçamento Social do Governo Federal 2001-2004*, Secretaria de Política Econômica, Ministério da Fazenda, Brasília; available electronically at http://www.fazenda.gov.br/portugues/releases/2005/OS200429abr.pdf

Mitrusi, A. and J. Poterba (2000) "The Distribution of Payroll and Income Tax Burdens, 1979 – 1999", National Bureau of Economic Research, Working Paper No. 7707, Cambridge, MA.

O'Donoghue C., J. L. Albuquerque, M. Baldini, O. Bargain, P. Bosi, H. Levy, D. Mantovani, M. Matsaganis, M. Mercader-Prats, C. Farinha Rodrigues, A. Spadaro, S. Toso, I. Terraz and P. Tsakloglou (forthcoming) "The Impact of Means Tested Assistance in Southern Europe", in V. Atella (ed.) *Le Politiche Sociali in Italia ed in Europa Coerenza e Convergenza nelle Azioni 1999-2001*. Bologna: il Mulino.

O'Donoghue, C. and F. Utili (2001) "Micro-Level Impacts of Low Wage Policies in Europe", forthcoming, in Salverda W., B. Nolan and C. Lucifora (eds.), *Policy Measures for Low-Wage Employment in Europe*.

OECD (2005) *Economic Survey of Brazil 2005*, Economics Department, Organisation for Economic Co-operation and Development, Paris.

Palme, M., (1996) "Income Distribution Effects of the Swedish 1991 Tax reform: An Analysis of a Microsimulation Using Generalised Kakwani decomposition", *Journal of Policy Modelling*, Vol. 18, No. 4.

Piachaud, D. and H Sutherland, (2000) How Effective is the British Government's Attempt to Reduce Child Poverty? CASE paper 38, CASE, London School of Economics, London.

Ramos, C. A. (2000) "Impacto Distributivo do Gasto Público: Uma Análise a Partir da PCV/1998", Texto para Discussão No. 732, IPEA, Rio de Janeiro.

Redmond, G., H. Sutherland, and M. Wilson (1998) *The Arithmetic of Tax and Social Security Reform: A User's Guide to Microsimulation Methods and Analysis*. Cambridge: Cambridge University Press.

Schiefelbein, E.. (1997) "School-Related Economic Incentives in Latin America: Reducing Drop-Out and Repetition and Combating Child Labour", *Innocenti Occasional Papers, Child Rights Series* (CRS 12), UNICEF International Child Development Center, Florence.

Selowsky, M. (1979) *Who Benefits from Government Expenditure?: A Case Study of Colombi*a, New York: Oxford University Press.

Siqueira, R. B., J. R. Nogueira and H. Levy (2002) "The Effects of Federal Taxes and Benefits on Household Incomes in Brazil", paper presented at the workshop *Evaluating the Impact of Policy on Poverty and Distribution: Models and Experiences of Brazil and the World Bank*, World Bank e FIPE/USP, São Paulo, July, mimeo.

Siqueira, R. B., J. R. Nogueira e H. Levy (2003) "Política Tributária e Política Social no Brasil: Impacto Sobre a Distribuição de Renda Entre os Domicílios", in D. Benecke e R. Nascimento (eds.) *Política Social Preventiva: Desafio para o Brasil*, Rio de Janeiro: Fundação Konrad Adenauer.

Siqueira, R. B., J. R. Nogueira and E. S. Souza (2000) "Os Impostos Sobre Consumo no Brasil São Regressivos?", *Economia Aplicada*, vol. 4, No. 4.

Siqueira, R. B., J. R. Nogueira and E. S. Souza (2001) "A Incidência Final dos Impostos Indiretos no Brasil: Efeitos da Tributação de Insumos", *Revista Brasileira de Economia*, vol. 55, No. 4.

Sundrum, R.M. (1990) *Income Distribution in Less Developed Countrie*s, London, New York: Routledge.

Stern, N., (2002) "Public Finance and Policy for Development: Challenges for India", NIPFP Silver Jubilee Lecture, http://www.econ.worldbank.org/files/11413_Nick_Stern_NIPFP_revised_Feb_28-02.pdf .

Weisbrod B. (1970) "Collective Action and the Distribution of Income: a Conceptual Approach". In: R. Haveman and J. Margolis (eds.), *Public Expenditure and Policy Analysis*. Chicago. IL: Markham.

TABLES AND FIGURES

Table 1 – Percentage shares of household income, ratios of share of the top 20% to share of bottom 20% and Gini coefficients

	Initial Income	Gross Income	Disposable Income
Decile Group			
Bottom	0,8	0,8	0,8
2nd	1,9	1,8	1,9
3rd	2,6	2,6	2,8
4th	3,5	3,6	3,7
5th	4,6	4,7	4,8
6th	6,4	6,1	6,3
7th	7,0	7,8	8,0
8th	10,8	10,7	10,9
9th	16,3	16,2	16,6
Top	46,0	45,8	44,1
All households	100	100	100
Ratio of share of top 20% to bottom 20%	23.1	23.8	22.5
Gini coefficient	0,6301	0,5783	0,5646

Notes:

1. Initial Income: total annual income of all members of the household before the deduction of taxes or the addition of any state benefits.
2. Gross Income: Initial Income plus state benefits.
3. Disposable Income: Gross Income minus direct taxes and employee social security contributions.

Table 2 – Average Incomes, Taxes and Transfers by Decile Group - Brazil – 2003 (R$ per Year)

	Deciles of Individuals Ranked by Per Capita Gross Household Income									
	Bottom	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**Top**
Initial Income	1,307	3,044	4,036	4,691	6,221	7,774	6,949	11,693	16,437	42,734
Transfers	271	759	1,215	1,433	1,889	1,743	2,933	3,123	4,677	11,827
Pension	93	474	863	1,099	1,502	1,408	2,549	2,711	4,203	10,856
Annual Bonus	8	39	72	92	125	117	212	226	350	905
Unemployment Benefit	56	68	98	103	123	119	103	123	93	56
Wage Bonus	12	25	43	40	53	47	40	43	24	8
Family Benefit	20	68	79	64	59	40	24	16	7	2
Bolsa Escola	81	84	61	35	26	11	4	2	1	0
Gross Income	1,578	3,803	5,251	6,124	8,110	9,516	9,881	14,815	21,114	54,561
Direct Taxes	11	70	131	184	281	379	388	677	1,067	5,607
Social Contribution	11	70	131	184	281	379	387	670	948	1,701
Income Tax	0	0	0	0	0	0	1	8	119	3,906
Disposable Income	1,567	3,733	5,120	5,940	7,829	9,137	9,494	14,138	20,047	48,954

Table 3. Progressivity and Redistributive Effect of the Brazilian Tax-Benefit Instruments

	Rate	Progressivity – Kakwani	Redistribution - Reynolds Smolensky	Reranking – Atkinson Plotnick
	A	B	C	D
Taxes				
Personal Income Tax	0.0434	0.1462	0.0047	0.0019
Social Contribution – Employee	0.0457	0.0092	0.0001	0.0003
Direct Taxes	0.0891	0.0758	0.0050	0.0024
Benefits				
Pension	0.2495	0.7396	0.0442	0.1034
Annual Bonus	0.0208	0.7396	0.0123	0.0028
Unemployed Benefit	0.0078	0.5692	0.0038	0.0006
Wage Bonus	0.0027	0.4992	0.0013	0.0000
Family Benefit	0.0028	0.7054	0.0019	0.0000
Bolsa-Escola Program	0.0020	1.0306	0.0021	0.0000
Total Benefits	0.2856	0.7344	0.0519	0.1113

Note: The base income used is initial income. In other words, the progressivity of an income is expressed relative to the progressivity of initial income. The rate refers to the instrument as a proportion of initial income and redistribution measures the change in the distribution of income through the inclusion of the instrument in question.

Table 4. Poverty Efficiency of Brazilian Benefits compared with Social Assistance Instruments in Southern European Countries

	VEE	PRE	S	PGE
Brazil	51.4	17.1	66.7	45.7
Pension	51.8	17.2	66.9	40.0
Annual bonus	51.8	44.2	14.7	8.6
Unemployment benefit	38.6	32.4	16.1	2.4
Wage bonus	31.5	28.9	8.3	0.7
Family benefit	51.8	49.5	4.5	1.3
Bolsa Escola	80.7	79.5	1.5	1.5
Social Assistance (Means-tested Child Benefits)				
France	45.5	36.5	19.8	41.9
Greece	26.2	24.3	7.2	4.4
Italy	63.4	56.3	11.2	19.9
Portugal	33.2	32.5	2.0	15
Spain	55.9	51.7	7.5	6.8
Social Assistance (Other Means-tested Benefits)				
France	60.0	43.2	28.0	72.5
Greece	55.3	47.2	14.6	23.9
Italy	51.9	39.3	24.4	14.4
Portugal	60.5	46.4	23.3	30.9
Spain	53.5	39.9	25.4	33

Source: Brazil - authors' calculations; other countries – O'Donoghue et al. (2003)
Notes: (1) Poverty Gap is as a percentage of total disposable income; (2) Poverty Headcount as a percentage of total population; (3) VEE - Vertical Expenditure Efficiency, PRE - Poverty Reduction Efficiency, S - Spillover Index, PGE - Poverty Gap Efficiency.

Table 5 – Impact of Transfers and taxation on Income Distribution (measured by the Gini coefficient)

	Renda Inicial A	Renda Disponivel B	Overall Impact (A-B)/A
Finland	0.48	0.25	0.49
Belgium	0.50	0.26	0.48
Denmark	0.46	0.24	0.48
Austria	0.44	0.23	0.47
Luxembourg	0.48	0.26	0.47
Germany	0.47	0.26	0.45
France	0.49	0.29	0.41
Sweden	0.50	0.30	0.40
Netherlands	0.41	0.25	0.39
United Kingdom	0.50	0.31	0.38
Spain	0.52	0.33	0.37
Ireland	0.52	0.32	0.37
European Union 15	0.51	0.32	0.37
Greece	0.48	0.34	0.31
Portugal	0.51	0.36	0.30
Italy	0.50	0.35	0.29
Brazil	0.63	0.56	0.10

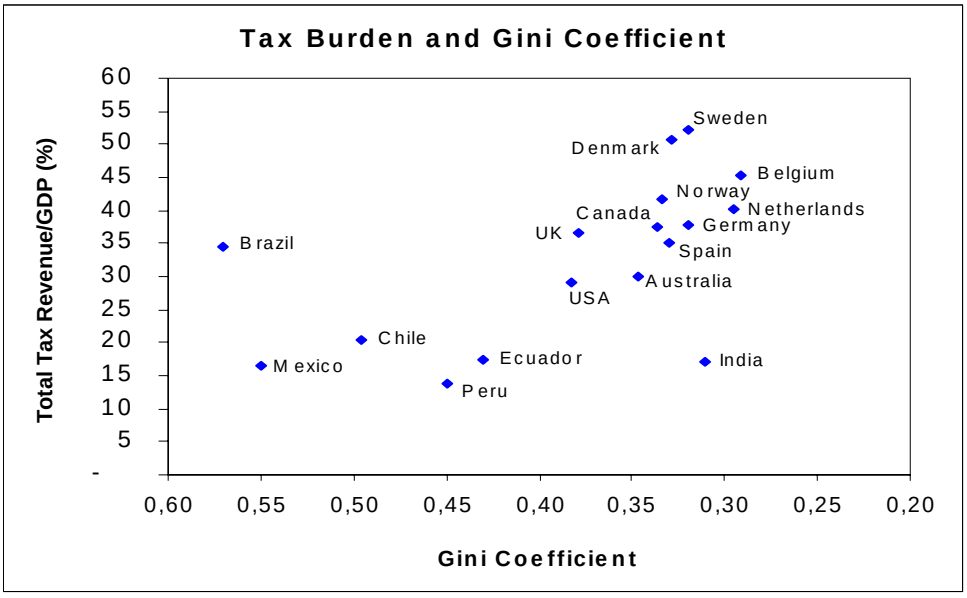
Source: European countries - EUROMOD (2004); Brazil - authors' calculations

Table 6 – Household Characteristics - Brazil

	Deciles groups ranked by per capita gross household income											
	Bot-tom	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Top**	**Brazil**	**Poor**
Average Number per Household												
Number of individuals												
children (up to 16 years)	2.4	2.0	1.5	1.3	0.8	0.8	0.7	0.6	0.5	0.4	1.1	2.1
working age adults (17 to 64 years)	2.3	2.4	2.3	2.4	1.9	2.3	2.2	2.1	2.2	2.0	2.2	2.4
old age adults (65 years or more)	0.1	0.1	0.2	0.2	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.1
Economically active people	1.8	1.9	1.8	1.9	1.6	1.9	1.9	1.8	1.8	1.6	1.8	1.9
Composition (percentage)												
Household type												
couple with children	62.4	64.8	55.0	57.7	43.7	52.3	48.8	45.4	45.1	39.6	51.5	63.8
couple without children	6.2	5.6	12.2	11.9	15.6	16.1	17.4	18.5	19.6	22.3	14.4	6.1
mother with children	22.0	23.2	22.6	21.6	16.2	18.4	16.6	14.7	14.2	10.5	18.1	22.4
alone person	6.1	1.5	2.7	2.6	18.2	6.5	10.0	15.0	14.1	21.2	9.9	3.6
other	3.3	4.8	7.4	6.2	6.2	6.6	7.3	6.4	7.0	6.3	6.1	4.1
Occupation (head of household)												
formal employee	7.4	21.4	24.7	29.4	25.3	31.3	31.3	29.3	26.3	23.6	24.8	16.5
informal employee	21.4	23.9	18.6	16.4	12.0	11.8	11.0	8.8	7.8	6.2	13.8	22.4
civil servant	1.0	2.1	2.3	3.1	3.5	5.1	6.2	7.8	9.6	12.2	5.2	0.5
self-employed	31.4	26.9	24.0	24.3	18.7	23.8	22.7	22.0	20.7	16.0	22.9	29.0
employer	0.9	0.9	1.4	2.1	1.9	3.6	4.2	5.9	10.1	18.4	4.9	1.0
own consumption	3.6	2.3	2.5	2.0	3.4	1.5	1.4	1.5	0.9	0.3	2.0	2.7
other occupied	0.6	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	1.7
retired non-occupied	0.2	0.4	0.6	0.5	0.6	0.3	0.5	0.4	0.3	0.5	0.4	0.3
other non-occupied	33.5	21.7	25.6	21.9	34.5	22.2	22.4	23.8	23.9	22.3	25.5	25.9
Geographical Area												
metropolitan	43.5	50.9	53.5	55.0	55.9	54.1	56.0	54.6	52.5	47.5	33.2	25.0
urban non metropolitan	25.6	23.8	26.6	29.5	29.6	34.1	34.2	38.0	42.8	49.8	52.4	48.4
rural	30.9	25.3	19.9	15.5	14.5	11.8	9.8	7.3	4.7	2.7	14.3	26.6

Source: PNAD 2003

Figure 1



Source: Siqueira, Nogueira e Levy (2003)

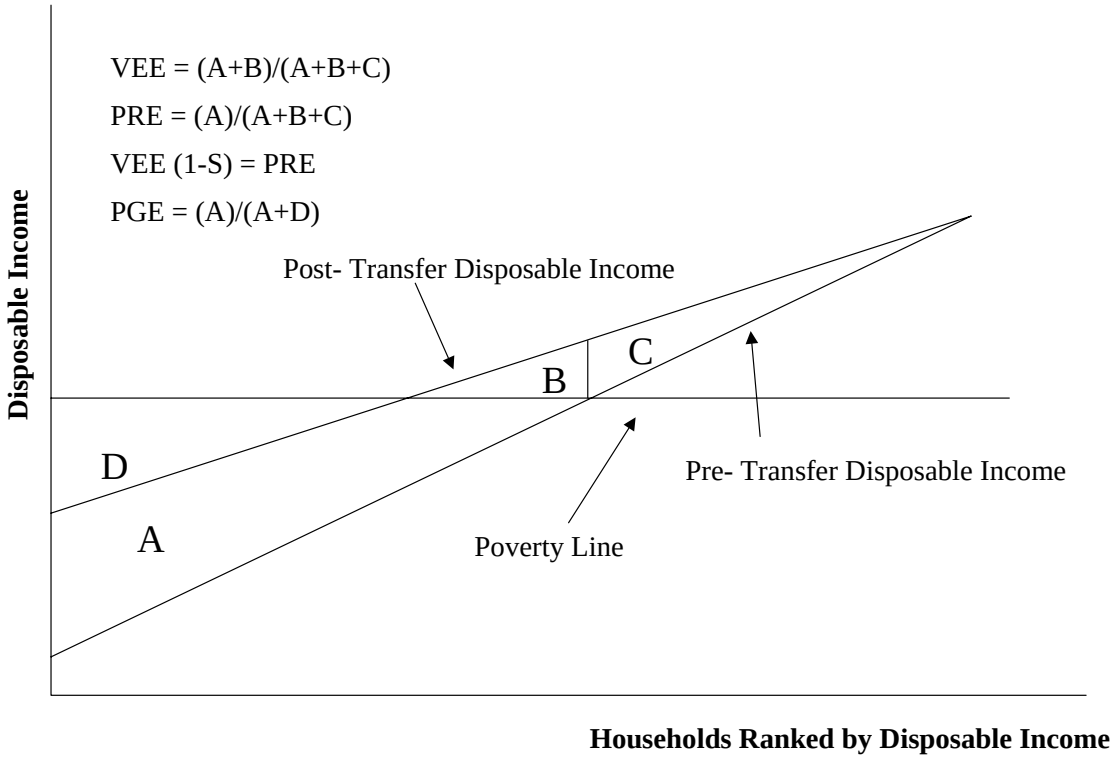



Figure 2. The Efficiency of Social Assistance