

THE EFFECTS OF FEDERAL TAXES AND BENEFITS ON HOUSEHOLD INCOME IN BRAZIL¹

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1. Introduction

Governments affect the standard of living of households through direct income transfers, through the provision of goods and services and by means of taxation. Around 68 per cent of Brazilian households receive some kind of cash transfer from the government, which accounts in average for 30 per cent of their incomes. All households in Brazil pay taxes directly on their income and/or indirectly on their consumption of goods and services, and many benefit from public expenditures on such services as health and education.

Brazil being a country with one of the most unequal income distribution in the world and where a large part of the population faces poverty, it is important to know how the costs and benefits associated with the government budget are distributed among the different socio-economic groups.

This study represents an attempt to identify the types of households which benefit from the federal government expenditures and those which finance them, and the size of gains and losses.

2. Methodology and Definitions

The values of taxes and benefits estimated in this study reflect the methodology adopted. In order to allow a critical interpretation of the results, this section briefly describes the main concepts, assumptions and data sources used.

Unit of analysis

The basic unit of analysis in this study is the household. A household is defined as comprising related or unrelated persons who live in the same dwelling and who usually pool their income. A major reason for using this unit of analysis is that spending on many items, such as housing and electricity, is largely joint spending by the members of the household, so that it would be difficult to apportion indirect taxes between smaller units.

Benefits and taxes allocated

¹ Preliminary version of a research report on the distributional impact of the Brazilian tax-benefit system. Please do not quote.

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Benefits and taxes included in this study are restricted to those federal taxes and benefits that can reasonably be attributed to households. Therefore some government revenue and expenditure are not allocated, such as revenue from corporate taxes and spending on defense.

Some R\$ 121 billion of taxes and R\$ 116 billion of benefits have been allocated to households. This is equivalent to 55% and 54% respectively of total taxation revenue of Federal Government, which totaled around R\$ 216 billion in 1999. The benefits allocated respond for about 77% of the total social expenditure by the Federal Government in 1999.² See Boxes 1 and 2 of the Appendix for a description of each cash benefit and tax allocated in this study.

Cash benefits and direct taxes

Cash Benefits and direct taxes account, respectively, for 76% of the total amount of benefits and 27% of all taxes allocated in the present analysis. The allocation of cash benefits and direct taxes to households was carried out using a tax-benefit microsimulation model based on the 1999 household survey Pesquisa Nacional por Amostra de Domicílios – PNAD.³ Table A in the Appendix shows the estimated distribution of direct taxes among household groups.

The model allocates pensions to households as they are reported in the PNAD. The other cash transfers included in this study, as well as the direct taxes, are simulated by applying the rules for benefit eligibility and for tax liability to each individual or family in the PNAD. The simulated amounts are then validated using administrative data. In average, an above 90% matching with the administrative data have been obtained.

For the Bolsa-Escola programs⁴, we have opted in the present paper to simulate the coverage defined in the 2002 Federal Government budget rather than the 1999 situation. This is because expenditure on these programs have increased drastically since 1999 – yet it still represents only about 2% of the total benefits allocated.

Indirect taxes

In allocating indirect taxes, which amount to 73% of all taxes allocated, it was assumed that their incidence was fully shifted to the final consumer. The amount of indirect taxes paid by households was calculated as follows:

- the effective tax rates on final goods and services were estimated using input-output techniques⁵;

² According to Levy et al (2002), social expenditure by the federal government in 1999 totaled R\$ 150 billion (including tax expenditures for social purposes).

³ This model is an extended version of Micro-Sim, the static microsimulation model for Brazil described in Siqueira and Nogueira (2001).

⁴ This term actually refers to three different programs, the *Bolsa Escola*, the *Bolsa Alimentação*, and the *Bolsa Criança Cidadã*, which were lumped together for purpose of presentation in this paper.

⁵ Details on the methodology are presented in Siqueira et al (2000).

- the estimated tax rates were applied to the 1995/96 household expenditure survey Pesquisa de Orçamentos Familiares – POF to calculate the amount of indirect taxes paid by POF households as a proportion of their incomes;
- these proportions were then used to estimate the payment of indirect taxes by the PNAD households groups defined in this paper.

It should be noted that, since POF covers only metropolitan areas, this procedure assumes that the tax burden on a household elsewhere in the country is the same as that on a metropolitan household with the same income. In addition, it is assumed that the definitions of income in POF and PNAD are compatible. Table B in the Appendix shows the estimated distribution of indirect taxes among household groups.

Non-cash benefits

Non-cash benefits allocated in the present analysis are health and education related to federal government expenditure. The imputed value of benefits were based on the cost to government of the provision of those services. Although this is a standard procedure in incidence studies (see Lakin, 2001), it involves the unrealistic assumption that the quality of the service received is the same for individuals from all income groups.

Health expenditure was distributed to households from information on the use of each type of health services, provided in the 1998 PNAD. Expenditure on public health and health research was distributed equally to each person, given the difficulty of defining who benefited from these outlays. The benefit allocated to households was the sum of each member's benefits.

In allocating education benefits, we used the 1996 Pesquisa sobre Padrões de Vida – PPV, which provides information on the utilization of state education services by individuals in the Southeast and Northeast of Brazil. The estimated distribution of utilization of each kind of educational service across PPV households grouped by income was then used to allocate the 1999 Federal Government expenditures on education among the household groups considered in this study. Table C in the Appendix shows the estimated distribution of health and education services among decile groups of households.

Income concepts

In order to describe the effects of different types of government benefits and taxes on households, this analysis uses 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 state benefits. Cash benefits are added to initial income to obtain **gross income**. Personal income tax and employees and self-employed contributions to social security are deducted from gross income to give **disposable income**. Indirect taxes are then deducted to give **post-tax income**. Finally, the value of federal government non-cash benefits for health and education is added to disposable income to obtain **final income** (see Appendix, Chart 1).

3. Results

In the tables (figures) of results presented below, households are classified in decile (quintile) groups according to each household per capita gross income. Table 1 summarizes the estimated impacts of cash benefits and direct taxes on the distribution of income and on poverty in Brazil. It shows that the richest 10 per cent of households (according to per capita gross income) receive 44.8 per cent of all initial income. This compares with only 0.8 per cent for households in the bottom decile.

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

	Percentage share of income		
	Initial Income	Gross Income	Disposable Income
Decile group ¹			
Bottom	0.8	1.0	1.0
2 nd	1.7	1.9	2.0
3 rd	2.5	2.7	2.8
4 th	3.6	3.6	3.7
5 th	4.6	4.7	4.8
6 th	5.8	6.0	6.2
7 th	8.2	8.0	8.2
8 th	11.3	10.8	11.1
9 th	16.7	16.3	16.6
Top	44.8	45.0	43.6
All households	100	100	100
Ratio of share of top 20% to bottom 20%	25	21	20
Gini coefficient	0.646	0.583	0.569
Proportion of poor households (%) ²	33.5	16.6	17.4

¹ Households ranked by per capita gross income

² Estimated using a poverty line of half the per capita 1999 minimum wage (R\$ 68)

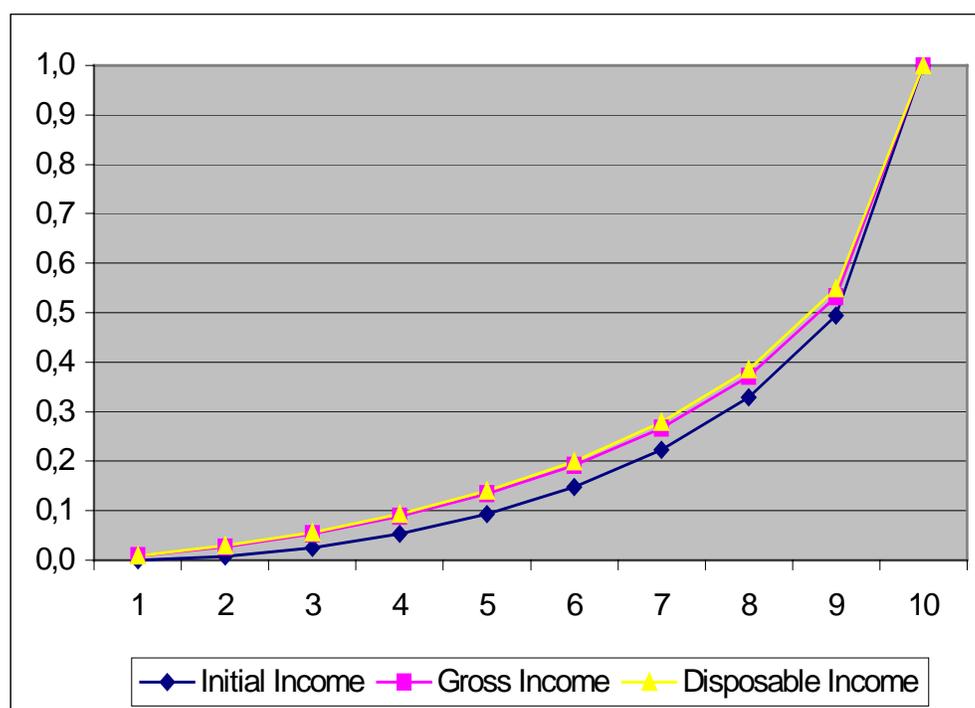
Of total gross income, which includes government cash transfers, the top decile group receives a share of 45 per cent, which is slightly higher than its share of initial income. This results from the fact that this group receives around 46 per cent of all cash payments made by the federal government. However, among the other household groups the distribution of benefits is less unequal than the distribution of initial income. This is reflected by a reduction in the ratio of the share of the top 20 per cent to the share of the bottom 20 per cent, which decreases from 25 to 21 when moving from initial to gross income.

On the other hand, the incidence of income tax and employee's social insurance contribution reduces the share of the top decile group to 43.6 percent. This is because direct taxes, particularly income tax, are highly concentrated on the richest 10 per cent of households (see Table A in the Appendix).

The size of the leveling of income distribution through the benefit and tax system can be measured by means of the Gini coefficient. The difference between the Gini coefficient of the distribution of initial incomes and the Gini of the distribution of gross incomes measures the extent of leveling by the cash transfer system, while the difference between the Gini for gross incomes and the Gini of the distribution of disposable incomes measures the amount of leveling by direct taxation.

As shown in Table 1, the Gini coefficient for initial income is 0.646, falling to 0.583 after the payment of cash transfers. This represents a reduction of approximately 10 per cent in inequality (as measured by the Gini). The direct tax system has a less significant effect on inequality, reducing it in only 2 per cent. These effects are illustrated by the Lorenz curves in Figure 1.

Figure 1 – Lorenz Curves



Looking at the proportion of poor households in the total number of households in Table 1, we can see that the system of cash transfers have prevented many households from falling into poverty. However, due its lack of relation to need, cash transfers leave many households – including households recipients of benefits - in poverty.

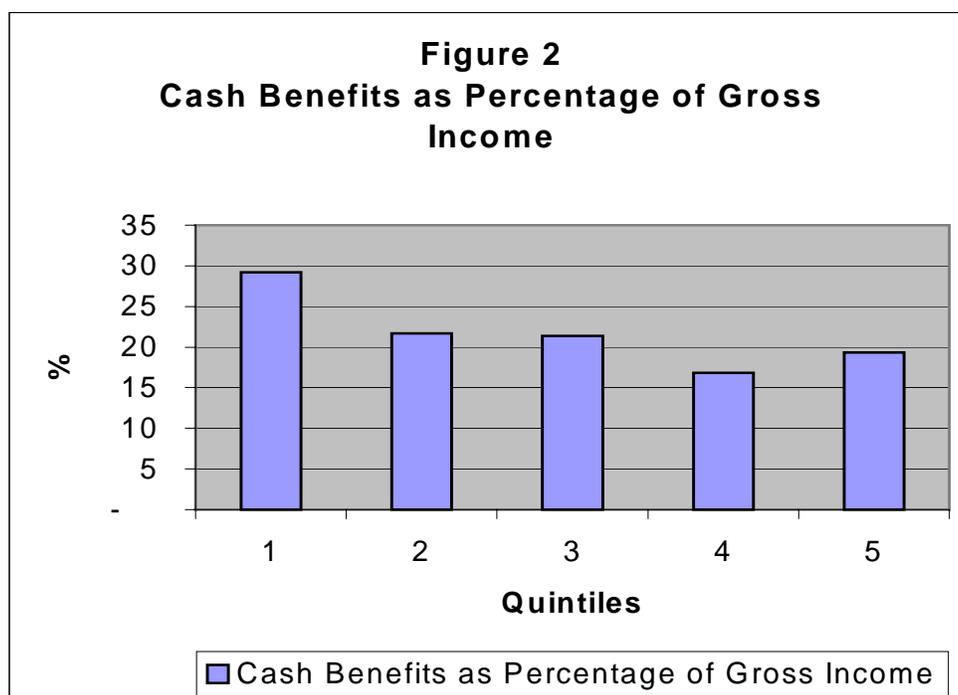
Table 2 offers a more detailed picture of the effects on household incomes of each federal tax and benefit included in this study. In interpreting the results presented in this table, one should keep in mind that the amounts do not take into account differences in household size. Specifically there are more people in households in the lower income deciles.

Table 2 – Average household incomes, taxes and benefits by decile groups (R\$ per year)

	Deciles of households ranked by per capita gross income									
	Bottom	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	Top
Initial Income	1,007	2,171	2,772	3,919	4,592	4,945	7,753	9,969	14,619	33,778
Cash Benefits	472	838	970	885	1,144	1,451	1,652	1,936	3,196	8,410
Pensions	109	355	580	617	817	1,294	1,462	1,776	3,020	8,283
Unemployment Benefit	64	71	76	114	101	66	107	89	111	57
PIS/PASEP e Salário-Família	17	83	100	114	101	77	78	67	60	69
Old Age Benefit	25	41	88	15	118	0	0	0	0	0
Bolsa Escola Programs	257	288	127	26	8	0	0	0	0	0
Gross Income	1,479	3,009	3,742	4,804	5,736	6,396	9,405	11,905	17,815	42,188
Direct Taxes	6	42	76	144	203	247	426	565	1,002	4,255
Personal Income Tax	0	0	0	0	0	0	2	8	145	2,946
Employee Social Contribution	6	42	76	144	203	247	424	556	887	1,309
Disposable Income	1,473	2,967	3,666	4,660	5,533	6,149	8,979	11,340	16,813	37,933
Indirect Taxes	331	511	614	668	792	831	1,176	1,452	1,870	3,164
COFINS	131	208	251	274	312	345	489	607	784	1,350
PIS/PASEP	30	45	56	62	75	77	113	143	178	295
IPI	71	105	120	130	149	147	188	226	267	422
Employer Social Contribution	90	141	172	187	229	243	357	440	588	1,012
Salário-Educação	9	12	15	14	17	19	28	36	53	84
After-Taxes Income	1,142	2,456	3,052	3,992	4,741	5,318	7,803	9,888	14,943	34,769
Non-Cash Benefits	888	831	753	643	598	519	545	532	600	733
Health	754	699	620	514	487	406	318	266	222	133
Education	134	132	133	129	111	113	228	267	378	600
Final Income	2,030	3,287	3,805	4,635	5,339	5,837	8,348	10,420	15,543	35,502

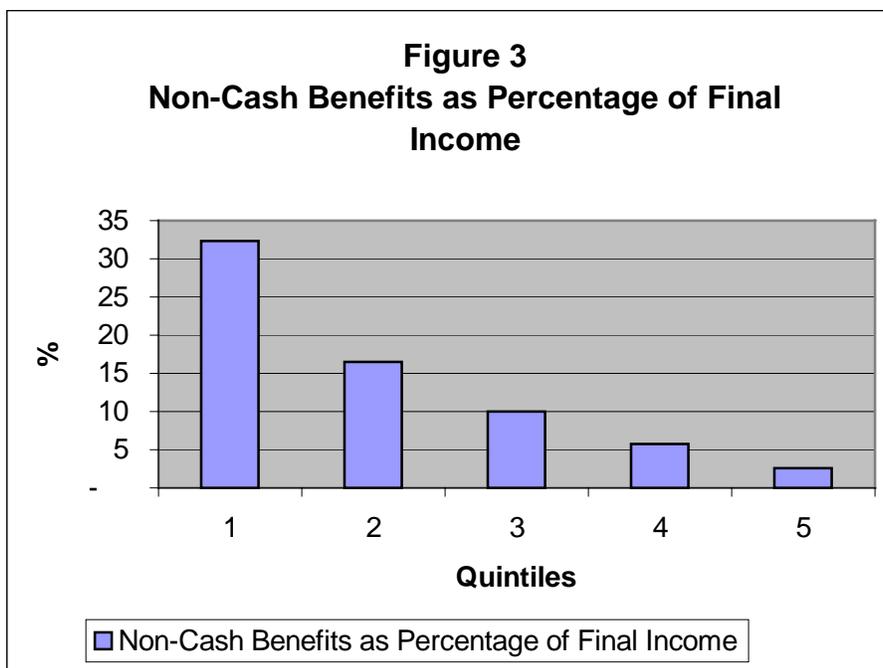
The average cash benefit received by the top decile is around 18 times that received by the bottom decile. As a proportion of gross income, however, these benefits are more important to low income households, as can be seen in Figure 2. Observe that cash benefits reduces the ratio of the average income of the top decile to the average income of the bottom decile

from 33.5 (with initial income) to 28.5 (with gross income). The ratio is further reduced to 25.7 after the payment of direct taxes.

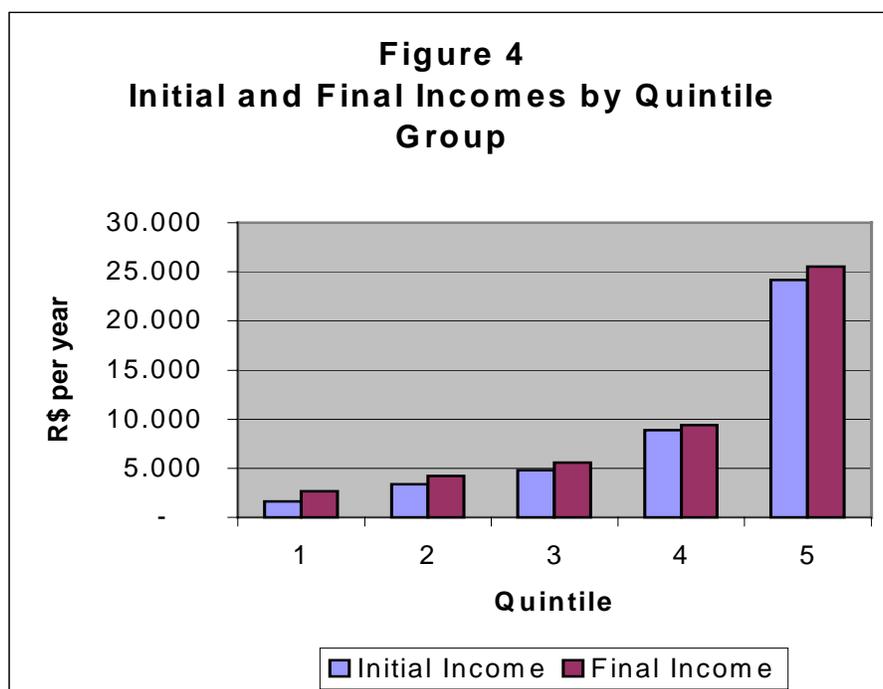


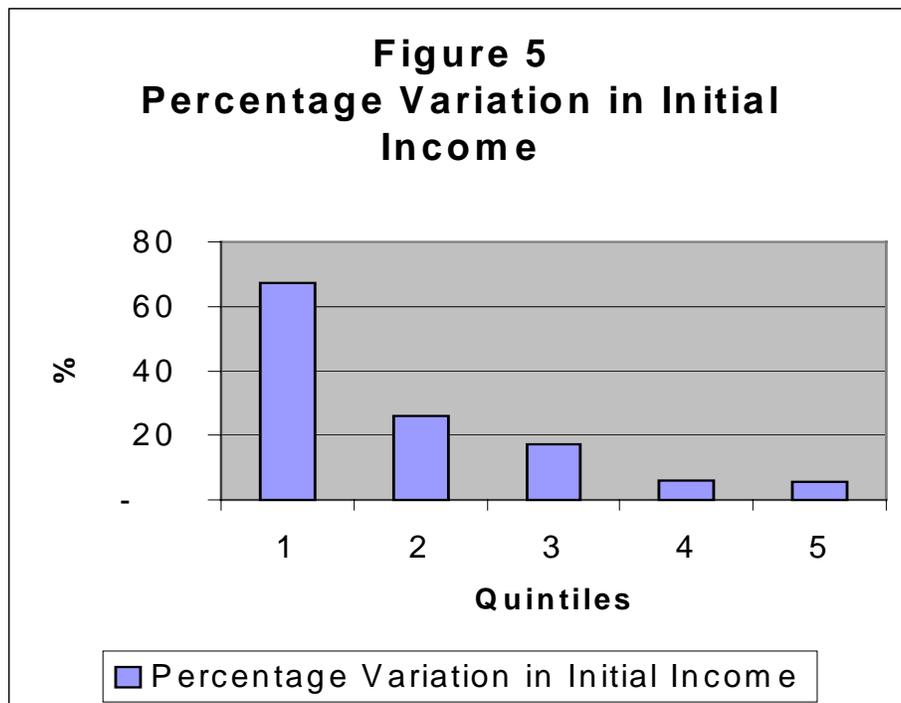
According to Table 2, the average amount of indirect taxes paid by households in the lowest decile represents almost 70 per cent of the average total cash transfers received by them, and is higher than the average Bolsa-Escola benefit paid to households in this decile.

Non-cash benefits are particularly important for the bottom two deciles, amounting to at least 30 per cent of their final income. As shown in Figure 3, the proportion of income represented by non-cash benefits declines smoothly as income increases. For the most affluent 10 per cent of Brazilian households, non-cash benefits accounted for only 2 per cent of final income.



Figures 4 and 5 illustrate the overall effects on household incomes of the federal tax and benefits allocated in this study. They indicate that, although the federal benefits provides a significant supplement to the income of the lowest two income deciles - which have their initial income increased in average by more than 60 per cent - the highly skewed pattern of the distribution of initial income is to a greater extent reproduced in the distribution of final income.





4. Summary and Final Comments

The greatest part of social spending in Brazil bears little relation to need (or the level of household income). This is particularly true for social security pensions, that accounts for around 87 per cent of all cash transfers made to households by the Federal Government, but which incidence is highly concentrated on the most affluent households. Assistance programs like the Bolsa-Escola, on the other hand, are very well focused on the most vulnerable population. However, the budget devoted to these programs is a minuscule share of total social spending.

On the other hand, much of the budget of the social security system is financed by taxes which fall indiscriminately on all households, including those not covered by the system. This study has estimated that the amount of indirect taxes paid by households in the lowest income decile may be equivalent to around 70 per cent of the total cash transfers received by them from the government. It should be observed that most of the federal (as well as state) taxes not included in this analysis is of the indirect type.

This study indicates that access to state health and education services is what makes significantly positive the net effect of federal government expenditure on low income households. For households in the lowest income group, the combined amount of health

and education benefits is nearly two times the total cash benefits they receive. It should be recognized, however, that recipients may value non-cash benefits quite differently from cash benefits.

In terms of inequality reduction and poverty alleviation, the performance of the tax and benefit system analyzed in this paper is deceptively modest given the substantial amount of resources involved. In addition, it can be said that the contribution of the tax system is negligible, with all redistributive role being concentrated on the expenditure side of the government budget.

It must be emphasized that the results presented in this paper provide only a rough guide to the effects of federal taxes and benefits on different household groups. Further developments in the scope and framework of the analysis should improve its accuracy and reliability. In particular, the follow steps should be taken in the future:

- Merging of the income and expenditure data and making the income and expenditure measures more closely compatible;
- Extension of the analysis to incorporate other elements of the government budget, including state and local taxes and expenditures;
- Linking of the microsimulation tax-benefit model to an input-output model.

This more fully articulated model would also introduce more flexibility in the simulations, allowing the sensitivity of the results to the model assumptions to be more easily tested. Further, it would enable us to simulate alternative policy reforms by changing tax and benefit rules and parameters.

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APPENDIX

Table A – Incidence of direct taxes by gross income decile (%)

	Deciles of households ranked by per capita gross income									
	Bottom	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	Top
Share of Revenue										
Personal Income Tax	0	0	0	0	0	0	0	0	3	97
Employee Social Contribution	0	1	2	3	4	6	10	14	22	38
Total	0	1	1	2	2	3	5	7	13	66
Percentage of income										
Personal Income Tax	0	0	0	0	0	0	0	0	1	7
Employee Social Contribution	0	1	2	3	4	4	5	5	5	3
Total	0	1	2	3	4	4	5	5	6	10

Table B – Incidence of indirect taxes* by gross income decile (%)

	Deciles of households ranked by per capita gross income									
	Bottom	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	Top
Share of Revenue	3	4	5	6	7	7	10	13	16	29
Percentage of Income	22	17	16	14	14	13	13	12	11	8
Percentage of Expenditure	15	15	15	15	15	15	15	15	15	15

* Including: IPI, COFINS, PIS/PASEP, Employer Social Contribution and Salário-Educação.

Table C – Percentage Shares of Non-Cash Benefits by Decile Groups

	Deciles of households ranked by per capita gross income									
	Bottom	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	Top
Health	17	16	14	12	11	9	7	6	5	3
Education	6	6	6	6	5	5	10	12	17	27
Elementary School ¹	18	19	13	12	10	9	7	6	4	2
Secondary School ²	3	5	10	11	15	13	13	15	11	4
Higher Education ³	0	0	1	0	0	1	11	15	26	46
Total Non-Cash Benefits	13	13	11	10	9	8	8	8	9	11

1 Ensino Fundamental

2 Ensino Médio

3 Ensino Superior

Box 1 – Cash Transfer Programs

Benefit	Eligibility	Amount and Duration of Benefits	Financing Source
Pensions	Entitlement based on contributions made to the social security system	Earnings-based formula that takes account of years of service or contributions.	Employer and employee social contributions
Unemployment Benefit	Loss of job, other than voluntary quit	Up to 5 months. The amount of the benefit takes account of last wage. The lower benefit threshold is the minimum wage.	Workers Support Fund (Fundo de Amparo ao Trabalhador – FAT)
Family Allowance (salário-família)	Paid for all children less than 14 years old or disabled of any age to employees and temporary workers who earn R\$429,00 or less	Monthly payments of R\$9.58 child	Employer and employee social contributions
Bonus PIS/PASEP	Paid to employees who earn up to 2 minimum wages from employers contributors to PIS or PASEP programs	Annual payment equal to 1 minimum wage	PIS and PASEP programs
Old Age Benefit	Paid to persons aged 67 years or more with no remunerated activity and to disabled individuals, who have monthly per capita family income less than ¼ the minimum wage and receives no other social benefit	Monthly payments equal to 1 minimum wage	Employer and employee social contributions
Bolsa Escola	Paid to families with children 7 to 14 years old enrolled in school and with monthly per capita family income less than ½ the minimum wage	R\$15 per child up to R\$45 per family	Poverty Fund from financial transactions contribution
Bolsa Alimentação	Paid for pregnant women and for children aged 6 months to 6 years and 11 months with monthly per capita family income up to R\$ 90	R\$15 per child up to R\$45 per family	Poverty Fund from financial transactions contribution
Bolsa Criança Cidadã	Paid to families with children 7 to 14 years old enrolled in school and monthly per capita family income less than ½ the minimum wage	Rural areas, R\$ 25 per child; urban areas, R\$ 40 per child	Poverty Fund from financial transactions contribution

Box 2 – Federal Taxes

Taxes	Incidence	Rates(%)
Direct Taxes		
Personal Income Tax	Taxable Income	Zero for monthly incomes up to R\$900; 15% for monthly incomes from R\$901 up to R\$1,800; 27,5% for monthly incomes greater than R\$1,800
Employee Social Contribution	Salaries	20,0
Employer Social Contribution	Payroll and profits	20,0
Indirect Taxes		
Tax for Social Security Financing (COFINS)	Gross Revenue	3,0
Excise Tax (IPI)	Sales and transfers of goods Manufactured in or imported into Brazil	Varying rates according to the product's tax code
PIS/PASEP	Gross Revenue	0,65 (PIS) 1,0 (PASEP)
Education Fund	Payroll	2,5

Chart 1 – Income Definitions