The impacts on family consumption of the *Bolsa Família* subsidy programme

Marcela Nogueira Ferrario

ABSTRACT

The aim of this paper is to evaluate the effects of the *Bolsa Família* family conditional cash transfer programme (PBF) on beneficiary families' spending on food, fruit, meat and fish, poultry and eggs, green vegetables, cereals and oilseed products, flours and pastas, tuber and root vegetables, sugar, bakery products, alcoholic beverages, education, hygiene, health and school utensils. The estimation was based on microdata obtained from the 2008-2009 Brazilian Household Budget Survey; and the propensity-score matching methodology was used to calculate the average effect of the treatment on the families treated. The results were statistically significant in respect of expenditure on: (i) food products; (ii) poultry and eggs; (iii) legumes and green vegetables; (iv) cereals, leguminous and oilseed products; (v) flours, starches and pastas; (vi) tuber and root vegetables; (vii) sugars and sugar-based products; and (viii) school articles. The fact that beneficiary families increased their purchases of priority goods and school utensils suggests an investment in education.

AUTHOR

Marcela Nogueira Ferrario obtained her Ph.D. from the Postgraduate Programme in Applied Economics at the Luiz de Queiroz School of Agriculture (ESALQ), University of São Paulo (USP). mnferrario@gmail.com

I

Introduction

The income-transfer programmes implemented in developing countries have helped to reduce inequality and poverty and to raise the education and health status of beneficiary families. According to Attanasio and others (2005, p. 1), "conditional cash-transfer (CCT) programmes are becoming an extremely popular tool for improving the education and health outcomes of poor children in developing countries."

Rocha (2005) shows that the recent reduction in inequality is largely the result of the income-transfer policies implemented since the mid-1990s. During the presidency of Fernando Henrique Cardoso, the federal government implemented a set of poverty-reduction policies involving direct income transfers, and these were maintained and expanded in 2003 by the government of President Luiz Inácio Lula da Silva. Barros and others (2010) found that income-transfer programmes, such as *Bolsa Família* (PBF), are much more effective in reducing inequality than policies to raise the minimum wage, for example. Hoffmann (2010) demonstrated the effectiveness of the *Bolsa Família* programme and the continuous cash-benefit (BPC) programme in reducing inequality and poverty, and found that the former is even more effective than the latter.

Although Brazil had the ninth largest gross domestic product (GDP) in the world in 2008, it suffers from profound social inequalities and high poverty levels as a result of its bad income distribution. The analysis performed by Barros and others (2010), based on data from the National Household Survey (PNAD), shows that 51 million people were living below the poverty line in 2007; and Hoffmann and Ney (2008) report that while the wealthiest 10% of the population received 44.4% of total income in 2005, the poorest 50% received just 14.7%.

Nonetheless, income inequality and the proportion of the population living in poverty are declining. According to Ipeadata, the Gini coefficient,[1] which measures the degree of inequality in the personal distribution of per-capita household income, declined systematically from 2001 onwards, to reach a level of 0.54 in 2009. In addition, the proportion of the population classified as poor, with a per-capita household income below the poverty line,[2] fell from 0.36 in 2003 to 0.21 in 2009. Barros and others (2010) report that the degree of income inequality decreased by an average of 1.2% per year between 2001 and 2007.

Despite the lower income-inequality and poverty rates recorded in recent years, social inequality in Brazil remains very high. Barros and others (2007, p. 113) state that between 2001 and 2005, the income share received by the poorest 20% of the population grew by 0.5 percentage points (p.p.) per year. At that rate, 25 years would be needed for Brazil's international ranking in term of the average income of the poorest 20% of the population to match its per-capita income position. Accordingly, economic measures are still needed to reduce income inequality and poverty levels, such as public policies for direct income transfer and education policies that improve the quality of teaching at all levels. Direct income-transfer policies, conditional or otherwise, are important tools for enhancing poor families' access to the consumer market and helping them to break free from social exclusion and extreme poverty.

This article is organized as follows: section II outlines the social-protection system in Brazil and the most important income-transfer programmes. Section III describes the methodology used and the databases consulted. Section IV evaluates the effects of the *Bolsa Família* programme on consumer spending; and section V sets out the main conclusions of this study.

[1]   The Gini coefficient, which takes values between 0 and 1, is used to measure income inequality in the country. The closer the index is to 1, the greater the concentration of income.
[2]   The poverty line used in data published by the Institute of Applied Economic Research (IPEA) is twice the level of the extreme poverty line, which is an estimation of the cost of a basket of food products containing the minimum calories needed for a person's subsistence, based on recommendations made by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

II

Brief review of the Brazilian social protection system and the main income-transfer programmes

The first income-transfer programme initiatives in Brazil date back to 1995 (Soares and Sátyro, 2010); and, in1996, the Child Labour Eradication Programme (PETI) was created, as the first federal government conditional income-transfer programme aimed at removing children and adolescents up to 16 years of age from work.

The second programme of this type was the school subsidy programme *Bolsa Escola* (PBE), introduced by the federal government in 2001. The conditionality in the PBE requires the beneficiary family to keep their 6-15 year-old children in school, maintaining a minimum annual attendance of 85% (Soares and Sátyro, 2010). Also in 2001, the *Vale-Gás* gas voucher programme was created, which involved a transfer of 15 reais to enable poor families to purchase cooking gas. Immediately afterwards, the food subsidy programme *Bolsa Alimentación* (PBA) was introduced, and this was followed by the *Cartão Alimentação* food card programme in 2003.

As a result, the federal government had implemented at least five conditional income-transfer programmes by 2003: PETI, PBE, *Vale-Gás*, PBA and the food card programme, each of them under the responsibility of a ministry or an undersecretariat. The PETI programme was coordinated by the Office of the Under-Secretary for Social Assistance; the PBE by the Ministry of Education; the *Vale-Gás* by the Ministry of Mines and Energy; and the PBA and food card programmes by the Ministry of Health.

The *Bolsa Família* (PBF) programme was created in 2003, with the aim of combating poverty by making direct income transfers to families with per-capita monthly incomes of up to 70 reais. The PBF was formed by merging the following programmes: *Bolsa Escola, Bolsa Alimentação, Cartão Alimentação* and *Auxílio-Gás*. Through income transfers, the PBF increased poor families' access to health, education and social assistance services, while also enhancing their food security.

The fact that the PBF is a conditional income-transfer programme means that the beneficiary families have to make and fulfil commitments in the area of health, education and social assistance.

The amount of money transferred will depend on the size of the family and its per-capita monthly income. Pursuant to Decree No. 6.917, of 30 July 2009, families without children with per-capita monthly incomes of up to 70 reais are entitled to the basic benefit of 68 reais. The variable benefit, of 22 reais, is paid to families that have children and adolescents of up to 15 years of age and per-capita monthly incomes of up to 140 reais. The variable benefit of 33 reais tied to the adolescent, known as the variable youth benefit (BVJ), is given to families with adolescents of 16 or 17 years of age.

As shown in table 1, families with per-capita monthly incomes of up to 70 reais can receive a maximum benefit of 200 reais if, for example, they have three children and adolescents of up to 15 years of age and two 16 or 17 year-old.

Families with per-capita monthly incomes of between 70 and 140 reais do not receive the basic benefit, and the maximum transfer they can receive is 132 reais.

The 2009 Budgetary Guidelines Law provides for an 11,953 million reais appropriation to the PBF, equivalent to 0.38% of GDP. According to data contained in the Unified Cadastre (CadÚnico) available online at the website of the Ministry of Social Development and Hunger Alleviation, the PBF had over 12 million beneficiary families in 2010.

Decree No. 5.209 of 2004, defines the basic objectives of the PBF in relation to its beneficiaries as:

"I - Promote access to the public services network, particularly health, education and social assistance; II - Combat hunger and promote food and nutritional security; III - Stimulate the sustained emancipation of families living in poverty and extreme poverty; IV - Combat poverty; and V - Promote the intersectorality, complementarity and synergy of the social actions undertaken by public authority.

Through the PBF, the Ministry of Social Development and Hunger Alleviation also seeks to uphold the human right to adequate food, by promoting food and nutritional security, and by contributing to the eradication of extreme poverty and the conquest of citizenship by the most

TABLE 1

**Bolsa Família programme: calculation of the benefit transferred
to families under Decree No. 6.917, of 30 July 2009**

(Reais)

Number of children and adolescents of up to 15 years of age	Number of young people of 16 or 17 years of age	Type of benefit: families with per-capita monthly incomes of up to 70 reais	Transfer amount (*reais*)	Type of benefit: families with per-capita monthly incomes of 70-140 reais	Transfer amount (*reais*)
0	0	Basic	68	Does not receive benefit	0
1	0	Basic + 1 variable	90	1 variable	22
2	0	Basic + 2 variables	112	2 variables	44
3	0	Basic + 3 variables	134	3 variables	66
0	1	Basic + 1 BVJ	101	1 BVJ	33
1	1	Basic + 1 variable + 1 BVJ	123	1 variable + 1 BVJ	55
2	1	Basic + 2 variables + 1 BVJ	145	2 variables + 1 BVJ	77
3	1	Basic + 3 variables + 1 BVJ	167	3 variables + 1 BVJ	99
0	2	Basic + 2 BVJ	134	2 BVJ	66
1	2	Basic + 1 variable + 2 BVJ	156	1 variable + 2 BVJ	88
2	2	Basic + 2 variables + 2 BVJ	178	2 variables + 2 BVJ	110
3	2	Basic + 3 variables + 2 BVJ	200	3 variables + 2 BVJ	132

Source: Ministry of Social Development and Hunger Alleviation.

BVJ: variable youth benefit.

hunger-vulnerable segment of the population" (Ministry of Social Development and Hunger Alleviation, 2010).

According to research undertaken in 2008 by the Brazilian Institute of Social and Economic Analyses (IBASE) on a sample of 5,000 holders of the *Bolsa Família* card living in 229 municipalities in all regions of the country, 87% of PBF money is used to buy food. The beneficiary families spend an average of 200 reais per month in that category, or 56% of total family income.

A brief analysis of the 2008-2009 Brazilian Household Budget Survey shows that poor families still have problems in satisfying their food needs. The data generated by that survey show that the percentage of families declaring insufficient food consumption was 12.3% in rural areas and 8.6% in urban zones; whereas the percentage of families that habitually or potentially had some difficulty in satisfying their food needs was 45.6% and 33.6% in rural and urban areas, respectively.

The data of the 2002-2003 Brazilian Household Budget Survey shows that 27.2% of families had major difficulties in making their income last to the end of the month, but this figure had fallen to 17.9% in 2008-2009.

"A review of the perceptions expressed by different income groups in the 2008-2009 Brazilian Household Budget Survey, showed that 31.1% of families with monthly incomes of up to 830 reais claimed to have major difficulties, whereas just 2.6% of families with monthly household incomes of over 10,375 reais mentioned that level of difficulty. The largest proportion of families who said it was easy to get to the end of the month (72%) was recorded in the income group of over 10,375 reais per month, whereas 88% of families with incomes of up to 830 reais claimed some degree of difficulty" (IBGE, 2010, p. 82).

Against that backdrop, this study will use an evaluation method to determine the effects of income-transfer policies on the beneficiary families' consumption expenditure. The database used comes from the Brazilian Household Budget Survey (POF) conducted by the Brazilian and Geographical and Statistical Institute (IBGE) from 19 May 2008 to 18 May 2009.

The idea of evaluating the effects of income transfers on the consumption of beneficiary families is based on studies such as those of Hoddinott, Skoufias and Washburn (2000); Martínez (2005); Attanasio and

Mensard (2006); Resende and Oliveira (2008), and Duarte, Sampaio and Sampaio (2009).

Hoddinott, Skoufias and Washburn (2000) studied the effects of the Mexican *Progresa* programme on food purchased by poor families, and noted that the beneficiary families increased their food consumption (particularly fruit, green vegetables and products of animal origin), compared to the non-beneficiaries.

Martínez (2005) studied the effects of the Solidarity Bond (*Bonosol*) programme implemented by the Plurinational State of Bolivia on families' consumption, and showed that beneficiary families in rural zones increased their food consumption in proportion to the amount of the transfer.

Attanasio and Mensard (2006) analysed the effects of the Colombian "Families in Action" programme, and demonstrated its effectiveness in increasing food consumption by poor families in both urban and rural areas, and in improving the quality of the consumption of protein- and cereal-rich foodstuffs.

Resende and Oliveira (2008) investigated the effects of the *Bolsa Escola* school subsidy programme on the consumption expenditure of beneficiary families, using the database of the 2002-2003 Brazilian Household Budget Survey. The authors found positive results, which indicate an efficient use of the programme's resources by the families (consumption of food, hygiene products, education and clothing).

Duarte, Sampaio and Sampaio (2009) estimated the effects of the PBF on food expenditure by rural families in the Brazilian states of Paraíba (Cariri), Ceará (Sertão Central), Rio Grande do Norte (Apodi) and Sergipe (Sertão) in 2005. The results show an increase in food consumption among PBF-beneficiary families. Although this is a national income-transfer programme, the authors' analysis was confined to the consumption expenditure of rural families in 32 municipalities in the north-east region. For this reason a nationwide level analysis is needed, covering families from both rural and urban areas.

A study conducted by Brandão, Dalt and Gouvêa (2007) to evaluate the food and nutritional security of PBF beneficiaries found that the beneficiary families spend the resources received from the programme essentially on food and school utensils. The article does not specify the food products purchased by the families,

and the control group consists of families that received the benefit for a maximum of three months.

In a masters degree dissertation, Baptistella (2012) analysed the effects of the PBF on expenditure on food consumption using data from the 2008-2009 Brazilian Household Budget Survey, and applying the propensity-score matching methodology. The author noted that the beneficiary families increased their spending on food products such as grains and cereals, poultry and eggs, meat and alcoholic beverages; but the research did not consider expenditure on tobacco, health, education, hygiene and school utensils. Moreover, the study evaluated the effects on per-family expenditure in total rather than in per-capita terms.

The hypothesis that beneficiary families are investing in their children's education has been analysed in studies by Glewwe and Kassouf (2012) and Helfand and Souza (2010).

Glewwe and Kassouf (2012) studied the effects of the PBF on the school performance of students at public schools that had students whose families were recipients of this programme, compared to public schools that did not have beneficiary students. They found that the PBF caused an increase in enrolment rates, a reduction in school dropout rates, an increase in student pass rates from first to fourth grade and from fifth to eighth grade.

Helfand and Souza (2010) analysed the effects of the *Bolsa Escola* programme on school attendance and progression, and also on child labour in rural zones, comparing the situation of beneficiary and non-beneficiary siblings in the same family. Although they found that the programme increased school attendance and progression rates, they did not detect any effects on child labour.

The studies cited above examine the effects of the PBF on school performance and attendance. To make a more detailed evaluation of the programme's effect on education, this analysis used expenses on education and school utensils as proxy variables for family investment in that category.

The present article makes several contributions to the evaluation of the effects of the PBF on family consumption expenditure. Firstly, it considers gross and net per-capita income to control for the income effect caused by the transfer of resources to the families; and, secondly, it evaluates investments in education, health and hygiene, in addition to consumer spending.

III

Methodology and description of the database

1. Empirical strategy

The process of evaluating a public policy involves identifying its effects and verifying whether there is a causal relation with the variable of interest.

To estimate the effects of the PBF on beneficiary families' consumption, two groups were defined: the control group, consisting of non-beneficiary families, and the treatment group representing beneficiary families. In equation (1), Y_i is the variable of interest (consumption of family i); and D_i is a binary variable that indicates whether or not the family participates in the programme, such that $D_i = 1$ in the case of participating families and $D_i = 0$ in the case of non-participants. The variable of interest, Y_{1i}, measures the consumption expenditure of families belonging to the treatment group, and variable Y_{0i} measures the consumption expenditure of families in the control group.

$$Y_i = Y_{0i} + (Y_{1i} - Y_{0i})D_i \qquad (1)$$

The analysis uses the propensity-score matching method, proposed by Rosenbaum and Rubin (1985). Thus, the selection of the control group was based on the probability $p(X_i)$ of the family being a beneficiary, based on observable characteristics. The propensity score can be defined as the conditional probability that a person receives the treatment, given his or her observable characteristics, according to equation (2):

$$p(X) \equiv \Pr(D = 1 \mid X) = E(D \mid X) \qquad (2)$$

where D indicates exposure to the treatment, X is the co-variables vector, and $p(X)$ is the conditional probability that the person receives the treatment. Rosenbaum and Rubin (1985) show that if exposure to the treatment is random in X, then the estimated values of $p(X)$ will also be random. Nonetheless, considering a sample of units defined by i, if the propensity score $p(X_i)$ is known, then the average effect of the treatment on the treated (ATT)[3] can be described as follows, as in Becker and Ichino (2002):

$$\tau \equiv E\{Y_{1i} - Y_{0i} \mid D_i = 1\}$$
$$\tau = E\left[E\{Y_{1i} - Y_{0i} \mid D_i = 1, p(X_i)\}\right] \qquad (3)$$
$$\tau = E\left[E\{Y_{1i} \mid D_i = 1, p(X_i)\} - E\{Y_{0i} \mid D_i = 0, p(X_i)\} \mid D_i = 1\right]$$

where Y_{1i} and Y_{0i} are the potential results of the treatment and control group, respectively.

The treatment group will thus consist of families that are beneficiaries of one of the income-transfer programmes; and the control group will comprise families with observable characteristics that are similar to those of the treatment group, but which are not beneficiaries. Nonetheless, this methodology has been criticized for its failure to control for unobservable characteristics.

To illustrate the problem of the unobservable conditioning variables, one can allow for the possibility that the woman head of family may or may not be a responsible person,[4] by letting $T=1$ if she is responsible and $T=0$ otherwise. It is reasonable to assume that a poor family is more likely to participate in the *Bolsa Família* programme if the woman is responsible. Moreover, a responsible woman will manage the domestic budget more effectively and will use its scarce resources to meet the family's basic needs. The likelihood that the woman will remain with a husband who spends most of the budget on alcoholic beverages should also be lower in the case of a responsible woman. Thus, the fact that the woman is or is not a good "housekeeper" could generate a positive relation between the fact that the family receives the PBF and higher spending on food, and a negative relation with respect to alcoholic beverages and tobacco. As the variable T is unobservable, both the multiple regression and the propensity-score matching methodology will be able to detect those relations, without the changes in the expenditure patterns actually being caused by the fact that the family receives PBF benefits.

After estimating the propensity score using a logit or probit model, the units of the treatment group

---

[3] The acronym ATT stands for average effect of treatment on the treated.

[4] A behaviourally autonomous or highly responsible woman could be an active, secure, developed person with leadership qualities and self-governance capacity. The expression "responsible woman" represents a set of characteristics pertaining to the woman and other circumstances that are hard to describe clearly and precisely.

need to be matched with those of the control group. According to Becker and Ichino (2002), the following matching methods can be used: nearest-neighbour matching, radius matching, kernel matching, local linear matching and stratification matching. This article uses two methodologies: three nearest neighbours, and kernel matching. As there are no substantial differences with the other matching methodologies, it was decided to present results for these two only.

To check that the matching has been done satisfactorily requires comparing the averages of the control variables of the treatment and control groups, both before and after the procedure. A reduction in the absolute value of the standard deviation after matching is the first sign that the procedure was done well. The standard deviation is the standardized difference between the average values of a given control variable (covariate) in the treatment and control groups.

Nonetheless, Caliendo and Kopeinig (2005) argue that the value of the standard deviation alone does not clearly indicate whether the matching was done adequately. For that reason, the t-test must be used to verify whether a statistically significant deviation with respect to each covariable still persists after the matching. The null hypothesis for the t-test is that the difference between the averages of the covariables is zero. Accordingly, after performing the matching, one expects the null hypothesis not to be rejected.

2. Description of the database

The aim of the Brazilian Household Budget Survey, conducted by the IBGE, is to investigate family budgets and combine them with data on the families' social conditions. The survey used in the present study was performed from 19 May 2008 to 18 May 2009, in urban and rural areas throughout Brazil. Data were collected on 55,970 households, which, when expansion factors are applied, represent a population of 57,816,604 households. The main variables analysed are: characteristics of the households and persons, monetary and non-monetary expenses and purchases, monetary and non-monetary income, and evaluation of living standards.

Table 2 clarifies the statistics of the data obtained from the 2008-2009 Brazilian Household Budget Survey. The average family size was 3.30 individuals, which is less than the average recorded in 2002-2003; and average per-capita income was 838.60 reais, compared to 696.60 reais in 2002-2003. It can also be seen that all indices of income inequality decreased during the period 2002-2003 to 2008-2009.

Figure 1 shows the income concentration curves for Brazil based on data from the 2008-2009 Household Budget Survey. The dotted line shows the concentration of income obtained from PBF transfers. The per-capita income of the poorest 40% of families is less than 358.08 reais. Based on this information, a sample group was created for the PBF including only families with per-capita income is below 358 reais. That cut-off point can be useful for the matching process, because it removes outliers from the sample, such as families with per-capita incomes in excess of 6,000 reais that receive the PBF benefit. Resende and Oliveira (2008) and Tavares (2010) also use the income cut-off point to obtain more homogeneous control and treatment groups.

Table 3 sets out the descriptive statistics of the variables used in the propensity-score matching procedure. Of the total of 56,091 consumption units in the 2008-2009 Household Budget Survey, 198 observations were excluded for replying "Don't know" with respect to colour; 343 were excluded because they did not specify the level of schooling (Code 88 "Not determined"); 205 cases were eliminated because the families in question were receiving *Bolsa Família* and the BPC simultaneously; and 34,407 families were eliminated with per-capita incomes of 358 reais or more. This reduced the sample to 20,938 observations.

Table 3 shows that 33.6% of families receive PBF transfers. The analysis of data on families that do not participate in the programme shows that 69.6% of their heads of household are male, 35.7% claim to be white or yellow, and 30.8% have four to seven years of schooling. In terms of household infrastructure, 37.5% of homes are connected to the general sewerage network, 84.7% have brick walls, 74.5% obtain water from the general network (see table 3), and 35.9% have a rudimentary septic tank. In terms of geographic location, 48% of the families are in the north-east region.

Table 3 also shows that the gross per-capita income of non-PBF-beneficiary families was 220.99 reais. In terms of family composition, 26.8% of the families have four members; 26% of the families have a child in the 0-4 year age range and 7.7% have two or more; 25.2% of the families with children in the 5-9 year age range have one child in that age bracket, and 7.9% have two or more.

The net per-capita family income of PBF-beneficiary families was 152.58 reais. Of these families, 24.8% of heads of family claimed to be white or yellow, and 69.2% are male; 28.1% of the families have one child in the 0-4-year-old bracket and 9.5% have two or more; while 35.6% of the families with children in the 5-9 year age

TABLE 2

Brazil (urban and rural areas): main characteristics of the distribution of per-capita family income,[a] according to the 2002-2003 and 2008-2009 Household Budget Surveys
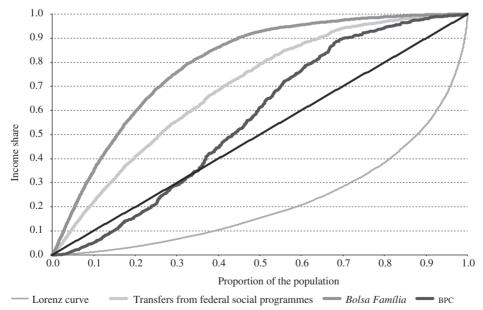
Statistic	2002-2003 Household Budget Survey			2008-2009 Household Budget Survey		
	Brazil	Urban areas	Rural areas	Brazil	Urban areas	Rural areas
Number of families (*thousand*)	48 535	41 133	7 401	57 817	48 809	9 008
Number of persons (*thousand*)	175 846	145 846	30 000	190 519	158 080	32 440
Number of persons per family	3.62	3.55	4.05	3.30	3.24	3.60
Average income (*reais*)	696.6	777.7	302.2	838.6	926.3	411.5
Percentile 25	174.1	204.6	95.2	237.0	273.9	134.4
50	348.9	397.4	177.6	457.3	518.2	247.5
75	724.2	820.4	332.5	903.0	1 007.3	470.0
80	874.9	986.3	388.9	1 072.2	1 184.2	543.6
90	1 513.9	1 679.4	586.4	1 746.6	1 921.0	807.3
95	2 392.9	2 619.3	851.2	2 765.0	3 018.0	1 157.9
99	5 687.5	6 123.1	2 282.7	6 329.1	6 707.3	2 844.6
Income share of the:						
50% poorest	12.9	13.5	16.1	14.5	15.1	16.4
10% wealthiest	47.1	46.0	42.3	44.4	43.5	40.7
5% wealthiest	33.7	32.6	30.7	31.5	30.6	29.0
1% wealthiest	14.0	13.5	14.0	12.8	12.4	12.9
Gini coefficient	0.591	0.579	0.534	0.561	0.550	0.522
Theil-T[b]	0.715	0.680	0.606	0.635	0.608	0.561
Theil-L[c]	0.655	0.624	0.510	0.578	0.549	0.491

Source: R. Hoffmann, "Desigualdade da renda e das despesas per-capita no Brasil, em 2002-2003 e 2008-2009, e avaliação do grau de progressividade ou regressividade de parcelas da renda familiar", *Economia e sociedade*, vol. 19, No. 3, Campinas, Institute of Economics, State University at Campinas, 2010.

[a] Per-capita value of total income and variation in capital, in reais at 2009 prices.
[b] Theil T and L: indices that measure income inequality.
[c] Considering positive income only.

FIGURE 1

Brazil: income concentration based on data from the 2008-2009 household budget survey

Source: prepared by the author on the basis of data from the 2008-2009 Brazilian Household Budget Survey.

Note: Lorenz curve of per-capita family income and concentration curves for several of its components: Continuous Benefit Programme (BPC); *Bolsa Família* programme (PBF) and concentration of income obtained from federal income-transfer programmes. All of the curves are identified as per the legend below the figure.

TABLE 3

Bolsa Família programme (PBF): average and coefficient of variation of the variables used in the propensity-score matching procedure
(Families with per-capita incomes below 358 reais)

Variable	Not a PBF beneficiary		PBF beneficiary		Total	
	Mean	CV[a]	Mean	CV[a]	Mean	CV[a]
Sample size	13 601		7 337		20 938	
PBF = 1 if receives PBF	0		1		0.336	
Income						
Per-capita gross income[b]	220.99	0.366	170.82	0.471	201.67	0.411
Per-capita net income[c]	220.99	0.366	152.58	0.535	194.66	0.441
Location of household						
Zone = 1 if urban	0.775	0.539	0.637	0.755	0.728	0.610
Region						
North	0.097	3.049	0.112	2.819	0.102	2.967
North-east	0.359	1.338	0.609	0.801	0.443	1.122
South	0.124	2.663	0.053	4.241	0.100	3.004
Centre-west	0.084	3.295	0.039	4.983	0.069	3.673
South-east	0.336	1.404	0.188	2.080	0.286	1.578
Household characteristics						
Sex = 1 if male	0.696	0.661	0.692	0.667	0.695	0.663
Colour = 1 if white[d]	0.357	1.342	0.248	1.742	0.320	1.456
Age	44	0.350	42	0.282	43	0.331
Age^2	2 156	0.694	1867	0.588	2 059	0.671
Presence of young children and adolescents						
0-4 years						
None	0.663	0.713	0.623	0.777	0.650	0.734
Has 1	0.260	1.686	0.281	1.600	0.267	1.656
Has 2 or more	0.077	3.473	0.095	3.078	0.083	3.325
5-9 years						
None	0.669	0.703	0.466	1.070	0.601	0.815
Has 1	0.252	1.724	0.356	1.346	0.287	1.577
Has 2 or more	0.079	3.409	0.178	2.149	0.112	2.810
10-15 years						
None	0.645	0.742	0.404	1.214	0.564	0.879
Has 1	0.243	1.766	0.321	1.454	0.269	1.648
Has 2 or more	0.112	2.811	0.275	1.625	0.167	2.234
16-17 years						
None	0.852	0.416	0.780	0.531	0.828	0.455
Has 1	0.138	2.498	0.199	2.004	0.159	2.302
Has 2 or more	0.009	10.254	0.020	6.937	0.013	8.681
Presence of adults and older adults						
18-30 years						
None	0.396	1.234	0.428	1.157	0.407	1.207
Has 1	0.327	1.436	0.335	1.408	0.330	1.426
Has 2 or more	0.277	1.616	0.237	1.795	0.263	1.672
31-64 years						
None	0.222	1.870	0.142	2.455	0.196	2.028
Has 1	0.337	1.403	0.336	1.404	0.337	1.403
Has 2 or more	0.441	1.127	0.521	0.959	0.468	1.067
65 years or more						
None	0.854	0.413	0.939	0.255	0.883	0.364
Has 1	0.112	2.812	0.055	4.132	0.093	3.120
Has 2 or more	0.033	5.381	0.006	13.111	0.024	6.363
Education						

Table 3 (*conclusion*)

Variable	Not a PBF beneficiary		PBF beneficiary		Total	
	Mean	CV[a]	Mean	CV[a]	Mean	CV[a]
Less than 1 year	0.165	2.254	0.216	1.908	0.182	2.122
1-3 years	0.197	2.017	0.276	1.622	0.224	1.863
4-7 years	0.308	1.497	0.332	1.420	0.316	1.471
8-10 years	0.144	2.441	0.094	3.108	0.127	2.622
11-14 years	0.175	2.168	0.082	3.342	0.144	2.437
15 years or more	0.010	9.719	0.001	27.040	0.007	11.571
Family size						
Single person	0.037	5.116	0.006	12.605	0.027	6.056
2 members	0.149	2.392	0.049	4.391	0.115	2.769
3 members	0.257	1.699	0.171	2.200	0.228	1.838
4 members	0.268	1.653	0.275	1.623	0.270	1.643
5 members	0.152	2.366	0.223	1.869	0.175	2.168
6 members	0.078	3.433	0.127	2.621	0.095	3.093
7 members	0.030	5.649	0.069	3.670	0.043	4.695
8 members or more	0.029	5.783	0.079	3.411	0.046	4.560
Bathroom or toilet						
Bathroom or toilet = 1 if it has bathroom or toilet	0.936	0.262	0.867	0.392	0.913	0.310
Infrastructure-walls of the home						
Brick	0.847	0.425	0.824	0.462	0.839	0.438
Building wood	0.105	2.912	0.089	3.205	0.100	3.003
Bare adobe	0.029	5.835	0.060	3.959	0.039	4.957
Recycled wood	0.014	8.327	0.017	7.605	0.015	8.062
Straw	0.001	32.280	0.002	23.398	0.001	28.273
Other	0.004	15.742	0.009	10.708	0.006	13.356
Infrastructure-sewerage						
Sewerage	0.375	1.292	0.226	1.850	0.325	1.442
Septic tank	0.185	2.101	0.161	2.286	0.177	2.160
Rudimentary pit	0.305	1.510	0.386	1.262	0.332	1.418
Sewerage pipe directly into a ditch	0.029	5.807	0.046	4.575	0.034	5.294
Sewerage pipe direct to the river	0.037	5.122	0.037	5.115	0.037	5.120
Other type of sewerage pipe	0.006	12.590	0.012	9.201	0.008	11.07
No sewerage pipe	0.064	3.820	0.133	2.549	0.087	3.231
Infrastructure-water supply						
Water from the general network	0.745	0.585	0.655	0.725	0.715	0.632
Water from a well or spring	0.209	1.944	0.260	1.685	0.226	1.848
Other type	0.046	4.563	0.084	3.298	0.059	4.004

Source: prepared by the author on the basis of data from the 2008-2009 Brazilian Household Budget Survey.

[a] Coefficient of variation.
[b] Gross per-capita income includes all income including transfers from the PBF.
[c] Net per-capita income includes all income other than transfers from the PBF.
[d] Colour: white (white and yellow); non-white (negro, mulatto and indigenous races).

group have one child in that age range and 17.8% have two or more. In terms of the average schooling of the heads of beneficiary households, 21.6% have completed less than one year of studies, 27.6% have completed between one and three years, and 33.2% have completed between four and seven years of schooling.

IV

Evaluation of effects of the *Bolsa Família* programme on consumption expenditure

1. Selected statistics from the *Bolsa Família* programme

The number of PBF-beneficiary families has grown over time. According to data from the Ministry of Social Development and Poverty Alleviation, the number of families assisted rose from over 6 million in 2004 to over 13 million in 2011. The same ministry also reports the largest number of beneficiary families in the north-east region (50.51% in 2010) and the second largest number in the south-east region (24.93% in 2010).

Table 4 shows that the heads of PBF-beneficiary families have an average of 3.93 years of schooling, compared to 5.31 years among the heads of non-beneficiary families. The heads of beneficiary families in the north-east region have completed an average of 3.49 years of study (see table 4), the lowest of all regions.

The average per-capita income of PBF-beneficiary families is 22.70% less than that of families that are not affiliated to the programme. In the case of beneficiary families from the north-east region, the difference widens to 24.62%. The average size of families assisted by the PBF is 4.84 members, with the highest average (5.49 persons per family) being recorded in the north region. In summary, according to the data shown in table 4, PBF-beneficiary families are poorer, larger, and have lower levels of schooling.

Table 5 shows that PBF-beneficiary families spend 13.71% less per-capita on food than non-beneficiary families. Similarly, per-capita expenditure on education by families assisted by the programme is 36.67% less than that of families that do not participate. Nonetheless, per-capita family expenditure on alcohol and tobacco consumption among beneficiary families is 38.35% less than that of non-beneficiary families.

The results presented in table 5 show that, even in the sample restricted to families with per-capita incomes below 358 reais, there are very significant differences between PBF beneficiaries and non-beneficiaries. Consequently, a much better control procedure needs to be applied, or else a suitable matching technique for the differences in consumption to be considered as effects of the PBF.

2. Results

Table 6 sets out the results of the logit model. The first column reports a model that controls for gross per-capita income and the second column reports the results controlling for net per-capita income. In relation to the per-capita income of the family without the PBF transfer, the greater the income, the less the likelihood of participation in the PBF. That probability also decreases when the household is headed by a white man. In terms

TABLE 4

Brazil and regions: average head-of-household characteristics, per-capita family income (in reais) and family size
(Families with per-capita income below 358 reais)

	Years of schooling		Per-capita income		Age		Family size	
	Does not receive	Receives	Does not receive	Receives	Does not receive	Receives	Does not receive	Receives
North	5.20	4.39	198.87	170.96	42.18	41.28	4.27	5.49
North east	4.58	3.49	207.95	156.76	45.47	42.27	3.75	4.70
Centre-west	5.82	4.47	223.75	191.58	41.95	39.65	3.84	4.72
South-east	5.78	4.87	235.52	202.44	43.25	39.82	3.86	4.67
South	5.86	4.32	234.59	200.73	43.18	41.94	3.75	4.77
Brazil	5.31	3.93	221.00	170.82	43.82	41.58	3.87	4.84

Source: prepared by the author on the basis of data from the 2008-2009 Brazilian Household Budget Survey.

TABLE 5

Average monthly consumption expenditure of *Bolsa Família* (PBF) beneficiary and non-beneficiary families

(Families with per-capita income of less than 358 reais)

Expenditure category	Total family expenditure			Per-capita family expenditure		
	Does not receive	Receives	Total	Does not receive	Receives	Total
Food[a]	266.00	289.32	273.83	68.58	60.31	65.39
Fruit	7.64	7.29	7.52	1.97	1.52	1.80
Meat, offal and fish	49.88	54.57	51.46	12.86	11.38	12.29
Poultry and eggs	18.69	24.29	20.57	4.82	5.06	4.91
Milk and other dairy products	22.66	20.55	21.95	5.84	4.28	5.24
Legumes and green vegetables	6.73	7.16	6.87	1.74	1.49	1.64
Cereals, leguminous and oilseed products	24.65	34.27	27.88	6.36	7.14	6.66
Flours, starches and pastas	12.44	18.00	14.31	3.21	3.75	3.42
Tubers and root vegetables	3.29	3.25	3.27	0.85	0.68	0.78
Sugars and derivative products	9.12	10.82	9.70	2.35	2.26	2.32
Bakery products	24.59	25.33	24.84	6.34	5.28	5.93
Alcohol and tobacco[b]	18.80	14.34	17.30	4.85	2.99	4.13
Education[c]	14.72	11.52	13.64	3.79	2.40	3.26
Health	56.45	45.16	52.65	14.55	9.41	12.57
Hygiene	31.12	29.86	30.69	8.02	6.22	7.33
Schoolbooks and utensils	5.54	7.50	6.20	1.43	1.56	1.48

Source: prepared by the author on the basis of data from the 2008-2009 Brazilian Household Budget Survey.

[a] The "food" category consists of the sum of expenditures on: cereals, leguminous and oilseed products, flowers, starches and pastas; tubers and root vegetables, sugars and derivative; legumes and green vegetables; fruit; meat, offal and fish; poultry and eggs; milk and other dairy products; bakery products; oils and fats; beverages and infusions (except alcoholic beverages); canned and conserved products; prepared foods; food consumed outside the home (except near, barrel beer, and other alcoholic beverages).

[b] The "alcohol and tobacco" category consists of the sum of expenditures on: beer, barrel beer and other alcoholic beverages (consumed in the home); beer, barrel beer and other alcoholic beverages (consumed outside the home) and tobacco.

[c] The "education" category consists of regular courses, higher-education courses, other courses and activities, didactic books and technical magazines, school utensils and others.

of family size, all coefficients were positive: four-member families are most likely to be participants in the programme. In terms of region, the likelihood of participation in the PBF increases if the family lives in the north-east, and it decreases if the family lives in the south region. In terms of infrastructure, if the home is connected to the general sewerage network and it obtains its water from the general grid, it will be less likely to participate in the PBF. All coefficients relating to the presence of children and adolescents were positive: families with children between 10 and 15 years of age were most likely to participate in the PBF. Lastly, as the level of schooling rises, the probability of participation in the programme falls.

Table 7 reports the average effect on the treatment on the treated. The calculation is performed using two different algorithms: nearest neighbour (with replacement) and kernel normal. The average effect of the treatment on the treated was significant under both methodologies, and positive for per-capita family expenditure on food; milk and dairy products; legumes and green vegetables; cereals,

leguminous and oilseed products; flours, starches and pasta; tubers and root vegetables; sugars and derivative; didactic books, technical magazines and school utensils.

The results of the matching of the treatment and control groups shows that the beneficiary families increased their expenditure on the specified categories. Table 7 shows that the average per-capita expenditure on food consumption by participating families was 3.11 reais more than the average consumption expenditure of families in the control group defined by kernel matching.

Decree No. 5.209 of 2004 defines two of the basic objectives of the PBF as combating hunger and stimulating the sustained emancipation of families living in situations of poverty and extreme poverty. The results obtained suggest that the programme has been successful in achieving these aims. Greater consumption of poultry, eggs, legumes, green vegetables, cereals, leguminous and oilseed products, confirms that the programme has made foodstuffs containing proteins and essential vitamins easier for the families to obtain.

TABLE 6

Bolsa Família programme (PBF): results of the logit model for propensity-score matching

(Families with a per-capita income of less than 358 reais)

Variable	Gross per-capita income			Net per-capita income		
	Coefficient	Standard deviation	p value[a]	Coefficient	Standard deviation	p value[a]
Per-capita income without PBF (*thousand*)	–5.904	0	0			
Gross per-capita income (*thousand*)				–2.637	0.214	0
Characteristics of head of household						
Age (*tens of years*)	0.941	0.008	0	0.948	0.078	0
Age^2 (*hundred years*)	–0.110	0	0	–0.115	0.008	0
Colour or race[b] = 1 if white	–0.127	0.040	0	–0.143	0.039	0
Sex = 1 if male	–0.121	0.039	0	–0.170	0.038	0
Family structure						
Presence of young children and adolescents:						
0-4 years						
Has 1	0.096	0.046	0.03	0.161	0.045	0
Has 2 or more	0.102	0.075	0.18	0.250	0.074	0.001
5-9 years						
Has 1	0.602	0.042	0	0.653	0.041	0
Has 2 or more	0.928	0.065	0	1.057	0.064	0
10-15 years						
Has 1	0.641	0.043	0	0.682	0.042	0
Has 2 or more	1.064	0.059	0	1.173	0.058	0
16-17 years						
Has 1	0.386	0.049	0	0.417	0.048	0
Has 2 or more	0.685	0.150	0	0.722	0.146	0
Family size						
2 members	0.847	0.182	0	0.848	0.181	0
3 members	1.229	0.177	0	1.251	0.176	0
4 members	1.367	0.179	0	1.385	0.178	0
5 members	1.344	0.183	0	1.371	0.182	0
6 members	1.224	0.191	0	1.257	0.190	0
7 members	1.284	0.202	0	1.321	0.200	0
8 members or more	1.016	0.21	0	1.048	0.208	0
Education						
1-3 years	0	0.052	1	–0.024	0.051	0.643
4-7 years	–0.100	0.053	0.06	–0.167	0.052	0.001
8-10 years	–0.422	0.068	0	–0.520	0.067	0
11-14 years	–0.656	0.069	0	–0.800	0.068	0
15 years or more	–1.727	0.333	0	–1.971	0.332	0
Infrastructure						
Bathroom or toilet						
Bathroom or toilet = 1 if it has a barter or toilet	–0.120	0.064	0.06	–0.181	0.063	0.004
Walls of the home						
Building wood	–0.090	0.066	0.17	–0.068	0.065	0.296
Bare adobe	–0.159	0.085	0.06	–0.063	0.083	0.452
Recycled wood	–0.052	0.135	0.7	0.036	0.133	0.784
Straw	–0.505	0.368	0.17	–0.384	0.364	0.292
Other	0.382	0.223	0.09	0.440	0.220	0.046
Sewerage						
General sewerage network	–0.293	0.052	0	–0.325	0.051	0
Septic tank	–0.131	0.046	0.01	–0.153	0.046	0.001
Ditch	0.067	0.087	0.44	0.086	0.085	0.314
Direct to the river	–0.073	0.098	0.46	–0.052	0.096	0.589
Other form	0.129	0.166	0.44	0.186	0.164	0.256
Water supply						
Well or spring	–0.095	0.048	0.05	–0.097	0.047	0.041
Other form	–0.037	0.076	0.63	0.013	0.075	0.861
Location of the home						
Zone						
Zone = 1 if urban	–0.253	0.046	0	–0.274	0.046	0
Region						
South-east	–0.387	0.071	0	–0.954	0.054	0
North-east	0.464	0.057	0	–0.538	0.057	0
South	–0.670	0.088	0	–1.250	0.086	0
Centre-west	–0.795	0.073	0	–1.355	0.063	0
Constant	–2.667	0.269	0	–2.640	0.260	0

Source: prepared by the author on the basis of data from the 2008-2009 Brazilian Household Budget Survey.

[a] Causal probability of the test.
[b] To identify the category taken as the base, see table 3.

The negative impact on education expenditure, as reported in the gross-income column in table 7, reflects lower expenditure on regular or higher-education courses among the beneficiary families. Nonetheless, those families may have prioritized expenditure on school books and utensils, given the positive effects of the transfer on those expenditure categories, as also shown in table 7. This is due to the fact that the beneficiary families have children and adolescents who attend public primary or secondary schools and have to spend more on school books and utensils.

It is also important to remember that the mother is responsible for receiving the benefit in the home, because she knows the family's needs and those of her children. For that reason she is better able to organize the domestic budget, allocating it to food for example. In that case, on the hypothesis that the mother plays the role of good housekeeper, it is natural to expect

the family to spend more on food. It also needs to be remembered that propensity-score matching cannot control for unobservable factors, so the results found may not be exclusively attributable to the PBF.

Table 8 reports the results of the effects of the PBF, according to the gender of the head of household. The gross-income column shows that expenditure on poultry and eggs, cereals, leguminous and oilseed products, and also on flours, starches and pastas, were greater among families headed by men. As the presence of an adult man in the family may increase food expenses, the effects of the PBF on families headed by men are greater than on those headed by women. Bearing this in mind, 68.39% of PBF-beneficiary families are headed by married men, whereas 20.87% are headed by single women. Nonetheless, expenditure on school books and articles was nearly eight times greater among families headed by women than on those headed by men.

TABLE 7

Bolsa Família programme (PBF): average effect of treatment on the treated in terms of monthly per-capita consumption expenditures

Expenditure category	Controlling for net income		Controlling for gross income	
	Kernel (normal)	3 nearest neighbours	Kernel (normal)	3 nearest neighbours
Food	3.115	4.094	0.453	0.911
	(2.61)*	(3.32)*	(0.4)	(0.76)
Fruit	0.014	0.032	–0.114	–0.099
	(0.17)	(0.38)	(–1.45)	(–1.19)
Meat, offal and fish	0.129	0.308	–0.392	–0.524
	(0.35)	(0.79)	(–1.13)	(–1.38)
Poultry and eggs	0.51	0.579	0.336	0.399
	(3.16)*	(3.4)*	(2.17)**	(2.35)*
Milk and dairy products	–0.128	–0.169	–0.343	–0.225
	(–0.79)	(–0.93)	(–2.22)**	(–1.34)
Legumes and green vegetables	0.217	0.234	0.127	0.182
	(3.35)*	(3.44)*	(2.04)**	(2.83)*
Cereals, leguminous and oilseed products	0.958	1.092	0.796	0.973
	(3.25)*	(3.54)*	(2.81)*	(3.21)*
Flours, starches and pastas	0.315	0.37	0.243	0.268
	(2.25)**	(2.39)*	(1.80)***	1.78***
Tubers and root vegetables	0.132	0.149	0.092	0.108
	(2.63)*	(2.8)*	(1.88)***	(2.20)**
Sugars and derivatives	0.218	0.229	0.15	0.155
	(2.32)*	(2.27)**	(1.66)***	(1.56)
Bakery products	0.005	0.071	–0.202	–0.086
	(0.04)	(0.51)	(–1.66)***	(–0.64)
Alcohol and tobacco	–0.194	–0.161	–0.368	–0.299
	(–0.78)	(–0.69)	(–1.56)	(–1.30)
Education	–0.205	–0.046	–0.442	–0.386
	(–0.96)	(–0.23)	(–2.20)**	(–2.03)**
Health	–0.037	0.341	–0.673	–0.220
	(–0.07)	(0.72)	(–1.37)	(–0.46)
Hygiene	–0.238	–0.170	–0.642	–0.638
	(–1.08)	(–0.7)	(–3.03)*	(–2.72)*
School books and utensils	0.239	0.292	0.177	0.167
	(4.19)*	(4.53)*	(3.23)*	(2.73)*

Source: prepared by the author on the basis of data from the 2008-2009 Brazilian Household Budget Survey.

Note: t-statistics in parentheses.
* Significant at 1%. ** Significant at 5%. *** Significant at 10%.

TABLE 8

Bolsa Família programme (PBF): average effect of the treatment on monthly per-capita consumption expenditures

(Controlling for the effect of gross and net per-capita family income, by gender of head of household)

Variables	Net income				Gross income			
	3 nearest neighbours		Kernel		3 nearest neighbours		Kernel	
	Man	Woman	Man	Woman	Man	Woman	Man	Woman
Food	4.52	3.83	3.48	2.29	2.07	0.98	0.67	–0.03
	(3.03)*	(1.70)***	(2.39)*	(1.07)	(1.4)	(0.45)	(0.48)	(–0.02)
Fruit	0.09	–0.098	0.06	–0.09	0.02	–0.19	–0.08	–0.18
	(0.88)	(–0.64)	(0.58)	(–0.63)	(0.21)	(–1.3)	(–0.84)	(–1.37)
Meat, offal and fish	0.31	0.43	0.20	–0.04	–0.17	–0.49	–0.41	–0.37
	(0.64)	(0.68)	(0.43)	(–0.07)	(–0.36)	(–0.77)	(–0.94)	(–0.63)
Poultry and eggs	0.71	0.37	0.62	0.26	0.56	0.32	0.43	0.12
	(3.39)*	(1.25)	(3.19)*	(0.88)	(2.77)*	(1.06)	(2.31)*	(0.44)
Milk and dairy products	–0.05	0.10	–0.15	–0.10	–0.32	–0.14	–0.40	–0.26
	(–0.22)	(0.3)	(–0.77)	(–0.33)	(–1.61)	(–0.45)	(–2.11)***	(–0.92)
Legumes and green vegetables	0.26	0.15	0.23	0.14	0.14	0.13	0.11	0.10
	(3.05)*	(1.14)	(2.96)*	(1.15)	(1.78)***	(0.99)	(1.55)	(0.88)
Cereals, leguminous and oilseed products	1.11	1.08	1.17	0.72	1.20	0.71	1.00	0.59
	(2.95)*	(2.15)**	(3.23)*	(1.4)	(3.07)*	(1.31)	(2.85)*	(1.19)
Flours, starches and pastas	0.38	0.16	0.42	0.11	0.44	0.06	0.37	0.03
	(2.02)*	(0.6)	(2.4)*	(0.48)	(2.35)*	(0.26)	(2.18)*	(0.14)
Tubers and root vegetables	0.17	0.09	0.16	0.06	0.08	0.08	0.11	0.04
	(2.51)*	(0.94)	(2.62)*	(0.63)	(1.13)	(0.77)	(1.91)	(0.37)
Sugars and derivatives	0.24	0.38	0.20	0.26	0.25	0.21	0.14	0.18
	(1.93)***	(2.18)**	(1.76)***	(1.55)	(2.1)*	(1.24)	(1.25)	(1.14)
Bakery products	0.18	0.20	0.00	0.00	–0.14	–0.11	–0.22	–0.19
	(1.05)	(0.78)	(0.01)	(–0.01)	(–0.87)	(–0.42)	(–1.48)	(–0.85)
Alcohol and tobacco	–0.08	0.27	–0.26	0.06	–0.20	0.29	–0.46	–0.04
	(–0.30)	(0.67)	(–0.78)	(0.17)	(–0.72)	(0.82)	(–1.47)	(–0.12)
Education	–0.33	0.27	–0.43	0.24	–0.68	–0.02	–0.64	–0.08
	(–1.31)	(0.74)	(–1.57)	(0.71)	(–2.77)*	(–0.07)	(–2.46)*	(–0.25)
Health	0.01	–0.24	–0.32	–0.15	–0.63	–0.72	–0.73	–0.56
	(0.03)	(–0.47)	(–1.23)	(–0.36)	(–2.29)*	(–1.53)	(–2.92)*	(–1.38)
Hygiene	0.23	0.61	–0.12	0.24	–0.83	0.27	–0.68	–0.56
	(0.40)	(0.80)	(–0.17)	(0.30)	(–1.26)	(0.34)	(–1.06)	(–0.74)
School books and utensils	0.20	0.43	0.16	0.39	0.04	0.32	0.11	0.30
	(2.60)*	(3.28)*	(2.43)*	(3.45)*	(0.56)	(2.46)*	(1.7)	(2.73)*

Source: prepared by the author on the basis of data from the 2008-2009 Brazilian Household Budget Survey.

Note: _t_-statistics in parentheses.
* Significant at 1% (t=2.32). ** Significant at 5% (t=1.96). *** Significant at 10% (t=1.64).

V

Conclusions

Income-transfer programmes play a major role in Latin American economies, because they translate into public policies that directly and indirectly help reduce inequality and poverty. Most of these programmes target poor families and combine actions in the education, health and nutrition areas. They can also be effective in breaking the intergenerational cycle of poverty, because they enable families to encourage their children to stay in school, improve their nutritional level, and have good health consequences.

One of the main contributions of this article has been the use of gross per-capita income to measure the income effect of the PBF. As food expenditure is relatively higher among the poorest segments of the population, the beneficiary families can be expected to spend the additional income obtained from the cash transfer from the government on food. Using gross rather than net income as the control variable makes it possible to verify whether the effect of receiving the benefit includes budgetary redistribution, in addition to the direct effect

of the increase in per-capita disposable income. The use of net per-capita income as the explanatory variable showed the effects of the benefit and of the budgetary redistribution on family consumption expenditure. Using net income as the control variable enables the average effect of the treatment on the treated to capture both the effect of the increase in income and the potential effect of being a beneficiary on the redistribution of the family's budget.

As noted above, income-transfer programmes make a major contribution to improving family education and health. An evaluation of the effects of the PBF showed that the beneficiary families, particularly those headed by women, increased their on expenditure on school books and utensils. It also reported higher expenditure on

poultry and eggs; legumes and green vegetables; cereals, leguminous and oilseed products; flours, starches and pastas; tuber and root vegetables.

The research also showed that the beneficiary families use their income to purchase priority goods, which alleviate their extreme poverty, and also school utensils which represent an investment in their children's education. As this is a wide-ranging topic, some aspects remain to be studied in greater detail, including the nutritional value of the food consumed by the beneficiary families. Lastly, the results obtained were satisfactory in terms of achieving the basic objectives of the PBF, namely to combat hunger and enhance the food and nutritional security of families living in poverty and indigence.

Bibliography

Angrist, J.D. and J. Pischke (2008), *Mostly Harmless Econometrics: an Empiricist's Companion*, Princeton, Princeton University Press.

Attanasio, O. and others (2005), *Evaluación del impacto del Programa Familias en Acción – Subsidios condicionados de la red de apoyo social. Informe del primer seguimiento*, Bogota.

Attanasio, O. and A. Mensard (2006), "The impact of a conditional cash transfer programme on consumption in Colombia", *Fiscal studies*, vol. 27, No. 4, Wiley.

Baptistella, J. (2012), "Avaliação de programas sociais: uma análise do impacto do Bolsa Família sobre o consumo de alimentos", thesis, Sorocaba.

Barros, R.P. and others (2010), "Markets, the State and the Dynamics of Inequality: Brazil's Case Study" [online] www.undp.org/latinoamerica/inequality.

_____ (2007), "A queda recente de desigualdade de renda no Brasil", *Desigualdade de renda no Brasil: uma análise da queda recente*, R.P. de Barros, M. Foguel and G. Ulyssea (orgs.), vol. 1, Brasilia, Institute of Applied Economic Research (IPEA).

_____ (2006), "Uma análise das principais causas da queda recente na desigualdade de renda brasileira", *Econômica*, vol. 8, No. 1, Rio de Janeiro, Fluminense Federal University, June.

Becker, S. and A. Ichino (2002), "Estimation of average treatment effects based on propensity scores", *The Stata Journal*, vol. 2, No. 4, StataCorp.

Brandão, A., S. Dalt and V.H. Gouvêa (2007), "Segurança alimentar e nutricional entre os beneficiários do Programa Bolsa Família", *Avaliação de Políticas e Programas do MDS – Resultados, J. Vaitsman and R. Paes-Souza (orgs.), vol. 2, Brasilia, Ministry of Social Development and Hunger Alleviation.

Caliendo, M. and S. Kopeinig (2005), "Some practical guidance for the implementation of propensity score matching", IZA *Discussion Paper*, No. 1588, Bonn, Institute for the Study of Labor, May.

Duarte, G.B., B. Sampaio and Y. Sampaio (2009), "Programa Bolsa Família: impacto das transferências sobre os gastos com alimentos em famílias rurais", *Revista de Economia e Sociologia Rural,* vol. 47, No. 4, Brasilia, Sociedad Brasileira de Economia e Sociologia Rural.

Glewwe, P. and A.L. Kassouf (2012), "The impact of the Bolsa Escola/Família conditional cash transfer programme on enrollment, drop out rates and grade promotion in Brazil", *Journal of Development Economics*, vol. 97, No. 2, Amsterdam, Elsevier.

Guo, S. and M.W. Fraser (2010), *Propensity Score Analysis: Statistical Methods and Applications*, Los Angeles, Sage Publications.

Helfand, S.M. and A.P. Souza (2010), "The Impact of Conditional Cash Transfer Programme on Human Capital Formation in Brazil: A Structural Approach" [online] http://virtualbib.fgv.br/ocs/index.php/sbe/EBE10/paper/view/2299/1124.

Hoddinott, J., E. Skoufias and R. Washburn (2000), *The Impact of PROGRESA on Consumption. Final Report*, Washington, D.C., International Food Policy Research Institute (IFPRI).

Hoffmann, R. (2010), "Desigualdade da renda e das despesas per-capita no Brasil, em 2002-2003 e 2008-2009, e avaliação do grau de progressividade ou regressividade de parcelas da renda familiar", *Economia e sociedade*, vol. 19, No. 3, Campinas, Institute of Economics, State University at Campinas.

_____ (2006), "Transferências de renda e a redução da desigualdade no Brasil e cinco regiões entre 1997 e 2004", *Econômica*, vol. 8, No. 1, Rio de Janeiro, Fluminense Federal University, June.

Hoffmann, R. and M.G. Ney (2008), "A recente queda da desigualdade de renda no Brasil: análise de dados da PNAD, do Censo Demográfico e das Contas Nacionais", *Econômica*, vol. 10, Rio de Janeiro, Fluminense Federal University.

Holland, P.W. (1986), "Statistics and causal inference", J*ournal of the American Statistical Association*, vol. 81, No. 396, Taylor & Francis.

IBGE (Brazilian Geographical and Statistical Institute) (2010), *Pesquisa de Orçamentos Familiares* 2008-2009: *despesas, rendimentos e condições de vida*, Rio de Janeiro.

Martínez, S. (2005), "Pensions, Poverty and Household Investments", unpublished.

Ministry of Social Development and Hunger Alleviation [online] http://www.mds.gov.br/bolsafamilia/o_programa_bolsa_familia/o–que–e.

Philippi, S.T. (2008), *Pirâmide dos alimentos: fundamentos básicos da nutrição*, Barueri, Manole.

Resende, A.C.C. and A.M.H.C. Oliveira (2008), "Avaliando resultados de um programa de transferência de renda: o impacto do Bolsa–Escola sobre os gastos das famílias brasileiras", *Estudos Econômicos*, vol. 38, No. 2, São Paulo, University of São Paulo.

Rocha, S. (2005), "Impactos sobre a pobreza dos novos programas federais de transferência de renda", *Revista de Economia Contemporânea*, Rio de Janeiro [online] www.anpec.org.br/encontro2004/artigos/A04A137.pdf.

Rosenbaum, P.R. and D.B. Rubin (1985), "Constructing a control group using multivariate matched sampling methods that incorporate the propensity score", *The American Statistician*, vol. 39, No. 1, Taylor & Francis.

————— (1983), "The central role of propensity score in observational studies for causal effects", *Biometrika*, vol. 70, No. 1, Oxford, Oxford University Press.

Silva, G. and L. Tavares (2010), "Sobre o futuro do Bolsa Família", *Bolsa Família 2003-2010: avanços e desafios*, vol. 2, Jorge Abrahão de Castro and Lúcia Modesto (orgs.), Brasilia, Institute of Applied Economic Research (IPEA).

Smith, J. and P. Todd (2005), "Does matching overcome Lalonde's critique of non-experimental estimators?", *Journal of Econometrics*, vol. 125, No. 1-2, Amsterdam, Elsevier.

Soares, S. and N. Sátyro (2010), "O Programa Bolsa Família: desenho institucional e possibilidades futuras", *Bolsa Família 2003-2010: avanços e desafios*, Jorge Abrahão de Castro and Lúcia Modesto (orgs.), vol. 1, Brasilia, Institute of Applied Economic Research (IPEA).

Tavares, P.A. (2010), "Efeito do Programa Bolsa Família sobre a oferta de trabalho das mães", *Economia e Sociedade*, vol. 41, Campinas, State University at Campinas.

Villatoro, P. (2011), "Las transferencias condicionadas en América Latina: Luces y sombras", paper presented at the International Seminar on "Evolution and Challenges Facing Conditioned Transfer Programmes", Brasilia [online] http://www.eclac.cl/dds/noticias/paginas/1/30291/CEPAL_PabloVillatoro_PTC.pdf.