

## THE BRAZILIAN CASH TRANSFER PROGRAM, REGIONAL EFFECTS, AND ITS IMPACT ON THE LABOUR MARKET

Paulo Aguiar do Monte (PPGE/UFPB)  
Helio de Sousa Ramos Filho(PPGE/UFPB)

### Abstract

The aim of this paper is to discuss the effects of the Bolsa Família Program on the Brazilian labour market. The data are derived from a sample from the Family Budget Survey, 2008-2009. The descriptive analysis highlights the importance of Bolsa Família in the composition of families' income, especially in the case of those families that live in less economically developed regions of Brazil such as North and Northeast, as well as rural areas. The empirical analysis carries out econometric models [Seemingly Unrelated Bivariate Probit model and Instrumental Variables (IV)], and demonstrates both a strong and negative effect of the cash transfer provided by Bolsa Família on the Brazilian labour market.

**Key-words:** Bolsa Familia Program. Brazil. Income. Region.

### Resumo

O objetivo deste artigo é discutir os efeitos do Programa Bolsa Família no mercado de trabalho brasileiro. Os dados foram obtidos a partir de uma amostra da Pesquisa de Orçamentos Familiares, 2008-2009. A análise descritiva destaca a importância do Bolsa Família na composição da renda das famílias, especialmente para as famílias que vivem em regiões economicamente menos favorecidas do Brasil, das regiões Norte e Nordeste, bem como as suas respectivas áreas rurais. A análise empírica se utiliza de modelos econométricos [Modelo Probit Bivariado aparentemente não relacionado e de Variáveis Instrumentais (VI)] para verificar que existe um efeito forte e negativo da transferência de renda fornecida pelo Programa Bolsa Família no mercado de trabalho brasileiro.

**Palavras-Chave:** Programa Bolsa Família. Brasil. Renda. Região.

## I. Introduction

Over the last years, it has been observed the presence of Conditional Cash Transfer Programs (from now on CCTP) in many countries. CCTP are widespread in Latin America and increasingly popular throughout the world, being directly related to mechanisms of social protection and ascension. Conditional Cash Transfer Programs are directed to the poorest extracts of society, families that live in conditions of social vulnerability. Among the various consolidated experiences of CCTP are the ones developed in countries such as Brazil (*Programa Bolsa Família*), Chile (*Chile Solidario*), Argentina (*Programa Familia*), Colombia (*Ação Família*), Mexico (*Progresa*) and, more recently, in African and Asian countries. (Cardoso and Sousa, 2004; Mattei, 2010)

Briefly, the Conditional Cash Transfer Programs (CCTP) aim at providing financial assistance to low income families, but their continuation depend of the observation of some requirements that have to be filled by the families, most of them related to children's school attendance, vaccine and regular visits to health centers. Specifically in regard to the most important CCTP in Brazil, the *Bolsa Família* Program (*Programa Bolsa Família - PBF*), the aim is to reduce the inter-generational cycle of poverty, and initially to alleviate the immediate effects of poverty and to reduce child labour. (Cardoso and Sousa, 2004)

Lindert (2007) argues that Brazilian society has been historically so unequal that it is indebted to poor people. Although Brazil still occupies a highly unfavorable position in social aspects, in recent years it has been observed a reduction of income inequality and a relative improvement in the Human Development Index (HDI). According to recent studies (for instance Smith, 2006; Hoffmann, 2006; Barros et al., 2006), cash transfers have been considered the major feature responsible for this change. Studies indicate that between 20% and 30% of income inequalities reduction are due to income transfer programs, together with other features such as the growth of formal employment and the improvement of the minimum wage which also contributes to the reversal of the trend observed recently. (Dedeca, 2006; Barros et al., 2006; Soares et al., 2006; Soares et al., 2007).

As said before, the main exponent in Brazil is the *Bolsa Família* Program (PBF) which is under the Brazilian Ministry of Social Development and Hunger Combat (*Ministério do Desenvolvimento Social e Combate a Fome - MDS*). According to this Ministry, PBF's main target is the immediate relief of poverty income through direct cash to the beneficiary families and to enable them to attend basic social rights, notably education and health care, through the application of associated conditionality.

The analysis concerning the influence of cash transfer has indicated its importance as a means of reducing income inequality and intergenerational transmission of poverty (Lindert et al., 1987; Glewwe and Kassouf, 2012). However, regarding the effects on the labour market, the results are still contradictory and emphasize the importance of further discussion. The argument regards the negative influence of income transfer on the labour market is based on the economic theory. Empirical research has suggested that long benefits (which means non-labour income) duration, insofar as they reduce the consequences of unemployment, can also reduce job seeking and the willingness of the unemployed person to accept a job (Okun, 1975; Mortensen, 1986). This is because when an unemployed finds a job, the benefit, probably, is withdrawn, which means that his or her reservation wage tends to rise to compensate this loss. According to Okun (1975) the pursuit of equity through policies that transfer income to the poor can lead to inefficiencies in the labour market. As stated by Reis and Camargo (2007), higher non-labour earnings can be seen as a pure income effect, so it would be expected a negative impact of this variable on labour supply. In turn, among the studies that do not find a negative impact on the Brazilian labour supply it can be cited the work of Medeiros, Brito and

Smith (2007), Bichir (2010) and Maas and Caetano (2010). These studies argued that the low value of the benefit received by the families does not suffice to discourage the family members from job seeking.

There is little evidence of the effects of Cash Transfers Programs on the labour market. Based on the above mentioned, the purpose of this article is to provide new evidence through the appliance of different econometric tools, the possible relationship between the *Bolsa Família* program and the participation of beneficiaries' members in the labour market. Unlike most of the studies that dealt with the subject, ours will make use of data from the Household Budget Survey (*Pesquisa de Orçamento Familiar - POF*) conducted by the Brazilian Institute of Geography and Statistics (IBGE), in 2008-2009. The main advantage of POF refers to the identification of the beneficiary family and the value received. However, like other sources of data available, there are faults which do not allow a more accurate analysis, among them the non-identification of the member of the family responsible for receiving the transfer.

Although the PBF was created as a program to reduce inequality, it influences various segments of the economy, including the labour market. Based on the difficulties above, our approach is more operational. We will make use of econometric models (such as Seemingly Unrelated Regression and Instrumental Variables) in order to analyse the effects of *Bolsa Família* cash transfer on the Brazilian labour market.

The argument of the paper will be developed over the next six sections. Section II provides a brief description of *Bolsa Família*, while section III is devoted to the description of the econometric methodology and the database applied for the simulation of the effects of cash transfer on the labour market. Sections IV and V discuss the results of descriptive and econometric analysis, respectively. Finally, section VI displays our conclusive remarks.

## II. Bolsa Família Program (PBF) and the Labour Market

The Conditional Cash Transfer Programs (CCTP) refer to monetary transfers to targeted population groups excluded from the access to the market of goods and services, aiming to improve health and education, and therefore alleviating the effects of poverty in both short- and long-term.

In Brazil, the pioneering experience of such CCTP was the *Programa Bolsa Educação* also called *Bolsa Escola*, implemented in the Federal District in 1995 (Suplicy and Buarque, 1997) and later extended to several other localities. Since then, new programs were created at both regional and national levels, primarily aiming to expand the scope of its coverage. In 2002, after the creation of the Ministry of Social Development and Hunger Combat (MDS) by the Brazilian government, it took place a process of convergence of benefits of the former Cash Transfer Programs (*Auxílio Gás, Bolsa Escola, Bolsa Alimentação e Cartão Alimentação*) toward a single program that consolidates all of these actions and consider the family as a nucleus consisting of members with different needs, called *Programa Bolsa Família* (PBF). PBF is the largest conditional cash transfer program in the world and the main component of a major governmental program called *Fome Zero*<sup>1</sup>.

*Bolsa Família* provided assistance to 13 million Brazilian families in 2012 approximately. In order to enroll in PBF, families fill out an application form that requests information about income and household composition; such information is determinant of the families' eligibility. The criteria of eligibility are basically based on the definition of families living in poverty. In 2009, the original income ceilings for eligibility to *Bolsa Família* were

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<sup>1</sup> For further details, see Lindert et al. (2007) and Brazil (2009).

set at a fixed monthly per capita family income ranging from R\$ 62,00 (US\$ 31.00) to R\$ 182,00 (US\$ 91.00), depending on the number of children or adolescents in the family for extremely poor families (families with income lower than R\$ 60,00 per capita) and from R\$ 20,00 (US\$ 10.00) to R\$ 60,00 (US\$ 30.00) for moderately poor families (families with income per capita ranging from R\$ 60,00 to R\$ 120,00)<sup>2</sup>. According to Lindert et al. (2007), the increase in *Bolsa Família* eligibility has been combined with the decrease in poverty.

The magnitude of PBF, both in quantitative and financial terms, reveals its importance as an instrument of social policy and explains why several studies are focusing on the subject. Given its diverse goals both in the short- and long-term, it is difficult to assess the potential effects of the cash transfer under one single perspective in the macroeconomic context. Despite this difficulty, there is no database which provides the necessary amount of information to make an accurate diagnosis.

Most studies regarding the impact of the cash transfers on the Brazilian labour supply applies the National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílios* - PNAD), more specifically the data collected in its supplement from 2004 and 2006 (Tavares, 2010; Foguel and Barros, 2010; Santos et al., 2010). However, the biggest difficulty to work with this database is the impossibility to identify the beneficiary family in the years in which there was no supplement, as well as the lack of a variable that identifies the amount of benefit received. Another source of information widely applied in research is displayed by the so-called Federal Government's *Cadastro Único* (Unified Register) that identifies low income families. To be eligible for *Bolsa Família* benefits, households must be listed in this registry. However, the lack of information about the households' situation in the labour market prevents a more accurate analysis. According to Brito (2011) and Brito and Kerstenetzky (2011), the non-fulfillment of some questions related to the labour market in the *Cadastro Único* ends up invalidating a more precise study.

Despite the difficulties outlined above, the literature already presents several preliminary results about *Bolsa Família*, which, in general, point to the importance of the program in reducing both inequality and child labour (Pedrozo, 2007). Focusing on the issue of the participation of the beneficiary's family in the labour market, however, the results are still divergent. Oliveira et al. (2007) conducted a survey applying the propensity score matching method and observed a higher participation of the beneficiary families in the labour market compared to the non-benefit ones. Similarly, Maas and Caetano (2010) also suggest that there is no lack of willingness to work among beneficiaries, especially among men. The authors, however, point out that there are higher probability that beneficiary members from the PBF get a precarious job, especially women, who are the majority amongst the beneficiaries of the program. Tavares (2010) states that the presence of an income effect associated with the value can reduce the effective engagement of the mothers in the labour market. Yet, overall the total effect is positive, indicating that there is a substitution effect, probably due to the reduction of children's labour supply, the higher availability of time for women to work or even a stigma derived from the participation in the program.

In turn, there are those that observed a negative impact in labour supply. Cavalcanti and Corrêa (2010) developed a matching model with endogenous job destruction and labour market participation, and showed that the size of cash transfers has a negative effect on the employment rate. Foguel and Barros (2010) pointed out that there is a small magnitude reduction on labour supply in terms of hours participation, women who live in rural areas, and significant magnitude to those who have incomes below the average. Similarly, Santos et al. (2010) noted that the negative effect of income transfers is more intense among women in rural areas and the impact tends to be higher in married female beneficiaries.

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<sup>2</sup> Considering an exchange rate of 2,00R\$/US\$ (July 2012).

In sum, if on the one hand there has been a common sense about the importance of *Bolsa Família* given its scope and magnitude, on the other hand, the results of PBF on the labour market are not conclusive yet, mainly because of the difficulties of obtaining accurate information about available databases.

### III. Methodology and Data

This section explains the way in which one can draw on Household Budget Survey (POF) data in order to estimate the impact of *Bolsa Família* on the labour market. Let us start by explaining the empirical model applied to evaluate whether the financial benefit provided by the Federal Government bear any influence upon labour market participation.<sup>3</sup>

#### (a) Empirical Model

Let  $Y_{ij}$  be an indicator variable of individual participation in the labour market in the region  $j$  - outcome variable - and  $B_{ij}$  be an indicator variable for the beneficiary families' labour market participation - treatment variable. This suggests the estimation of two simultaneous equations: the first one, representing the chances of the family to be beneficiary of the PBF, and the second one an equation for the beneficiary families' labour market participation (labour supply).

The econometric model is based on two equations; the first one is as follows:

$$\begin{aligned} B_{ij}^* &= \Gamma_{ij}\delta_1 + \Psi_{ij}\delta_1 + \varepsilon_{ij} \\ B_{ij} &= 1 \text{ if } B_{ij}^* > 0; B_{ij} = 0 \text{ if } B_{ij}^* \leq 0 \end{aligned} \quad (1)$$

Meanwhile, the second equation, relating to labour market participation, is determined by:

$$\begin{aligned} Y_{ij}^* &= \Gamma_{ij}\pi + B_{ij}\psi + \varepsilon_{ij} \\ Y_{ij} &= 1 \text{ if } Y_{ij}^* > 0; Y_{ij} = 0 \text{ if } Y_{ij}^* < 0 \end{aligned} \quad (2)$$

Where  $\psi$  measures the cash transfer effects (encouragement or discouragement) on labour supply;  $\Gamma_{ij}$  are vectors of the features of the two equations above (1 and 2), describing a set of Brazilian regional dummy variables,  $j$ ;  $\Psi_{ij}$  represents the subjective variables that describe the family life conditions  $i$  in region  $j$  (income sufficiency, food sufficiency and food satisfaction);  $\varepsilon_{ij}$  and  $U_{ij}$  are the error terms, which may be correlated because of the endogeneity.

The model specified by equations (1) and (2) suggests three reasons for the correlation between labour market participation ( $Y$ ) and enrollment in *Bolsa Família* ( $B$ )<sup>4</sup>: 1. The straight relationship between  $B$  and  $Y$  by means of parameter  $\psi$ ; 2. The correlation between the observed features of the family's labour market participation ( $Y_{ij}$ ) and the regional variables ( $\Gamma_{ij}$ ), that is, families that live in North Brazil have, on average, low indicators of life conditions compared to those who live in South Brazil; 3. The correlation between the non-

<sup>3</sup> For this study, it is considered that participation is linked to being employed in the labour market.

<sup>4</sup> We took as granted that those enrolled in PBF are receiving the benefits.

observable variables ( $\varepsilon_{ij}, U_{ij}$ ). In these cases, treatment variable (either receiving the benefits from *Bolsa Família* or do not receiving) is endogenous to the decision to take part in the labour market.

Faced with the possibility of the presence of endogeneity, two econometric procedures were used: Seemingly Unrelated Bivariate Probit model and Instrumental Variables (IV). Following Heckman (1978), the two probit equations comprise a system that jointly determines both the variable propensity to enrollment in *Bolsa Família* (treatment) and the variable of participation in the labour market (outcome). It is also assumed that the error terms of the two equations have joint normal distribution.

This set of assumptions implies a bivariate probit model in which the treatment variable (either receiving the benefits or do not receiving the benefits) is the dependent variable and with an endogenous explanatory variable in equation (2). This specification assumes that there is no correlation between  $U_{ij}$  and  $\varepsilon_{ij}$ . It provides consistent estimates of the effect of *Bolsa Família*, as stated by Wooldridge (2002). Therefore, it is necessary to test the null hypothesis of  $\rho = \text{corr}(\varepsilon_{ij}, U_{ij}) = 0$  by applying maximum likelihood test.

For any given labour market participation outcome, it is possible to estimate *Bolsa Família*'s effects by the Average Treatment Effect (ATE) and the Average Treatment effect on the Treated (ATT). In the bivariate probit model, the average effect of *Bolsa Família* on the labour market (ATE) is given by  $E[Y(B=1)] - E[Y(B=0)] = \Phi(\Gamma_{ij}\pi + \psi) - \Phi(\Gamma_{ij}\pi)$  and the average effect of *PBF* on the decision to work restricted to the group enrolled in the program (ATT) is given by  $E[Y(B=1) - E[Y(B=0) | B=1]]$ . These are the main parameters of interest in this study.

Once confirmed by the endogeneity test, the decision to take part in the labour market ( $Y$ ) is correlated with the gain of the benefit from *Bolsa Família* ( $B$ ); whatever the reasons already discussed, the Instrumental Variables regression (IV) is applied. The IV regression model consists in finding variables  $Z$  (instrument variable) which are not correlated with the error term  $\varepsilon_{ij}$ , but that has correlation with the treatment variable. In this case, it was considered the regional dummy variables  $j$ ,  $\Gamma_{ij}$ , and the ones which describe the perception of the family  $i$  in the region  $j$  about their living conditions (income sufficiency, food sufficiency and food satisfaction),  $\Psi_{ij}$ . In relation to the mean effects, its specification is complex and may be found in details in the work of Imbens and Angrist (1994), Angrist and Krueger (2001), Heckman and Vytlacil (1999) and Angrist and Pischke (2008).

Futhermore, it is relevant to highlight that the estimations were obtained separately for three types of samples: one in which any member of the family is treated as dependent variable (family), another one in which the dependent variable is the head of the family, and the last one in which the partner of the head of the family is the dependent variable (partner). The aim of these groups is to analyze whether the financial benefit granted differentially impacts the family members, as demonstrated by some previous studies (Tavares, 2010; Santos et al., 2010).

Finally, although the purpose of this paper not to discuss in detail the Brazilian labour market, it is important to highlights the complexity and the particular characteristics of the labour market. The informal sector is responsible for around 35-40% of employment in Brazil, which tends to be even higher in rural areas. Although aware of the differences between the formal and informal labour market segments, regional characteristics, different rates of labour force participation of women and men, in this paper we will not make further considerations about these distinctions. We consider in the analysis the labour force participation, regardless of the market segments (formal or informal) and the differences between the areas of residence.

### 3.2 Data

For the empirical analysis we draw on data from the Household Budget Survey (*Pesquisa de Orçamento Familiar - POF*) conducted by the Brazilian Institute of Geography and Statistics (IBGE) in 2008/2009. POF provides both analysis of the composition of family income, and analysis about the structure of consumption and spending. Thus, it is possible to analyze the regional disparities (urban and rural areas, for instance), as well as the effects of the social transfers among the different reference units.

Within the context of this article, the reference units are the families that comprise a single member or group of residents that share the same source of food. By making use of many variables in POF, it was possible to add further information about all individuals in their respective reference units (families). Then, for each family, we calculated the composition of their household income made of the main sources of income (basically, transfers and other sources). Given the aim of the study, the total household income was decomposed in the main social programs (*Bolsa Família*, the Continuous Cash Benefit - *Benefício de Prestação Continuada* -, and Eradication of Child Labour Program – *Programa de Erradicação do Trabalho Infantil*)<sup>5</sup>.

In addition to the variables of income (income from Social Programs and income from other sources), we also considered those variables related to the regions of Brazil (North, Southeast, Midwest, Southeast and South) and to the area of residence (urban or rural), the number of residents, income per capita and living conditions indicators (represented here by the subjective responses of interviewees, scaled on the concepts of income sufficiency, food sufficiency and food satisfaction<sup>6</sup>).

Finally, families with an income lower than R\$ 10,00 (roughly US\$ 5.00) per capita or higher than R\$ 50,000 per capita (roughly US\$ 25.000) were excluded from the sample.

## IV. Descriptive Analysis of Income and Living Conditions

In this section, we present the summary statistics of the key variables applied. Given all the caution the database requires, the sample consisted of 269,078 observations, mostly made up of residents from urban areas (77.85%). Table 1 describes the distribution of the sample along the main variables of analysis. Column 1 reports the variables, and the other columns report the different samples applied: Brazil, Urban and Rural areas of Brazil. It should be stressed the income disparity observed among urban areas (total income of R\$ 3.041,14, and average income per capita of R\$ 917,81) and rural areas (total income of R\$ 1.820,15 and average income per capita of R\$ 528,19). The variables in percentage indicate

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<sup>5</sup> The Continuous Cash Benefit (BPC) is a monthly benefit to elderly people (65 years old or older) and disabled people valued at a minimum wage in Brazil. The Eradication of Child Labour (PETI) is a Brazilian Program for children and teenagers (up to 16 years old) exposed to child labour practices, except as apprentices, implying the direct transfer of income to the benefited families.

<sup>6</sup> We drew on the same conceptual criteria applied in the POF questionnaire: a) Income sufficiency (if the total household income is enough for monthly expenses), food sufficiency (the amount of food consumed by family is sufficient) and food satisfaction (the type of food consumed is always the type wished by the family). The indicators of subjective conditions of life were obtained according to the individual's perception, whose values range from 1 to 5 (for income sufficient) and ranges from 1 to 3 (for food sufficiency and food satisfaction), and in which higher values mean best indicators.

the distribution of the sample among the Brazilians regions. For example, in the first column, the North region is responsible for 14.34% of all observations; while in the third column, its participation increases to 18.86% among all Brazilian rural areas.

Table 1. Sample description: Urban and Rural Brazil, 2008-2009.

Variables	Brazil	Urban	Rural
Total Income (R\$)	2,770.79	3,041.14	1,820.15
Income Per Capita (R \$)	831.54	917.81	528.19
Number of residents	4,10	4,03	4,40
North Brazil (%)	14.34	13.06	18.86
Northeast Brazil (%)	34.71	34.57	35.20
Midwest Brazil (%)	13.27	12.99	14.27
Southeast Brazil (%)	25.35	26.95	19.74
South Brazil (%)	12.33	12.43	11.93
Total (obs.)	269,078	209,500	59,578

Source - Household Budget Survey (*Pesquisa de Orçamento Familiar – POF*).

Table 2 provides another aspect describing the composition of family income, according to the major social programs available in the database (*Bolsa Família*, Continuous Cash Benefit, and Eradication of Child Labour Program) and other sources of income. Analyzing the results, it can be seen the importance of social programs in the composition of income, especially *Bolsa Família* (which is responsible for almost 80% of the total expenditure in these programs) in the less developed regions (particularly North and Northeast Brazil, where transfers of income are responsible for 4.77% and 10.56% of the total income in urban and rural areas, respectively).

Table 2. Percentage composition of total income by region of Brazil, 2008-2009.

Total Income / Region	North	Northeast	Southeast	South	MidWest
					Urban Area
Total Income	100.00	100.00	100.00	100.00	100.00
Social Programs	3.00	4.77	1.09	0.81	1.67
<i>Bolsa Família</i>	2.28	3.51	0.74	0.48	0.80
Continuous Cash Benefit	0.69	1.24	0.35	0.33	0.86
Eradication of Child Labour	0.03	0.02	0.01	0.01	0.01
					Rural Area
Total Income	100.00	100.00	100.00	100.00	100.00
Social Programs	6.00	10.56	1.95	0.92	2.28
<i>Bolsa Família</i>	5.13	9.19	1.54	0.84	1.81
Continuous Cash Benefit	0.87	1.35	0.41	0.08	0.42
Eradication of Child Labour	0.00	0.02	0.00	0.00	0.04

Source - Household Budget Survey (*Pesquisa de Orçamento Familiar – POF*).



## V. Econometric Analysis

The econometric analysis starts from the estimation of the seemingly unrelated regression (bivariate probit model) for which the dependent variables are labour market participation (1 for employed, 0 otherwise) and enrollment in *Bolsa Família* (1 for beneficiary, 0 otherwise).

The results are shown in Table 3. The first column of the results refers to the participation of any member of the beneficiary families in the labour market (Family); the second column refers to the household head labour market participation (Head of Family); and the third column refers to the participation of the partner of the head of family (Partner). The Household Budget Survey (POF) referred to in this paper has a crucial advantage: a very comprehensive sample. Yet, these data also have a serious disadvantage: it is not possible to determine, in each family, who is the responsible for the cash transfer. This information is important for a more robust analysis of the effects on the labour market participation.

The results of the first estimation (Bivariate Probit) show that the value of the correlation coefficient estimated (Rho) is positive (0.1771) and significant to 1% level, indicating that the unexplained component of receiving benefit is possibly related to the unexplained component of the family's participation in the labour market, which was confirmed by the appliance of Vuong-Rivers (1998) approach. The variable beneficiary of *Bolsa Família* is endogenous to the labour market participation. This result validates the model applied and indicates a relationship between receiving cash transfer and participation in the labour market, which is the reason why the equations must be jointly estimated.

As far as the estimated variables are concerned, the results of the second probit equation show that families with a low level of income sufficiency, food sufficiency and food satisfaction are more likely to receive the benefit compared to those families that live in Northeast Brazil (reference variable), confirming the poorest social conditions of the beneficiary group<sup>7</sup>. In turn, the results of participation in the labour market indicate that in the more developed regions job opportunities are higher than in Northeast; the same occurring in urban areas compared to rural ones. However, the main result refers to the variable *Bolsa Família* whose coefficient was negative and significant at 1% confidence level in all three equations, showing that the beneficiary families are less likely to be employed in the labour market.

The bootstrap method with 500 replications was applied to calculate the ATE (Average Treatment Effect), which represents the average treatment effect on the total households in the sample, and ATT (Average Treatment effect on the Treated), which depicts the average effect treatment for families that have been treated or receiving the benefits of PBF. Since the value of ATT can be understood as the difference of the expected result of a family (either head of family or partner) randomly selected from the subpopulation of the families that were enrolled in *Bolsa Família*, and that the result that this family (either head of family or partner) would reach had it not enrolled in PBF, the coefficient estimated indicates that the cash transfer from *Bolsa Família* has a negative effect on labour market employment/participation. A similar analysis can be made with respect to ATE, since it was also negative and statistically significant in all three equations estimated. On average, the probability of an enrolled family member to find a job is reduced by 17 percentage points (pp) for the partner, 20 pp for the head of family and 26 pp for any member of the family.

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<sup>7</sup> The test of Murphy was applied to verify the adjustment of the model due to excess kurtosis and asymmetry in the error distribution. The result is shown in Appendix. For further details, see Cameron and Trivedi (2009).

Table 3. Estimated coefficient from the seemingly unrelated bivariate probit for labour market participation, 2008-2009.

	Bivariate Probit Model		
	Family (1)	Head of family (2)	Partner (3)
<u>Labour Market participation</u>			
<i>Bolsa Família</i>	-0.7160*** (0.0510)	-0.7284*** (0.0487)	-1.4211*** (0.0346)
North Brazil	0.1207*** (0.0188)	0.1242*** (0.0175)	0.0475** (0.0187)
Southeast Brazil	0.1105*** (0.0185)	0.0807*** (0.0175)	-0.0344* (0.0188)
South Brazil	0.0393* (0.0227)	0.0017 (0.0214)	0.0593** (0.0233)
Midwest Brazil	0.0985*** (0.0213)	0.1146*** (0.0200)	-0.0821*** (0.0212)
Urban Area	0.1423*** (0.0151)	0.0262* (0.0142)	0.1267*** (0.0159)
Constant	0.6781*** (0.0224)	0.3409*** (0.0223)	-0.4690*** (0.0267)
<u>Beneficiary of Bolsa Familia</u>			
North Brazil	-0.1969*** (0.0194)	-0.1971*** (0.0194)	-0.2045*** (0.0194)
Southeast Brazil	-0.7029*** (0.0193)	-0.7010*** (0.0193)	-0.7046*** (0.0191)
South Brazil	-0.8101*** (0.0280)	-0.8111*** (0.0279)	-0.7938*** (0.0273)
Midwest Brazil	-0.7219*** (0.0237)	-0.7213*** (0.0237)	-0.7235*** (0.0234)
Urban Area	-0.3887*** (0.0153)	-0.3900*** (0.0153)	-0.3922*** (0.0152)
Income Sufficiency	-0.1672*** (0.0071)	-0.1672*** (0.0071)	-0.1733*** (0.0067)
Food Sufficiency	-0.1874*** (0.0110)	-0.1893*** (0.0109)	-0.1837*** (0.0105)
Food Satisfaction	-0.2262*** (0.0124)	-0.2227*** (0.0124)	-0.2131*** (0.0119)
Constant	0.9897*** (0.0294)	0.9878*** (0.0293)	0.9735*** (0.0295)
Athrho	0.2936*** (0.0316)	0.2902*** (0.0309)	0.7645*** (0.0406)
Rho	0.2854*** (0.0290)	0.2823*** (0.0284)	.6437*** (0.0238)
Exogeneity Test <sup>(2)</sup>	80.21 (p=0.0000)	98.25 (p=0.0000)	364.11 (p=0.0000)
ATT	-0.2484*** (0.0175)	-0.2835*** (0.0174)	-0.1252*** (0.0111)
ATE	-0.2042***	-0.2685***	-0.1713***

(0.0105)                      (0.0153)                      (0.0209)

Source - Household Budget Survey (*Pesquisa de Orçamento Familiar – POF*).

Notes: (1) Robust standard deviations in parentheses; (2) The ATE and ATT effects were estimated by bootstrap (500 replications) (3) The exogeneity test applied following approach Rivers and Vuong (1988); for further details see Wooldridge (2002, p.472-478.); (4) \*\*\*, \*\* and \* indicate significant at 1%, 5% and 10% confidence level.

Accordingly, in order to interpret the magnitude of the coefficients, it is useful to estimate the marginal effects for family, head of family and partner, whose results are presented in Table 4. The marginal effects for the variable *Bolsa Família* were significant and negative in all three equations, confirming that the higher the chance of the family being beneficiary of PBF, the lower the probability of any family member finding a job in the labour market. It is also noted that the marginal effect is negatively increased in equation (2) and equation (3) compared to equation (1). For instance, in equation (3) if the family is enrolled, the chances of employability are 31.66% lower than those families that do not receive benefits. The other results show the significant difficulty of the residents from both rural areas and Northeast Brazil to get a job in the labour market compared to those who live in other areas/regions.

Table 4. *Marginal effects from the seemingly unrelated bivariate probit for the labour market participation, 2008-2009.*

	dy/dx	dy/dx	dy/dx
	Family	Head of family	Partner
	(1)	(2)	(3)
<i>Bolsa Família</i> +	-0.2490*** (0.0194)	-0.2839*** (0.01837)	-0.3166*** (0.00569)
North Brazil+	0.0357*** (0.00537)	0.0468*** (0.00648)	0.0158*** (0.00627)
Southeast Brazil +	0.0331*** (0.00539)	0.0307*** (0.0066)	-0.0113** (0.00615)
South Brazil +	0.0119* (0.00679)	0.0007 (0.00818)	0.0198*** (0.00784)
Midwest Brazil +	0.0293*** (0.00614)	0.0432*** (0.00744)	-0.0265*** (0.00678)
Urban Area+	0.0447*** (0.00484)	0.0100* (0.00544)	0.0408*** (0.00495)
North Brazil	-0.0386*** (0.0035)	-0.0387*** (0.0035)	-0.0401*** (0.00348)
Southeast Brazil	-0.1216*** (0.00269)	-0.1214*** (0.00269)	-0.1222*** (0.00267)
South Brazil	-0.1189*** (0.00265)	-0.1190*** (0.00265)	-0.1177*** (0.00265)
Midwest Brazil	-0.1136*** (0.00266)	-0.1136*** (0.00266)	-0.1141*** (0.00263)
Urban Area	-0.0923*** (0.004)	-0.0927*** (0.004)	-0.0934*** (0.00398)
Income	-0.0355***	-0.0355***	-0.0369***

Sufficiency	(0.00149)	(0.00149)	(0.00141)
Food Sufficiency	-0.0398*** (0.00234)	-0.0402*** (0.00233)	-0.0391*** (0.00224)
Food Satisfaction	-0.0480*** (0.00263)	-0.0473*** (0.00264)	-0.0454*** (0.00253)

Source - Household Budget Survey (*Pesquisa de Orçamento Familiar – POF*).

Notes: (1)  $+ dy/dx$  is calculated for a discrete change of dummy variable from 0 to 1; (2) Robust standard deviations in parentheses; (3) \*\*\*, \*\* and \* indicate significant at 1%, 5% and 10% confidence level.

After that, the impact of receiving cash transfers from PBF on the labour market was simulated by IV Regression. The results are shown in Table 5. The IV regression is justified by the presence of endogeneity, which was confirmed by Rivers-Vuong exogeneity test (Rivers and Vuong, 1988).

The methodology of Instrumental Variables is applied when we have a problem of endogeneity of regressors. In this analysis the problem may exist because of the fact that variables that influence the choice of enrollment in the program will also be correlated with the variable of participation in the labour market. To check if this is true, we applied the test of exogeneity (Durbin and Wu-Hausman test) to assess whether the variable receiving Bolsa Família was truly exogenous. Since the hypothesis  $H_0$  (exogenous variable) was rejected, the equations were estimated by Instrumental Variables (IV)<sup>8</sup>.

The Instrumental Variables are those correlated with enrollment in *Bolsa Família*, but that are neither in regression of the result variable nor correlated with the error of this equation<sup>9</sup>. The results of endogeneity tests are in Appendix and confirm its presence, ratifying, therefore, the use of the IV model.

Like previous analysis, the estimated coefficients for the variable *Bolsa Família* were negative and statistically significant at 1% level, showing that families enrolled in the Program are less likely to be employed in the labour market. Although the results indicate the same trend in all three estimated equations [family (1), head of family (2) and partner (3)], it could be observed that the coefficient of *Bolsa Família* in equation (3), regarding the participation of the partner, is higher compared to the others (-0.5395 against -0.3499 and 0.2762 in equations (2) and (1), respectively). This result may reflect the fact that the group responsible for receiving the cash transfer is predominantly female, what implies a remarkable difference in employment rates between partner (mostly women) and head of family (mostly man), as ratified by Rosa and Santos (2010) and Glewwe and Kassouf (2012). Like the bivariate probit estimation, the positive coefficients of the regional variables estimated by IV

<sup>8</sup> The tests are in the Appendix. In addition to the exogenous test, the tests of instruments validation and of its strength were applied.

<sup>9</sup> The command used in the estimation already corrects the variance-covariance matrix with regards to the efficiency loss of the estimator due to the limitation of the available information.

confirm the higher occupational dynamics of these regions from the reference variable (Northeast).

Table 5. Instrumental Variables estimation for the labour market participation, 2008-2009.

	Family (1)	Head of family (2)	Partner (3)
<i>Bolsa Família</i>	-0.2762*** (0.0224)	-0.3499*** (0.0258)	-0.5395*** (0.0240)
North Brazil	0.0351*** (0.0059)	0.0436*** (0.0069)	0.0099 (0.0064)
Southeast Brazil	0.0234*** (0.0065)	0.0179** (0.0075)	-0.0174** (0.0070)
South Brazil	0.0007 (0.0079)	-0.0141 (0.0092)	0.0186** (0.0085)
Midwest Brazil	0.0197*** (0.0073)	0.0297*** (0.0084)	-0.0354*** (0.0078)
Urban Area	0.0402*** (0.0050)	0.0027 (0.0058)	0.0341*** (0.0054)
Constant	0.7693*** (0.0095)	0.6592*** (0.0109)	0.3294*** (0.0102)

Source - Household Budget Survey (*Pesquisa de Orçamento Familiar – POF*).

Obs: Instrumentalized: *Bolsa Família*. Instruments: North Region, Southeast Region, South Region, Midwest Region, Income Sufficiency, Food Sufficiency and Food Satisfaction.

Notes: (1) Robust standard deviations in parentheses; (2) \*\*\*, \*\* and \* indicate significant at 1%, 5% and 10% confidence level.

Since the instrumental variables estimator draws on a linear prediction of the endogenous variable as a regressor in the second stage, and that the standard errors do not take into account the fact that the estimation is performed in two stages, new variables were included in the regression, named “interaction variables” (the difference between the observed value of the individual from the average, for each control variable, interacting with the treatment dummy variable) in order to improve control measures. Therefore, the estimation was made up by variables representing the deviations from the average, interacting with the treatment variable and the estimated probability of the participation of the treatment, the latter used as an instrument.

The estimation results of the Average Treatment effect on the Treated (ATT) and Average Treatment Effect (ATE) are presented in Table 6. In all three regressions, the estimated coefficients of the variable *Bolsa Família* were negative and significant at 1% significant level, differing only in value magnitude. In this respect, it is observed that in both cases, ATT and ATE, and in all three equations, the probability of being employed is even lower for the head of family (2) and the partner (3) compared to the family regression, confirming the previous estimation (Table 4). On average, the fact that a partner lives in a beneficiary household is associated with a reduction of 60 percentage points (pp) in the probability of he or she getting a job. In conclusion, in all the three cases estimated, it was observed a negative effect on employability caused by the cash transfer from *Bolsa Família*.

Table 6. Simulation of the effects of PBF on the labour market participation by Instrumental Variables, 2008-2009.

	Family	Head of family	Partner	Family	Head of family	Partner
	(1)	(2)	(3)	(1)	(2)	(3)
	ATT			ATE		
	-	-	-	-	-	-
<i>Bolsa Família</i>	0.3264*** (0.0266)	0.3683*** (0.0306)	0.5983*** (0.0287)	0.2918*** (0.0210)	0.3647*** (0.0243)	0.4961*** (0.0226)
North Region	0.0184 (0.0120)	0.0154 (0.0138)	0.0279** (0.0130)	0.0229* (0.0120)	0.0209 (0.0138)	0.0264** (0.0129)
Southeast Region	0.0082 (0.0094)	-0.0054 (0.0108)	0.0202** (0.0099)	0.0162* (0.0092)	0.0031 (0.0107)	0.0283*** (0.0100)
South Region	0.0039 (0.0111)	-0.0215* (0.0128)	0.0737*** (0.0118)	0.0139 (0.0111)	-0.0112 (0.0128)	0.0852*** (0.0120)
Midwest Region	0.0165 (0.0107)	0.0229* (0.0122)	-0.0005 (0.0113)	0.0230** (0.0106)	0.0299** (0.0122)	0.0027 (0.0113)
Urban Area	0.0608*** (0.0050)	0.0305*** (0.0058)	0.0752*** (0.0054)	0.0363*** (0.0059)	0.0010 (0.0068)	0.0291*** (0.0062)
DTE North Region	-	-	-	-	-	-
	0.0733*** (0.0143)	0.0928*** (0.0165)	-0.0211 (0.0154)	-0.0154 (0.0143)	-0.0261 (0.0165)	0.0833*** (0.0151)
(bp) (pc) North Region	0.1386*** (0.0469)	0.2093*** (0.0539)	-0.0052 (0.0738)	0.0665 (0.0473)	0.1206** (0.0546)	0.2120*** (0.0727)
DTE Southeast Region	-	-	-	-	-	-
	0.2104*** (0.0255)	0.2526*** (0.0293)	0.3556*** (0.0276)	0.0532*** (0.0165)	0.0376** (0.0191)	0.1432*** (0.0174)
(bp) (pc) Southeast Region	0.2974*** (0.0581)	0.4123*** (0.0668)	0.2267** (0.0943)	-0.0000 (0.0650)	0.0650 (0.0751)	0.6069*** (0.1011)
DTE South Region	-	-	-	-	-	-
	0.3321*** (0.0398)	0.3729*** (0.0457)	0.6186*** (0.0427)	0.0539** (0.0250)	0.0480* (0.0288)	0.1162*** (0.0264)
(bp) (pc) South Region	0.1415 (0.1042)	0.3233*** (0.1197)	0.1753 (0.1843)	0.3285*** (0.1169)	-0.2145 (0.1350)	1.2940*** (0.2076)
DTE Midwest Region	-	-	-	-	-	-
	0.2578*** (0.0292)	0.2953*** (0.0335)	0.4122*** (0.0314)	0.0259 (0.0202)	0.0171 (0.0234)	0.1233*** (0.0214)
(bp) (pc) Midwest Region	0.2041*** (0.0782)	0.2631*** (0.0899)	0.4070*** (0.1373)	-0.1055 (0.0851)	-0.1011 (0.0983)	0.5110*** (0.1481)
DTE Urban	-	-	-	-	-	-
	0.0976*** (0.0126)	0.1187*** (0.0145)	0.1574*** (0.0135)	0.0087 (0.0111)	0.0008 (0.0128)	0.0373*** (0.0117)

Constant	0.7644***	0.6516***	0.2680***	0.7764***	0.6695***	0.3014***
	(0.0089)	(0.0102)	(0.0091)	(0.0098)	(0.0113)	(0.0106)

Source - Household Budget Survey (*Pesquisa de Orçamento Familiar – POF*).

Notes: (1) Robust standard deviations in parentheses; (2) \*\*\*, \*\* and \* indicate significant at 1%, 5% and 10% confidence level.

## VI. Concluding Remarks

The Conditional Cash Transfer Programs (CCTP), especially *Bolsa Família* (PBF) in Brazil, have been consolidated as an important instrument of social protection system given their considerable expansion in recent years.

This article aimed to analyze the effects of PBF on the Brazilian labour market. Despite the limitations of the database which cannot provide an accurate diagnosis on the subject - as already reported in other studies (Brito, 2011; Brito and Kerstenetzky, 2011) -, some discussions can be raised. By applying the still little explored database from the Household Budget Survey (*Pesquisa de Orçamento Familiar - POF*), 2008-2009, we estimated both a seemingly unrelated regression (bivariate probit model) and Instrumental Variables on a nationally representative household sample to make predictions about the effect of *Bolsa Família* on adult labour market participation.

The Household Budget Survey (POF) is a survey conducted by the Brazilian Institute of Geography and Statistics (IBGE). Although the survey identifies the beneficiary family, it provides limited information about the labour market. However, the data from the survey allowed us to infer some important considerations, among which can be highlighted:

1. Cash transfer programs in Brazil are summed up, basically, to *Bolsa Família* (PBF) which is responsible for approximately 80% of total cash transfers that come out of social programs. *Bolsa Família* has a strong impact on the composition of family income, especially in North, Northeast Brazil and in rural areas – the poorest parts of the country.

2. The econometric analysis shows that the focal group of *Bolsa Família* is formed by the poorest families which has the lowest self-perception of income sufficiency, income satisfaction and food satisfaction;

3. In the estimated regressions, the results indicate that beneficiary families from *Bolsa Família* are less likely to get a job in the labour market. The estimated values of ATE and ATT reinforce that the cash transfer program may be causing a negative effect on the labour market.

According to many studies cited here, *Bolsa Família* tends, due to its own design and methodology, to cause a reduction in the amount of time the children spend in the labour market and hence their participation in the workforce, and tends to reduce the effects of short-term poverty by cash transfers to the poor. Therefore, here we have two aspects that could suffice to justify the applicability of such social policy. However, the intention of this study was not to discuss the monetary importance and the effect that *Bolsa Família* brings for the reduction of inequality and poverty which have been widely disseminated in the literature, but rather to a continuing debate about the methodology of cash transfers, given that the monetary benefit may lead to changes (in this case, reduction) in the parents employment opportunities (head of family or partner) in the labour market, as it has been discussed in some studies (Foguel and Barros, 2010; Santos et al., 2010; Cavalcanti and Corrêa, 2010). A possible explanation for this finding is that cash transfers might be creating among families a disincentive for either job seeking or accepting job offers – due to the increase of the reservation wage. Unfortunately, there are some important developments of the argument put forward by this paper that could not be discussed because of the databases at hand.

The importance of income transfer programs in reducing inequalities is sufficiently stressed by the literature on the theme; however, in order for the results to become more effective, especially in the long term, and also independent of these types of policies, it is necessary a stronger investment in education policy either for the children and for the parents, what will produce raising incomes and, more generally, improvement of life quality.



Finally, it should be emphasized the need for a systematic monitoring upon these programs by the Brazilian Federal Government. It is also important the adoption of evaluative practices that transcend the quantitative and distributional aspects by combining them with other programs such as inclusion policies, especially within the labour market.

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## APPENDIX

Table A. *Test of exogeneity of the variable enrolled in PBF and validation of the instruments adopted in Instrumental Variables regression, 2008-2009.*

	Family (1)	Head of family (2)	Partner (3)
<i>Exogeneity test</i>			
Durbin (score) chi2(1)	84,4305 (p = 0,0000)	99,9804 (p = 0,0000)	358,282 (p = 0,0000)
Wu-Hausman F(1,54607)	84,5488 (p = 0,0000)	100,149 (p = 0,0000)	360,595 (p = 0,0000)
<i>Tests for validation of a subset of instruments</i>			
Sargan (score) chi2(2)	19,3989 (p = 0,0001)	16,6415 (p = 0,0002)	32,2371 (p = 0,0000)
Basman chi2(2)	19,4026 (p = 0,0001)	16,6438 (p = 0,0002)	32,2508 (p = 0,0000)
<i>Strength test of validation of a subset of instruments</i>			
Variable: <i>Bolsa</i>			
<i>Família</i>	0,0000 (Prob > F)	0,0000 (Prob > F)	0,0000 (Prob > F)

Source: Household Budget Survey (*Pesquisa de Orçamento Familiar – POF*).