The Impact of Conditional Cash Transfers on Labour Supply: New Evidence from Brazil's *Bolsa Familia*

Job Market Paper

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Revisions requested,
Journal of Development Effectiveness

Abstract

This study estimates the effects of *Bolsa Familia* on labour force participation and weekly hours worked using a fixed effects approach applied to a census tract-level panel data set based on the Brazilian National Household Survey (PNAD) from 2001 to 2009. The results show that, in general, participation in *Bolsa Familia* increases labour supply on the extensive margin, but also marginally reduces labour supply on the intensive margin. It has a positive impact on both employment and unemployment rates. The results also suggest an increase in informal employment at the expense of formal sector employment. In conclusion, the estimates suggest that the cash transfers do not introduce disincentives to work. This study supports the use of CCT programmes as effective tools for poverty reduction and labour market activation. By providing robust empirical evidence, it aligns with the UN Sustainable Development Goal 17, which emphasizes revitalizing global partnerships for sustainable development through effective policies and programmes.

Keywords: conditional cash transfers; labour supply; Latin America; Brazil.

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1 Introduction

Conditional cash transfer (CCT) programmes have been widely implemented over the past two decades, and they have become an important part of the social safety net in many developing countries. A recurrent question, however, is whether transfers might affect individual participation in the labour market by generating disincentives to work. Given the possibility of a negative income effect on labour supply, one could expect that cash transfer beneficiaries would be discouraged from working, or from searching for a job if they do not have one, due to the cash transfer.

Even though the literature on the effects of CCT programmes on labour supply in developing countries is still somewhat limited, the existing studies indicate that, in general, such programmes do not reduce labour supply. Such evidence is provided by Skoufias and Di Maro (2008), who analysed Mexico's *PROGRESA*, as well as by Alzúa, Cruces, and Ripani (2013), who found that cash transfer programmes in Mexico, Nicaragua, and Honduras did not reduce labour supply in those countries. Indeed, some previous studies have estimated an increase in labour force participation, in rural areas of Chile and Colombia, as a result of CCT programmes (Galasso, 2006; IFS, Econometria, and SEI, 2006). More recently, Banerjee et al. (2017) re-analysed data from seven different randomised controlled trials (RCT)[2] and found no systematic evidence that such programmes affect labour supply.

[2] The authors identified a total of 18 RCTs and, based on methodological criteria and data availability, selected seven of them. Their analysis is based on the following studies: Galiani and McEwan (2013) and Glewwe and Olinto (2004) for Honduras; Benhassine et al. (2015) for Morocco; Parker and Skoufias (2000) and Skoufias and di Maro (2008) for Mexico (*PROGRESA*); Skoufias, Unar, and Cossio (2013) also for Mexico (*Programa de Apoyo Alimentario*); Chaudhury, Friedman, and Onishi (2013) for the Philippines; World Bank (2011) for Indonesia; and

The largest conditional cash transfer (CCT) programme in the world is Brazil's *Bolsa Familia*, implemented in 2004 as a merger and expansion of programmes implemented in 2001, which has proven effective in reducing poverty and inequality as well as in improving several educational outcomes (Soares, Ribas, and Osório, 2010; Glewwe and Kassouf, 2012). In spite of the programme's successes, its effects on labour supply remain an open question.

In the case of Brazil, the results provided by the literature are somewhat divergent, due to the fact that existing studies follow different specifications and empirical strategies, despite using the same data source, namely the Brazilian National Household Survey (PNAD). Using data from the PNAD of 2004, Tavares (2010) finds an increase in labour force participation due to *Bolsa Familia*. A positive effect is also found by Ferro, Kassouf, and Levison (2010), who find evidence of a positive impact of conditional cash transfers[3] on the labour force participation of parents using a 2003 PNAD sample, and also by Teixeira (2010), whose estimates are based on data for the year 2006. Foguel and Barros (2010), using a pseudo-panel of census tracts for the period 2001-2005, find no evidence of statistically significant effects on the labour force participation rate. Employing data aggregated at the same level (census tract level) for the years 2001, 2004 and 2006, Ribas and Soares (2011) obtain differences-in-differences estimates which indicate that *Bolsa Familia* increases labour force participation in rural areas but reduces it in the formal sector in metropolitan areas. Barbosa and Corseuil (2014) apply a regression discontinuity design along with the data from the 2006 PNAD. They find no effects of the programme on the occupational choices of adults for both the formal and the informal sectors.

Maluccio and Flores (2005) for Nicaragua.

[3] Conditional cash transfer programmes have existed at the federal level in Brazil since 2001. These programmes are discussed in more detail in Section 2.

Two more recent studies use datasets other than the PNAD and find evidence of negative effects of the cash transfers on labour supply. De Brauw et al. (2015) apply propensity score weighting to household survey data from the AIBF (*Bolsa Familia* Impact Evaluation) project[4] for the year of 2005 and 2009. They find that, in general, *Bolsa Familia* has no significant impact on either labour force participation or hours worked, except for a reduction in women's employment rate and a shift from the formal to the informal sector. Finally, using data from the 2010 Brazilian Census and propensity score matching with a quantile treatment effect estimator, Cavalcanti et al. (2016) find negative effects on hours worked for several quantiles, especially among rural area residents.

Thus, the literature remains unresolved about the actual effects of the *Bolsa Familia* programme on labour supply. Also, most scholars have not yet analysed data from more recent years that would cover the continuous expansion, increases in benefits, and operational changes made to *Bolsa Familia*. Therefore, this paper aims to answer the following question: Does Brazil's *Bolsa Familia* conditional cash transfer programme discourage individuals from working, or at least from searching for a job?

The main contribution of this study is to estimate the effects of *Bolsa Familia* on labour force participation and weekly hours worked using a fixed effects approach applied to a larger and more recent census tract-level panel data set based on the PNAD surveys from 2001 to 2009. The use of longitudinal data allows one to control for the influence of unobserved time invariant variables that could lead to biased estimates, and also to include the impact of precursor

[4] The AIBF is a couple of surveys organised by the Brazilian Ministry of Social Development in 2005 and 2009 that collected data on a sample of Brazilian households in order to evaluate impacts of *Bolsa Familia*.

programmes. Thus, besides covering a longer period post implementation, this study includes data for years before the official creation of *Bolsa Familia*, in 2004, thereby taking into consideration the fact that the cash transfers effectively started in 2001.

A potential limitation of most of the aforementioned studies on *Bolsa Familia* is that all but three studies (Foguel and Barros, 2010; Ribas and Soares, 2011; and Barbosa and Corseuil, 2014) use methods that leave unresolved the problem of self-selection into the programme due to unobservable characteristics. In contrast, this paper also avoids the potential endogeneity problems of several papers that have evaluated this programme. The results obtained by Foguel and Barros (2010), in spite of their choice of method, as well as by Teixeira (2010) and Tavares (2010), may reflect such endogeneity due to the inclusion of post-treatment income and/or the unemployment rate as regressors in the labour force participation equation. In the case of Tavares (2010), that issue might arise from the use of income thresholds when defining some of the control groups. Finally, most papers described above use household data for years no later than 2006, which limits their analyses to a period that is very close to the time of the programme's implementation. Also, only two of them assess the effects of pre-existing programmes. Starting in 2001, two conditional cash transfer programmes that were later integrated for the creation of *Bolsa Familia* were already operating and had a non-negligible coverage at the national level, so ideally *Bolsa Familia*, which was officially created in 2004, should be considered in conjunction with those programmes.

Therefore, the main gap in the literature on the labour supply impacts of *Bolsa Familia* is that the existing body of evidence suffers from serious methodological drawbacks that undermine the credibility of the results. Hence, this study adds to the literature by estimating the effects of the programme by using an empirical strategy that mitigates the endogeneity problem

and also estimates differential effects according to gender, race, area of residence, and formal/informal sector.

The remainder of this paper is organized as follows. Section 2 presents a brief description of *Bolsa Familia* and discusses possible channels through which it might affect labour supply. Section 3 describes the dataset, after which the next section addresses the empirical framework. The results are presented and discussed in Section 5, followed by the conclusions in Section 6.

2 Description of *Bolsa Familia* and some Theoretical Considerations

The Brazilian experience with conditional cash transfers programmes started in 2001 with *Bolsa-Escola* ('School Stipend') and *Bolsa-Alimentação* ('Food Stipend'), managed respectively by the Ministry of Education and the Ministry of Health. While the first aimed to increase school attendance by conditioning income transfers on a minimum of an 85% attendance rate among children between 6 and 15 years old, the second had the objective of reducing child mortality by requiring updated vaccination records for children from birth to age 6 years and regular clinical visits for pregnant women. In addition to these two '*Bolsas*', the federal government also implemented two unconditional cash transfers targeted to poor households: *Auxilio-Gas* ('Cooking Gas Subsidy'), which was a subsidy for cooking gas purchases that also started in 2001; and *Cartão-Alimentação* ('Food Card'), similar to *Bolsa-Alimentação* but without the conditionalities and with a temporary duration (up to 18 months).

Bolsa Familia ('Family Stipend') was created in 2004 as a result of the merger of the aforementioned programmes. The programme is coordinated by the Brazilian Ministry of Social Development (MDS) and targets poor and extremely poor families. During the COVID-19

pandemic, in late 2021, the program was officially terminated by the federal government. In 2023, when a new president took office, the program was relaunched with similar rules but a much higher budget, increased transfer amounts, and a greater number of beneficiaries[5]. Before its shutdown in 2021, *Bolsa Familia* served more than 14 million families whose monthly per capita incomes were below the program's poverty line (about US$50) and extreme poverty line (around US$25). The amount of money given to a household depended on the household's per capita income, the number of household members between age 0 to 15 years (extended to 17 years, in 2007), and the presence of a pregnant woman.[6] The transfers were conditional on children's school enrolment (grades 1 to 12) and attendance, and on vaccinations for children between age 0 to 6 years, as well as clinic visits for the latter and for pregnant women (MDS, 2020).[7]

Eligible families included households below the poverty line but above the extreme poverty line if they had at least one child or adolescent younger than 18 years of age, while families with per capita income below the extreme poverty line were eligible for a basic benefit (around US$25) regardless of the ages of the household members.[8] The highest amount possible

[5] The number of families in the program increased by approximately 50%, and the average transfer amount more than tripled after its 2023 relaunch.

[6] For a given household, the maximum number of children that will count towards the calculation of the transfer amount is limited to five children between age 0 and 15 years (pregnant women are included in this quota) and two teenagers age 16 or 17.

[7] Pregnant women became effectively eligible only starting in 2011.

[8] In the case of *Bolsa Familia*, although not mandatory, transfers are given to women whenever possible, even when they are not the household head.

a family could receive was approximately US$100 per month.[9] It is important to highlight that, because of the programme eligibility criteria, conditionalities, registration requirements, and also budgetary constraints, not all poor households received the cash transfers. In fact, individuals need to visit a local government office and sign up for registration in the *Cadastro Unico*, which is a national registry of low-income individuals who may, then, be eligible for some federal social programmes, including *Bolsa Familia*. Thus, based on the programme's eligibility criteria as well as budgetary constraints, those individuals may get enrolled or not in the programme.

The standard economic theory of labour supply applied to the case of cash transfers suggests that, because those transfers constitute additional non-labour income, they would lead to an income effect. Considering an individual who maximises utility over income and leisure, and allocates time between work and leisure, if we assume that the latter is a normal good, the cash transfer would produce a negative effect on labour supply.

In a programme like *Bolsa Familia*, the income effect discussed above may occur as a result of the transfer itself and hence may reduce labour supply. In addition, in order to continue receiving the benefit, individuals may reduce their labour supply within the household, either by working less or even by leaving the labour force, so that their income level remains within the eligibility criteria. Nevertheless, one could argue that this latter pathway is unlikely, at least in the specific case of *Bolsa Familia*, since the cash transfers are only enough to raise the household's income above the established extreme poverty line and a larger transfer would be

[9] This is the case of a family under the extreme poverty line and with five children between age 0 to 15 and two adolescents between age 16 and 17. Such a family gets US$10 per child, US$12 per adolescent plus the basic benefit of US$25 for being extremely poor, implying a total of US$100. Exceptions are allowed, since 2012, for families whose incomes do not exceed the (per capita) extreme poverty line even after receiving the cash transfer. In these cases, the total received can exceed the stipulated maximum amount.

needed to reduce labour supply. Another potential negative effect on labour supply could come from mothers facing increased household chores and childcare for younger children/babies as their older children, who were once responsible for that, start spending more time in school because of the programme.

Cash transfers, regardless of being conditional or unconditional, may also have a positive impact on labour supply. Banerjee et al. (2017) point out that cash transfers could: help households escape the poverty trap problem, by enabling them to be productive workers; reduce credit constraints, allowing poor households to start or increase a business; encourage risky although profitable efforts such as migration, which may lead to employment; and have spillover effects on local business in poor regions.

In the case of conditional cash transfers, besides the fact that they are targeted to poor households, the conditionalities may also play a role in increasing work among programme participants. Programme conditionalities such as the children's school attendance requirement can lead to a positive effect on labour supply. Because of this requirement, children would spend more time at school to the detriment of other activities, although one cannot predict what the new time allocation will be (Ravallion and Wodon, 2000; Foguel and Barros, 2010). If it reduces child labour, the amount of labour available within the household also decreases and, if the received benefit is lower than the child's earnings, then adult members may attempt to compensate for this reduction by increasing their labour supply. Moreover, the increased school attendance may reduce the time spent, mainly by mothers, in childcare activities and, consequently, allow them to devote more time to work, although complying with the school attendance itself (e.g. taking their children to school) as well as with the other programme conditionalities (vaccination, clinic visits) may go in the opposite direction.

Overall, the impact of conditional cash transfers on adult labour supply is ambiguous and thus needs to be estimated empirically.

3 The Data

Ideally, one would prefer to use data at the individual or household level, as the cash transfers are provided at those levels. In Brazil, however, there is no longitudinal survey that systematically measures participation in *Bolsa Familia*. The 2010 Brazilian Census (IBGE, 2015a) has a question in which individuals report whether they received benefits from *Bolsa Familia*, but this is only for one year (2010). The only annual survey that provides such information is the Brazilian National Household Survey (PNAD), and it does so only for two years, 2004 and 2006 (IBGE, 2015b).[10]

Nevertheless, the literature has, in general, relied on the PNAD survey for obtaining information on programme participation. Since the PNAD usually does not ask respondents about their participation in *Bolsa Familia*, researchers have taken advantage of an alternative method for imputing programme participation status, which is based on the responses to a question that asks individuals the amount of money they received as non-labour income. Based on the possible fixed amounts beneficiaries can receive from the programme, one can 'guess' the participation status of a surveyed individual by matching the exact possible transfer amounts and the amounts reported by individuals in the question about non-labour income received. The question on non-labour income asks the total amount an individual received as interest from

[10] The PNAD survey is not conducted in years in which the Brazilian census takes place.

savings accounts and other financial investments, dividends, as well as income from any other sources. Thus, whenever the reported received amount equals one of the possible (or 'typical') amounts paid by the programme to participants (according to the family income and the number of children and adolescents), the respondent is considered to be an actual *Bolsa Familia* recipient. This procedure was first applied by Barros, Carvalho, and Franco (2007), and is known in the literature as the 'typical value' method. Since the PNAD surveys of 2004 and 2006 had a question about participation in that programme, it was possible to implement that procedure using this paper's data set and, then, verify its success rate. Thus, this study carried out a simple validation test in which the method above correctly identified 92.3% of the individual beneficiaries in 2004 and 96.2% of those in 2006.[11] Note that a perfect (100%) prediction of programme participation is prevented by misreporting in either the question on actual participation in the programme or the question on the amount received as non-labour income.

Although administrative data on *Bolsa Familia* participation is publicly available at the municipality level, it is not possible to use these data in this study because there is no annual survey that is sampled at that geographic level. Also, the data available from the PNAD survey do not allow one to match programme participating households over time, but that survey does draw samples of households from the same census tracts each year in the period between the Brazilian decennial censuses,[12] randomly sampling households within each tract. Thus, a fixed effects estimation procedure is feasible if based on a panel of census tracts, and so this paper aggregates individual and household data at the census tract level from the Brazilian National

[11] More details and the codes used in this validation test are available upon request.

[12] The most recent Brazilian censuses were conducted in 1991, 2000 and 2010.

Household Survey (PNAD) for the 2001-2009 period. That time interval covers years around programme implementation and lies between the 2000 and the 2010 Brazilian censuses, thus making it possible to follow the same census tracts over time as they were defined based on the former census and redefined after the latter. The PNAD data were obtained from the Brazilian Institute of Geography and Statistics (IBGE). The survey questionnaires provide demographic and socio-economic information on households and on each household member, as well as data from the question on non-labour income, which allows for the identification of *Bolsa Familia* participants. As discussed in Sections 1 and 2, the cash transfers started effectively in 2001 with separate programmes that were later merged into *Bolsa Familia* in 2004, thus, participation in the programme is considered for all years in the period of analysis (2001-2009).

After excluding the rural areas of the North region, except for the State of Tocantins, since these rural areas were included in the PNAD sample only starting in 2004, this data set is comprised of 7,235 census tracts that were surveyed for nine years, for a total of 65,115 observations. More specifically, the questionnaires allow one to obtain the information of most interest for this study, such as the work status and weekly hours worked of working-age (age 18 to 65) individuals, in order to verify whether they were employed (worked, had a job) or unemployed (did not work, but took one or more actions to find a job) and thus were in the labour force, as well as to make inferences about labour supply on the intensive margin (hours worked). Additionally, treatment heterogeneity can be checked by gender (male or female), race (white or non-white) and area of residence (urban or rural), and separate effects of the programme can be estimated for individuals working in the formal and informal sectors. In this paper, participation in the formal sector was defined based on whether an individual had a formal

(documented) job, while informal sector participation refers to those with an informal (undocumented) job.

The data at the census tract level are averages of the individual level information, which implies that all variables, including the one indicating programme participation, have become proportions of individuals within each census tract. Thus, participation in *Bolsa Familia* is the proportion of individuals in the programme within a census tract rather than a binary programme participation status.[13] For that reason, the interpretation of the programme's impacts on labour supply can either be based on one percentage point increases in the proportion of participants or whether individuals participate or not in the programme. Another implication is that the variable measuring the number of weekly hours worked consists of the average over all individuals regardless of whether they were working (unconditional on working); that is, those who did not work are entered in these averages with zero hours. Finally, an important limitation imposed by the aggregation of individual level information to the census tract level is that programme effects cannot be estimated separately for each year. The effects by year could be estimated only if the programme participation variable was binary. In that case, indicator variables for each year of treatment could be included in Equation (2') and they would equal one only in the corresponding year, capturing the impacts of the programme in each year after implementation.

Table 1 shows some summary statistics for the overall sample and also for two separate groups, one comprising census tracts that never had any *Bolsa Familia* participant ('Never

[13] Due to the same aggregation, it is not possible to express programme participation in terms of the amounts beneficiaries receive, since the average of those amounts over all individuals within each census tract would include the zero amounts reported by non-participants, which would result in a misleading measure.

Treated') and the other comprising census tracts for which at least one individual eventually participated in the programme ('Eventually Treated').

[Table 1 near here]

One can infer from Table 1 that programme beneficiaries are mostly non-white (53%), and are concentrated in the Northeast (32%) and in the Southeast (31%) regions of the country, the two regions where most of the population is concentrated. Also, census tracts that had programme participants any time in the period 2001-2009 show lower schooling, as well as a higher proportion of residents from rural areas. Although this paper does not further analyse the programme's targeting performance, the information above suggests that *Bolsa Familia* is focused on groups of individuals that the programme was designed to serve, especially because the Northeast is the poorest region of the country in both relative (% of population in poverty) and absolute (number of people in poverty) terms, followed by the Southeast, in absolute terms.

Figure 1 displays the annual averages of the outcome variables of this study for both eventually treated and never treated census tracts over the period 2001-2009. Although it allows for only a simple visual examination of the labour supply outcomes, the graphs might give a hint about what to expect from the regression results. Comparing treated and never treated census tracts between 2004 and 2009, when the programme was largely expanded, it appears that one could expect a negative and significant impact of the programme on employment and labour force participation, a decrease in hours worked, and a nearly unchanged unemployment rate. As for the formal and informal sectors participation, the differences between treated and never treated census tracts seem to be maintained over time. Finally, despite the programme expansion

in 2004, this specific event does not appear to affect the trends for the labour supply variables and likely has no effects on the estimated results.

[Figure 1 near here]

4 Empirical Framework

This article contributes to the literature by identifying the impact of participation in *Bolsa Familia* on labour supply, as measured by labour force participation and weekly hours worked for working age individuals (age 18 to 65 years), based on a fixed effects estimation strategy applied to census tract-level data (aggregated from individual level data). The estimation strategy relies on a specification in which the coefficient of interest is the effect of the programme on these outcome variables of interest.

Let y_{icjt} be one of the outcomes of interest (labour force participation, or hours worked) for an individual *i*, in census tract *c*, in state *j* at time *t*. The individual level equation that measures the impact of participation in *Bolsa Familia* is given by:

$$y_{icjt} = \boldsymbol{\alpha}'\boldsymbol{x}_{icjt} + \delta p_{icjt} + \varepsilon_{icjt} \qquad (1)$$

where $\boldsymbol{x}_{icjt}$ is a vector of all individual and household characteristics that affect y_{icjt}, examples of which are age, gender, area of residence, race and schooling level, p_{icjt} is a dummy variable indicating *Bolsa Familia* participation, and ε_{icjt} is an error term with mean zero.

If data on *Bolsa* participation and individual and household characteristics were available at the individual level for the entire period of the analysis, Equation (1) could be estimated such that δ would measure the impact of participating in the programme. The data available in the PNAD, however, do not allow for matching individuals or households over time, but do allow for matching census tracts across years. Therefore, the impact of *Bolsa Familia* is estimated by aggregating Equation (1) up to the census tract level:

$$\bar{y}_{cjt} = \boldsymbol{\alpha}'\overline{\boldsymbol{x}}_{cjt} + \delta\bar{p}_{cjt} + \bar{\varepsilon}_{cjt} \qquad (2)$$

where the new variables are the census tract averages over all individuals for the variables in Equation 1. Note that δ measures the impact of participation in *Bolsa Familia* on programme participants, that is, the direct average treatment effect of the programme on labour supply at both the extensive (labour force participation) and intensive (hours worked) margins.

Ordinary Least Squares (OLS) estimation would generate unbiased estimates of $\boldsymbol{\alpha}$ and δ only if data for all variables in $\overline{\boldsymbol{x}}_{cjt}$ were available. However, many of these variables are unobserved, and they are likely to be correlated with observed individual and household characteristics ($\overline{\boldsymbol{x}}_{cjt}$), or may influence programme participation ($\bar{p}_{cjt}$). Examples of such variables could include innate ability, motivation, and preferences for work and leisure, among others. Since these variables are not observed, they become part of $\bar{\varepsilon}_{cjt}$, and if they are correlated with observed variables in $\overline{\boldsymbol{x}}_{cjt}$ and $\bar{p}_{cjt}$, this implies that the error term will be correlated with $\overline{\boldsymbol{x}}_{cjt}$ and $\bar{p}_{cjt}$, and the OLS estimates of the impact of the programme will be biased. To minimize bias due to correlation of $\overline{\boldsymbol{x}}_{cjt}$ and $\bar{p}_{cjt}$ with unobserved determinants of labour supply

outcomes, census tract fixed effects and state-year fixed effects, as well as differential time trends for eventually treated and never treated census tracts, are added as controls in Equation (2):

$$\bar{y}_{cjt} = \boldsymbol{\alpha}'\bar{\boldsymbol{x}}_{cjt} + \delta\bar{p}_{cjt} + \sigma_c + \pi_{jt} + \gamma(D_{cj} \times t) + \bar{\varepsilon}_{cjt} \qquad (2')$$

where σ_c indicates time invariant census tract fixed effects, π_{jt} represents census tract invariant state-year fixed effects, and D_{cj} is an indicator variable which equals one for eventually treated census tracts and zero for those never treated.

In order to check for treatment heterogeneity, estimates are also obtained separately by gender, race, and area of residence (urban/rural). Also, to further investigate the impacts of *Bolsa Familia* on labour supply, the effects of the programme on employment and unemployment, as well as on the participation in the formal and informal sectors, are also estimated. Since the programme itself might motivate migration and affect the proportions of individuals in the census tracts according to the individual characteristics mentioned above, the inclusion of interactions of the demographic variables above with the one measuring programme participation rate could potentially lead to biased estimates. Thus, as a simple manner to deal with that issue, when analysing each gender, race, and area of residence group, the dependent variable of interest is calculated for that specific group and run against all other variables in Equation (2'), with no use of interaction terms. There could also be migration due to other factors than the programme itself. Nonetheless, since the data is aggregated from the individual level to the census tract level and the same census tracts are followed over time with households being randomly sampled each

year, such an issue is likely to be minimized. As it will be discussed later in this section, this same aggregation process minimizes individual level measurement error.

Unlike some other conditional cash transfer programmes, the *Bolsa Familia* programme was not implemented as a randomised controlled trial. Thus, one must consider the impact of self-selection of individuals into the treatment group, which can be due to both observable and/or unobservable characteristics, on estimates of the programme's impacts. One can always control for observable variables, so the underlying problem is correlation between the unobservable characteristics and the treatment variable, which would result in biased estimates. In order to deal with this selection problem, this study relies on a fixed effects estimation approach.

The identifying assumption is that after controlling for time-invariant census tract fixed effects, state-year fixed effects, differential time trends for eventually and for never treated census tracts, and also for observable individual and household characteristics, time varying unobservable variables that affect labour supply outcomes are uncorrelated with the variable measuring participation in *Bolsa Familia* and with all other variables in Equation (2'). One way to check whether this assumption holds is to carry out a placebo test, in which one can test, for instance, whether the outcome variables in pre-treatment periods are affected by programme participation in subsequent years, that is, using leads of the programme participation variable. If no statistically significant effects are found, then the identifying assumption is more likely to hold, and, more generally, any possible omitted variable bias is minimized.

Another potential problem for the identification strategy is reverse causality (or simultaneity). Changes in labour supply are likely to affect an individual's level of income which could, in turn, also affect programme participation status. However, actual participation in *Bolsa Familia* does not depend only on income level and is determined by several other factors

including the programme eligibility criteria, conditionalities, registration requirements, and also budgetary constraints, which implies no direct effect from labour supply onto the variable measuring programme participation in Equation (2'). Also, after a household enters the programme, its level of income is not strictly monitored by the programme's administration (it is checked every other year) and participants may hide any additional income by working in the formal sector, which makes reverse causality even less likely. Nevertheless, it would certainly be an issue if, instead, the impacts of the programme were estimated using income or consumption variables in order to obtain, respectively, the income and non-income effects of the CCT programme on labour supply.[14]

A third potential source of statistical endogeneity is measurement error in the explanatory variables. Although at the individual level measurement errors in $\boldsymbol{x}_{icjt}$ are likely to bias coefficient estimates toward zero, the data are aggregated to the census tract level, so individual level measurement errors are likely to cancel out within each census tract. Moreover, as various fixed effects and time controls are used, any remaining measurement error is likely to be random, and any remaining attenuation bias in the estimates obtained via Equation (2') make these results lower bounds of the true effect of *Bolsa Familia* on labour supply.

[14] For more details on this matter, see Hoddinott and Skoufias (2004), Gitter and Barham (2008), and Novella et al. (2012).

5 Results

The estimated results of the impact of *Bolsa Familia* on labour force participation and hours worked are presented in Tables 2 to 5. In order to account for treatment heterogeneity, besides the overall results, estimates were also obtained by gender, race and area of residence (urban vs. rural). The effects of the programme on both employment and unemployment rates are also estimated and discussed in order to provide further understanding of how the programme affects labour supply. By definition, labour force participation is the sum of the employment and unemployment rates; thus, their analysis allows one to identify whether changes in labour force participation are due to individuals getting a job (employment) or just searching for one (unemployment). For this reason, the sum of the coefficients from the regressions in which employment and unemployment are the dependent variables equals the corresponding coefficient in the regression in which the dependent variable is labour force participation. Lastly, the effects of the programme on participation in both the formal and informal employment sectors are estimated and presented in Tables 6 to 8. For all tables with estimated results, the analysis focuses on the second column as it corresponds to the most complete specification, which includes the control variables described in the previous section.

The results in Table 2 suggest that the programme has statistically significant, but modest, impacts on both labour force participation and hours worked. Participation in *Bolsa Familia* increases labour force participation by 1.2 percentage points. However, the estimated coefficient for hours worked suggests that programme participation implies a reduction of 0.5 hours in weekly hours worked. Put differently, a one percentage point increase in the *Bolsa Familia* participation rate increases labour force participation by 0.012 percentage points and

reduces average hours worked by 0.005 hours per week. Despite the negative effect found on hours worked, the programme slightly increases employment and, to a lesser extent, also increases unemployment, which implies a higher proportion of individuals searching for a job. This apparently paradoxical result reflects a marginal downward adjustment in hours worked by participants who already had a job, due either to an effort to assure their incomes lie below the programme eligibility line or to an income effect.[15]

[Table 2 near here]

Table 3 provides estimates of the impacts of *Bolsa Familia* on men and women separately. Although positive for labour force participation and negative for hours worked, the estimated coefficients for male individuals are relatively small and not statistically significant, implying that the programme has no effects on the labour supply of men. On the other hand, larger and statistically significant estimates are found for women, indicating that programme participation increases women's labour force participation by 2.8 percentage points while it reduces hours worked by 0.6 hours a week. The positive result for participation becomes clearer when considering the estimated impact on women's employment, which exhibits a 2.3 percentage point increase, while no significant effect is found on women's unemployment. The fact that the programme impact on labour supply affects only women appears to support the idea that, because children are required to meet the school attendance conditionality, mothers have

[15] Note that because the hours worked variable is not conditional on working, one cannot attribute the overall lower number of hours worked to those who have become employed. Thus, it must be the case that the overall reduction in hours worked is due to lower hours for those who were already employed.

more time available and, consequently, become more able to take a job. Also, when children work fewer hours because of school, women may be more likely to work in order to fill an income gap due to that reduction in child labour.

[Table 3 near here]

The results disaggregated by race, reported in Table 4, show that the estimated coefficients are similar for both white and non-white individuals for labour force participation and hours worked, differing mostly in terms of statistical significance for the former. *Bolsa Familia* appears to have two statistically significant effects on white working age adults. Programme participation increases the unemployment rate rises by 1.0 percentage point, while hours worked fall by 0.7 hours, suggesting that the programme increases the proportion of white individuals searching for a job at the same time it slightly reduces how many weekly hours these individuals work. For non-white individuals, programme participation raises both labour force participation and employment by 1.2 and 1.3 percentage points, respectively, and has no significant impact on unemployment. Another statistically significant impact among non-white working age adults is the reduction in the number of hours worked by 0.7 hours. The increase in the employment of non-white workers suggests that the cash transfers contribute to reducing the racial disparities in the labour market, especially considering that around 52% of the population in participating census tracts are black or brown as opposed to a proportion of 30% in never treated census tracts.

[Table 4 near here]

The estimated results in Table 5 show the impact of *Bolsa Familia* by area of residence. For both urban and rural areas, programme participation has a significant positive effect on labour force participation, and a negative but statistically insignificant impact on hours worked. The main difference between the estimates for the two types of areas is that, in rural areas, the cash transfers increase employment and do not affect unemployment, while in urban areas they slightly increase unemployment and have no significant impact on employment. As previously shown (Table 1), *Bolsa Familia* is more common in rural areas. Its positive effect on rural employment appears to indicate that this constitutes an additional mechanism by which the programme helps reduce inequalities.

[Table 5 near here]

The results in Tables 2 to 5 show that *Bolsa Familia* has a positive impact on the employment rates of several groups. Thus, it is important to check in more detail how the programme affects employment among participants. Table 6 presents estimates of the impact of *Bolsa Familia* on participation in both the formal and informal sectors of the economy. The estimated coefficients suggest that participation in the programme raises the informal sector participation rate by 4.2 percentage points while reducing that of the formal sector by 3.4 percentage points. It is possible that cash transfer recipients migrate to the informal sector in order to make it harder for the government to measure their income by the time of the periodic registration updates (annual or biannual, depending on the local government). In this case, programme participants would remain within the eligibility criteria and avoid losing the benefit

even if their income rises above the programme's poverty lines. A similar conclusion is drawn in Ribas and Soares (2011), who also found a negative effect of *Bolsa Familia* on formal sector employment, although with no significant effect on the informal sector. In contrast, Barbosa and Corseuil (2014) found no effects on either the formal or informal sectors.

[Table 6 near here]

Further results for participation in the formal and informal sectors, estimated separately by gender and by race, are shown in Tables 7 and 8. The estimates indicate that both the decrease in the formal sector participation and the increase in informality are stronger for women and for non-white individuals. As for women, a possible intuition for this finding is that, even though sending children to school could allow mothers to dedicate more of their time to work, they might face difficulties managing after-school childcare and work. For instance, complying with the school attendance conditionality might demand additional time, as public-school transportation is scarce (and, many times, inadequate), and having children in school may not allow mothers to have a full day available to work, since the typical school day in Brazil is held in only one shift (either morning, afternoon or evening). Therefore, it is likely that having an informal job might make it easier to balance childcare activities and work.

[Table 7 near here]

In contrast, the stronger impacts for non-white individuals, as shown in Table 8, may relate to their lower schooling. This condition might make this group more likely to move to the

informal sector in order to assure their income is not monitored by the government, so they do not lose the benefit should their income go above the eligibility lines.

[Table 8 near here]

Overall, the results presented up to this point are in line with most previous findings for the Brazilian conditional cash transfers programme and may be explained in light of the discussion developed in Section 2. Previous studies have found evidence that the programme also improves children's educational outcomes and reduces child labour (Glewwe and Kassouf, 2012; Ferro et al., 2010). Thus, one of the main results, the increase in labour force participation for women, might be related to mothers having more time available to work and/or the necessity of compensating for the foregone income from child labour.

An approach to test the validity of the results presented and discussed in this study is to carry out a placebo test, for which the results are reported in Table 9. In this setting, the test consists of checking for the pre-treatment period whether programme participation in one or two time periods ahead has any effect on an outcome variable at the present time period. If the empirical model is correctly identified, one would expect to obtain coefficients that are neither large nor statistically significant. Since several locations already had individuals receiving cash transfers as early as 2001, there is no pre-treatment period for these census tracts and, for that reason, they are excluded from the test. For the census tracts considered in the test, the pre-treatment period corresponds to the 2001-2003 interval. Thus, the placebo test was carried out using programme participation status in 2004, when the cash transfers were merged and officially structured as *Bolsa Familia*, applied to previous years (2003 and 2002).

[Table 9 near here]

The results of the placebo test show that none of the estimated coefficients is statistically significant, although the magnitudes of these coefficients are not negligible. Thus, the estimates in Table 9 provide no evidence against the identification assumption, and thus the main results of this study appear to 'pass' the placebo test.

Overall, the findings of this paper suggest that *Bolsa Familia* does not contribute for discouraging participants from working. In fact, many of the estimates point out to an increase in work due to the programme. These positive effects sum to those already been found for other outcomes, such as poverty and inequality. Fiszbein and Schady (2009) found that the programme reduced the poverty gap by 15%, while Barros, Foguel, and Ulyssea (2006) estimated a similarly sized reduction in income inequality.

6 Conclusion

This paper addressed the question of whether conditional cash transfers discourage individuals from working by estimating the impacts of Brazil's *Bolsa Familia* on labour supply. Although the literature for programmes implemented in other developing countries indicate the absence of such a negative effect, the evidence for the Brazilian programme thus far is limited and suffer from serious methodological drawbacks that are avoided in this paper.

The results suggest that participation in *Bolsa Familia* increases labour force participation, but also implies a small reduction in hours worked. The effects are positive for

both employment and unemployment rates, and also indicate an increase in informal employment at the expense of formal sector employment.

The findings in this study add *Bolsa Familia* to the body of evidence concluding that conditional cash transfers do not introduce disincentives to work, despite the predictions from standard economic theory. Instead, the results suggest that the programme actually encourage individuals to work or at least to search for a job. Such findings may well contribute for the debate at the policy level, especially in Brazil, where scepticism against CCT programmes persist despite the growing evidence on their effectiveness in reducing poverty and inequality, as well as in improving educational outcomes.

Acknowledgments

The author is thankful to Paul Glewwe, Joe Ritter, Marc Bellemare, and Deborah Levison for their comments and support. This work was supported by CAPES Foundation under Grant number BEX 0898/13-9.

Declaration of Interest Statement

I wish to confirm that there are no known conflicts of interest associated with this work and there has been no financial support for this study that could have influenced its outcome.

Data Availability Statement

The data that support the findings of this study are openly available in IBGE at https://www.ibge.gov.br/estatisticas/sociais/trabalho.html, reference number 9127.

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Variable	Overall		Eventually Treated		Never Treated		Diff.
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
Dependent Variables							
Labour force participation	0.759	0.105	0.760	0.105	0.751	0.107	***
Hours worked	29.013	5.613	29.014	5.613	29.001	5.615	
Employment	0.694	0.121	0.695	0.121	0.688	0.114	***
Unemployment	0.064	0.063	0.065	0.063	0.063	0.060	
Formal employment	0.316	0.156	0.302	0.155	0.416	0.127	***
Informal employment	0.319	0.187	0.338	0.189	0.189	0.107	***
Bolsa Familia participation	0.086	0.142	0.098	0.147	-	-	
Individual Characteristics							
Geographic region							
North	0.093	0.291	0.098	0.298	0.057	0.233	***
Northeast	0.287	0.453	0.315	0.464	0.092	0.290	***
South	0.172	0.377	0.176	0.381	0.143	0.350	***
Central West	0.110	0.312	0.105	0.306	0.144	0.351	***
Southeast	0.338	0.473	0.306	0.461	0.563	0.496	***
Male	0.478	0.068	0.481	0.066	0.458	0.077	***
Age	37.2	3.1	37.0	3.0	38.7	3.4	***
Rural	0.143	0.350	0.161	0.367	0.017	0.129	***
Race (skin colour)							
White	0.497	0.278	0.471	0.273	0.685	0.231	***
Non-white	0.503	0.278	0.529	0.273	0.315	0.231	***
Black	0.073	0.098	0.075	0.100	0.058	0.081	***
Brown	0.422	0.263	0.447	0.260	0.245	0.210	***
Asian ('Yellow')[1]	0.005	0.022	0.004	0.019	0.010	0.036	***
Indigenous	0.003	0.020	0.003	0.021	0.002	0.012	***
Non-declared	0.000	0.004	0.000	0.003	0.000	0.005	***
Years of schooling	8.522	2.663	8.124	2.480	11.370	2.134	***
Number of observations	65,115		57,132		7,983		
Number of census tracts	7,235		6,348		887		

Notes: [1]Denotes individuals of Asian-descent in Brazil (mostly Japanese-Brazilian). ***Significant at 1% level. **Significant at 5% level. *Significant at 10% level.

Table 1. Descriptive Statistics for Overall, Eventually Treated, and Never Treated Census Tracts, 2001-2009

Variables	(1)	(2)
Labour Supply:		
Dependent Variable: Labour force participation		
Bolsa participation rate	0.019***	0.012***
	(0.004)	(0.004)
Dependent Variable: Hours worked		
Bolsa participation rate	-0.105	-0.547***
	(0.216)	(0.209)
Labour Force Participation:		
Dependent Variable: Employment rate		
Bolsa participation rate	0.015***	0.008*
	(0.004)	(0.004)
Dependent Variable: Unemployment rate		
Bolsa participation rate	0.004**	0.004*
	(0.002)	(0.002)
Number of observations	65,115	65,115
Number of census tracts	7,235	7,235
Control variables	No	Yes
Trend × Eventually treated	No	Yes
Census tract fixed effects	Yes	Yes
State-year fixed effects	Yes	Yes

Notes: Robust standard errors clustered at the census tract level in parentheses. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Table 2. Estimates of the Impact of Bolsa Familia on Labour Force Participation, Hours Worked, Employment, and Unemployment, 2001-2009

Variables	Male		Female	
	(1)	(2)	(3)	(4)
Labour Supply:				
Dependent Variable: Labour force participation				
Bolsa participation rate	0.011***	0.001	0.033***	0.028***
	(0.004)	(0.004)	(0.007)	(0.007)
Dependent Variable: Hours worked				
Bolsa participation rate	0.534*	-0.241	-0.418	-0.640**
	(0.290)	(0.290)	(0.269)	(0.265)
Labour Force Participation:				
Dependent Variable: Employment rate				
Bolsa participation rate	0.008*	-0.003	0.027***	0.023***
	(0.005)	(0.005)	(0.007)	(0.007)
Dependent Variable: Unemployment rate				
Bolsa participation rate	0.003	0.003	0.006*	0.005
	(0.003)	(0.003)	(0.003)	(0.003)
Number of observations	65,108	65,108	65,107	65,107
Number of census tracts	7,235	7,235	7,235	7,235
Control variables	No	Yes	No	Yes
Trend × Eventually treated	No	Yes	No	Yes
Census tract fixed effects	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at the census tract level in parentheses. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Table 3. Estimates of the Impact of *Bolsa Familia* on Labour Force Participation, Hours Worked, Employment, and Unemployment, 2001-2009: by Gender

Variables	White		Non-white	
	(1)	(2)	(3)	(4)
Labour Supply:				
Dependent Variable: Labour force participation				
Bolsa participation rate	0.015*	0.007	0.018***	0.013**
	(0.008)	(0.008)	(0.006)	(0.006)
Dependent Variable: Hours worked				
Bolsa participation rate	-0.224	-0.701*	-0.348	-0.684**
	(0.416)	(0.413)	(0.296)	(0.292)
Labour Force Participation:				
Dependent Variable: Employment rate				
Bolsa participation rate	0.004	-0.003	0.018***	0.012**
	(0.008)	(0.008)	(0.006)	(0.006)
Dependent Variable: Unemployment rate				
Bolsa participation rate	0.011***	0.010**	0.001	0.000
	(0.004)	(0.004)	(0.003)	(0.003)
Number of observations	64,372	64,372	62,598	62,598
Number of census tracts	7,233	7,233	7,231	7,231
Control variables	No	Yes	No	Yes
Trend × Eventually treated	No	Yes	No	Yes
Census tract fixed effects	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at the census tract level in parentheses. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Table 4. Estimates of the Impact of *Bolsa Familia* on Labour Force Participation, Hours Worked, Employment, and Unemployment, 2001-2009: by Race

Variables	Urban		Rural	
	(1)	(2)	(3)	(4)
Labour Supply:				
Dependent Variable: Labour force participation				
Bolsa participation rate	0.017***	0.012**	0.027***	0.021***
	(0.005)	(0.005)	(0.007)	(0.007)
Dependent Variable: Hours worked				
Bolsa participation rate	-0.019	-0.321	0.333	-0.091
	(0.260)	(0.253)	(0.375)	(0.354)
Labour Force Participation:				
Dependent Variable: Employment rate				
Bolsa participation rate	0.010*	0.006	0.031***	0.024***
	(0.005)	(0.005)	(0.008)	(0.008)
Dependent Variable: Unemployment rate				
Bolsa participation rate	0.007**	0.006*	-0.004*	-0.003
	(0.003)	(0.003)	(0.002)	(0.002)
Number of observations	55,809	55,809	9,306	9,306
Number of census tracts	6,201	6,201	1,034	1,034
Control variables	No	Yes	No	Yes
Trend × Eventually treated	No	Yes	No	Yes
Census tract fixed effects	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at the census tract level in parentheses. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Table 5. Estimates of the Impact of *Bolsa Familia* on Labour Force Participation, Hours Worked, Employment, and Unemployment, 2001-2009: by Area of Residence

Variables	(1)	(2)
Dependent Variable: Formal sector participation		
Bolsa participation rate	-0.036***	-0.034***
	(0.004)	(0.003)
Dependent Variable: Informal sector participation		
Bolsa participation rate	0.054***	0.042***
	(0.005)	(0.005)
Number of observations	65,115	65,115
Number of census tracts	7,235	7,235
Control variables	No	Yes
Trend × Eventually treated	No	Yes
Census tract fixed effects	Yes	Yes
State-year fixed effects	Yes	Yes

Notes: Robust standard errors clustered at the census tract level in parentheses. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Table 6. Estimates of the Impact of *Bolsa Familia* on Formal and Informal Sectors Participation, 2001-2009

Variables	Male		Female	
	(1)	(2)	(3)	(4)
Labour Supply:				
Dependent Variable: Formal sector participation				
Bolsa participation rate	-0.025***	-0.027***	-0.045***	-0.038***
	(0.005)	(0.005)	(0.004)	(0.004)
Labour Force Participation:				
Dependent Variable: Informal sector participation				
Bolsa participation rate	0.040***	0.028***	0.072***	0.060***
	(0.006)	(0.006)	(0.007)	(0.007)
Number of observations	65,108	65,108	65,107	65,107
Number of census tracts	7,235	7,235	7,235	7,235
Control variables	No	Yes	No	Yes
Trend × Eventually treated	No	Yes	No	Yes
Census tract fixed effects	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at the census tract level in parentheses. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Table 7. Estimates of the Impact of *Bolsa Familia* on Formal and Informal Sectors Participation, 2001-2009: by Gender

Variables	White		Non-white	
	(1)	(2)	(3)	(4)
Labour Supply:				
Dependent Variable: Formal sector participation				
Bolsa participation rate	-0.031***	-0.029***	-0.045***	-0.042***
	(0.007)	(0.007)	(0.005)	(0.005)
Labour Force Participation:				
Dependent Variable: Informal sector participation				
Bolsa participation rate	0.034***	0.022**	0.064***	0.051***
	(0.009)	(0.009)	(0.006)	(0.007)
Number of observations	64,372	64,372	62,598	62,598
Number of census tracts	7,233	7,233	7,231	7,231
Control variables	No	Yes	No	Yes
Trend × Eventually treated	No	Yes	No	Yes
Census tract fixed effects	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes

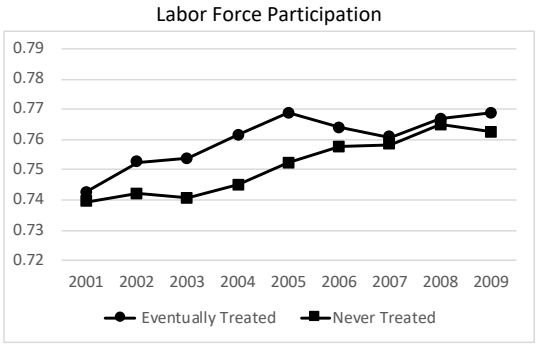
Notes: Robust standard errors clustered at the census tract level in parentheses. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

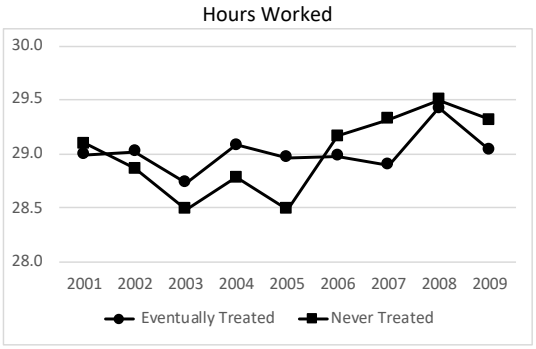
Table 8. Estimates of the Impact of *Bolsa Familia* on Formal and Informal Sectors Participation, 2001-2009: by Race

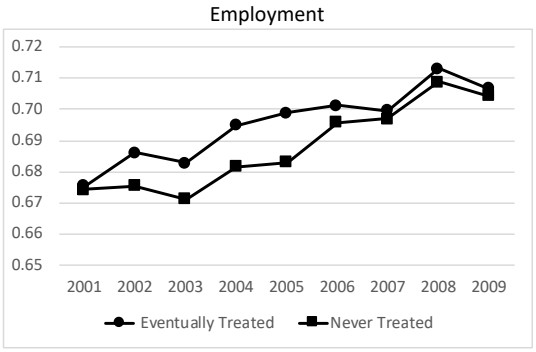
Variables	Labour Force Participation	Hours Worked	Employment	Unemployment	Formal Sector Participation	Informal Sector Participation
	(1)	(2)	(3)	(4)	(5)	(6)
Bolsa participation rate (1-year lead)	-0.027	-1.481	-0.050	0.023	-0.002	-0.046
	(0.034)	(1.629)	(0.033)	(0.018)	(0.027)	(0.033)
Bolsa participation rate (2-year lead)	-0.004	-0.454	-0.002	-0.002	-0.014	-0.004
	(0.032)	(1.560)	(0.033)	(0.019)	(0.026)	(0.035)
Number of observations	9,153	9,153	9,153	9,153	9,153	9,153
Number of census tracts	3,051	3,051	3,051	3,051	3,051	3,051
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Trend × Eventually treated	Yes	Yes	Yes	Yes	Yes	Yes
Census tract fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

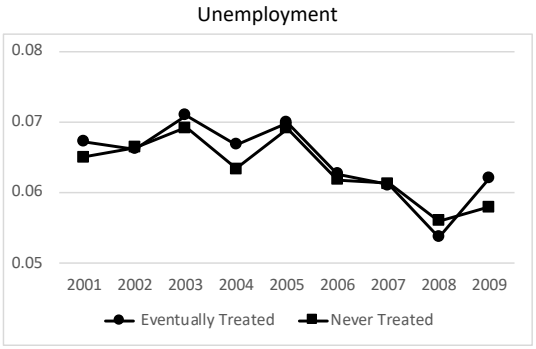
Notes: Robust standard errors clustered at the census tract level in parentheses. ***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.
This analysis takes programme participation status in *Bolsa Familia* for 2004 and applies it to 2003 and 2002, testing, for the period 2001-2003, whether the outcome variables are affected by participation status in 2004.

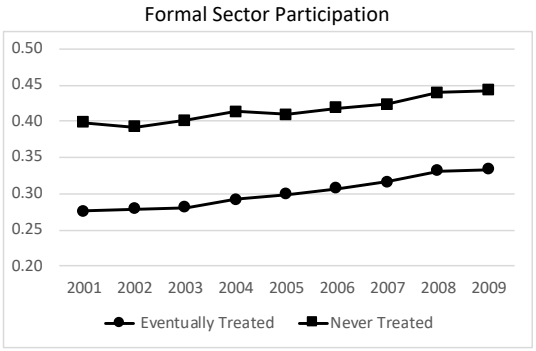
Table 9. Placebo Test for the Estimates of the Impact of *Bolsa Familia* on Labour Force Participation, Hours Worked, Employment, Unemployment, and Formal and Informal Sectors Participation: Including Lead Terms, 2001-2003


Labor Force Participation
0.79
0.78
0.77
0.76
0.75
0.74
0.73
0.72
2001 2002 2003 2004 2005 2006 2007 2008 2009
Eventually Treated
Never Treated


Hours Worked
30.0
29.5
29.0
28.5
28.0
2001 2002 2003 2004 2005 2006 2007 2008 2009
Eventually Treated
Never Treated


Employment
0.72
0.71
0.70
0.69
0.68
0.67
0.66
0.65
2001 2002 2003 2004 2005 2006 2007 2008 2009
Eventually Treated
Never Treated


Unemployment
0.08
0.07
0.06
0.05
2001 2002 2003 2004 2005 2006 2007 2008 2009
Eventually Treated
Never Treated


Formal Sector Participation
0.50
0.45
0.40
0.35
0.30
0.25
0.20
2001 2002 2003 2004 2005 2006 2007 2008 2009
Eventually Treated
Never Treated

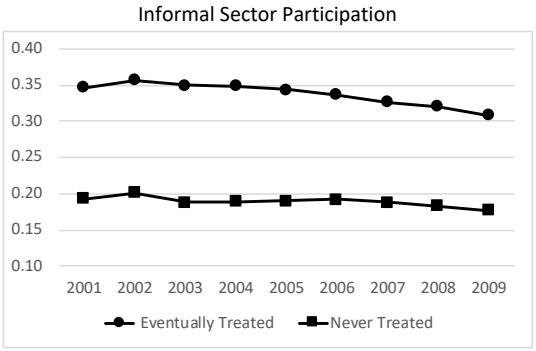

Informal Sector Participation
0.40
0.35
0.30
0.25
0.20
0.15
0.10
2001 2002 2003 2004 2005 2006 2007 2008 2009
Eventually Treated
Never Treated

Figure 1. Labour Force Participation, Hours Worked, Employment, Unemployment, and Formal and Informal Sectors Participation for Eventually Treated and Never Treated Census Tracts, 2001-2009