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THE IMPACT OF THE EXPANSION OF THE BOLSA FAMILIA PROGRAM ON THE TIME ALLOCATION OF YOUTHS AND THEIR PARENTS[1]

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Abstract

This paper evaluates the impact of the 2007 expansion of the Bolsa Família program to families with youths aged 16 to 17 years (entitled Benefício Variável Jovem) on the time allocation of youths and on the labor supply of their parents. A differences-in-differences intention to treat estimator was used to compare households among the poorest 20 per cent with 16 years old youths with households in the same income bracket with 15 years old adolescents before and after the expansion. The results show that granting the benefit had a positive and significant impact on school attendance, helping bridge 25% of the gap in school attendance between rich and poor households, and on the decision of young people to study and work at the same time. The effects on school attendance were stronger for males and when the child was the youngest in the household. No impacts were found on the parents' labor supply.

Keywords: Bolsa Família Program, Youth, Impact Assessment, Differences-in-Difference

JEL Classification: O15, D13, I38, J22

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1. Introduction

Conditional Cash Transfer (CCT) programs have been extensively used by many governments worldwide with the dual purpose of alleviating poverty in the short term and incrementing investment in human capital of children from poor families. The first goal is achieved via the money transfer component of programs, and the second by making the transfer conditional on beneficiary families meeting certain requirements such as pre-natal care, child immunization and school attendance of children and adolescents. It is expected that the children of beneficiary families will acquire the necessary conditions to escape from poverty in the long term.[2]

However, the success of such programs in reducing poverty depends on how and to what extent the transfers and conditions of the programs impact the allocation of family time, particularly the time devoted to education and labor market activities. CCTs can affect the decisions on the labor supply of beneficiary family members in different directions, especially families with school age children. Preferences, budget constraints, family composition, the magnitude of transfers, and opportunity costs are some of the elements that will influence the final allocation of time within the family.

In theory, CCTs can engender negative effects on the family labor supply. For instance, if leisure is a normal good, the income effect associated with the program transfer can diminish the participation in the labor market or reduce the total amount of hours worked (or both). This is seen as an adverse effect of the program either because the (aggregate)

[2] The literature raises two main arguments for attaching conditions to cash transfers programs. The first is suboptimal private investments by parents in poor families in the human capital of their children. The second is based on political economy arguments that state that redistribution becomes more socially acceptable when conditions are included in the transfer package. Fiszbein and Schady (2009) provide a longer discussion on the topic.

reduction in labor supply is considered socially undesirable or because beneficiary families could become more dependent on the program transfer due to the reduced labor income.

But the fact that the programs' conditions require a minimum level of school attendance by children and adolescents can affect the behavior of household members in various ways. For example, if an adolescent that used to work to supplement family income now spends more time in school, another family member may have to increase his or her supply of labor to at least partially compensate for the initial loss in income. Alternatively, the adolescent's leisure time may be reduced so that he or she can achieve the minimum school attendance condition without affecting his or her labor supply. Hence, in theory CCTs can affect the time allocation decisions of all household members in various ways. Unveiling the direction and magnitude of CCTs' impacts on this type of decision is thus an empirical matter.

The key contribution of this study is an empirical assessment of the effects of CCT programs on the time allocation of beneficiary youths and adults. In order to achieve that, we make use of the expansion of the Brazilian *Programa Bolsa Família* (PBF) in 2007 to cover eligible families with children aged 16 and 17. More specifically, we exploit the creation of the Variable Benefit for Youngsters (*Benefício Variável Jovem* — BVJ), which is a variable benefit component of the PBF that provides cash transfers to and imposes school attendance conditions on eligible families who have youths with 16 or 17 years of age.[3]

As school dropout in Brazil increases significantly around age 15, the main purpose of introducing the benefit was to stimulate youths at the targeted age bracket to stay longer in school. Figure 1 depicts the average rates of school attendance by age for the bottom and top

[3] In section 2, we present a detailed description of the eligibility rules of the PBF and its BVJ component.

quantiles of the per capita family income distribution in Brazil. It shows that while access to schooling is almost universal between the ages of 8 and 14, substantial gaps between the rich and poor household exist beyond the age of 14, reaching 16 percentages points at age 16. To the best of our knowledge, this is the first study that investigates the effects of an expansion of coverage of a CCT program to older children on the decisions regarding the time allocation of family members.

Specifically, the study presents estimates of the impacts of the BVJ on youths' school attendance and participation in the labor market and on the working hours of youths and their parents. The data we use are from the National Household Survey (*Pesquisa Nacional por Amostra de Domicílios* – PNAD), which is the main household survey in Brazil. Because PNAD does not identify which households receive PBF benefits, we focus on the poorest households. Thus, households that are amongst the poorest 20 percent and have 16-year-old adolescents are included in the treatment group. The control group consists of households that are also part of the 20 percent poorest segment and have 15-year-old children. The effects are estimated using the differences-in-difference method with 2006 and 2009 being the pre- and post-program periods.

The paper is organized as follows. Section 2 describes the main features of the PBF and presents a historical evolution of the selection criteria and benefit amounts. In Section 3, we present the related empirical evidence on the effects of CCT programs on education and labor supply outcomes. In Section 4, we describe the data and present descriptive statistics on relevant variables. Section 5 discusses the methodology used to measure the impact of the BVJ. The program's impacts on the outcomes of interest are presented in Section 6. This

section also provides robustness tests for the main results. Section 7 contains our final considerations.

2. Description of the *Bolsa Família* program

The *Bolsa Família* program (PBF) is a large-scale CCT intervention that was implemented in 2004 with the aim of promoting immediate poverty alleviation and reducing the intergenerational transmission of poverty.[4] The program was initially built through the unification of other social programs, both conditional and unconditional, such as School Allowance (*Bolsa Escola*), Food Allowance (*Bolsa Alimentação*), Food Card (*Cartão-Alimentação*) and Gas Aid (*Auxílio Gás*).

The PBF benefits families in poverty or extreme poverty throughout Brazil and is based on three main axes: cash transfer, conditions and complementary programs. Beneficiary families are selected from information collected for the Unified Registry for Social Programs (*Cadastro Único para Programas Sociais* – CADUNICO) but registration in CADUNICO does not imply entry into the program.[5] The main criterion for selection is the family's per capita income and the program's transfers are preferably paid to women through a debit card.

The PBF eligibility criteria currently classify as 'extremely poor' families whose per capita monthly income is up to R$70 (around US$35), regardless of family composition, and as 'poor' those families whose per capita monthly income is between R$70 and R$140 (US$70). To be eligible, the second group of families must include pregnant women, nursing mothers

[4] Although the conception of the program began in 2003, it was only officially enacted by Law No. 10,836 in January 2004. The program has been managed by the Ministry of Social Development and Fight against Hunger (*Ministério do Desenvolvimento Social e Combate à Fome* — MDS) since its inception.

[5] The Unified Registry is maintained by the federal government and the primary information about the families is collected by municipal authorities.

or children and adolescents up to 17 years old. Families in extreme poverty are entitled to the Basic Benefit (*Benefício Básico*) regardless of family composition. There are two main variable benefits which are granted to both the extremely poor and poor households: i) the Variable Benefit (*Benefício Variável*), which is paid to families that have children up to 15 years of age or pregnant or nursing mothers, and ii) the Variable Benefit for Youngsters (*Bolsa Variável Jovem – BVJ*), which is paid to families with youths aged 16 or 17.[6] Each family can receive up to five Variable Benefits and up to two BVJs. Benefits are paid on a monthly basis. The historical evolution of the program's benefits and eligibility criteria during the period of our analysis are shown in Table 1.

Place Table 1 HERE

The transfer of the two main variable benefits of the program is conditioned on health and education requirements. Health conditions require children younger than 7 years old to have their growth monitored and vaccinations up-to-date and pregnant and nursing women to visit regularly health centers for prenatal and postnatal care. Education conditions are that all children aged 6 to 15 must be enrolled in school and attend at least 85% of school days. Enrollment in school is also required for youths aged 16 and 17 and the minimum attendance rate for them is 75 per cent. Variable benefits are paid until December of the year when the child becomes 15 years old or when the youth completes 17 years old. After its inception in 2007, when a child becomes 16 the family is entitled to receive the higher benefit of the BVJ.

[6] Additionally, there are two other forms of benefits: i) the Extraordinary Variable Benefit (*Benefício de Caráter Extraordinário* is an amount calculated on a case-by-case basis which is paid to families in the Gas Aid, School Allowance, Food Allowance and Food Card programs, whose migration to the PBF caused financial loss; and ii) the Benefit for Overcoming Extreme Poverty in Early Childhood (*Benefício para Superação da Extrema Pobreza na Primeira Infância*) is an amount paid to beneficiary families with children aged 0 to 6 so that the per capita family income reaches the extreme poverty line. The first benefit exists since the outset of PBF, whereas the second since 2012.

As long as eligible, families can stay in the program with recertification every two years. Verification of conditions is the responsibility of the federal government with the help of municipal authorities. Noncompliance with the conditions generates progressive sanctions which start with a simple warning, goes through a suspension of the benefits for one or two months and end up with the total blockage of the benefits.

In terms of coverage, the PBF is granted to more than 13 million household and is currently one of the major instruments of social policy in Brazil.[7] In budgetary terms the PBF is relatively small and accounts for approximately 0.5 per cent of Brazilian GDP.

3. Literature review

The literature addressing the impact of CCT programs on education and labor supply outcomes is vast and continuously growing. This section presents international and Brazilian evidence on the effects of CCTs on these dimensions. Since we are interested in the effects of the expansion of the PBF on youths aged 16 and 17, our focus will be on the education and labor supply effects for this group. We also cover the evidence on labor supply effects on adults.

3.1 Effects on education

The Mexican program *Oportunidades*, originally known as *Progresa* (*Programa de Educación, Salud y Alimentación* — Education, Health and Food Program), stands out among the CCTs because it was implemented using social experiment techniques. Skoufias and Parker (2001) found evidence of increases in the school enrollment rate of both boys and girls

[7] According to Soares and Satyro (2009), the PBF beneficiaries are outnumbered only by those of the Unified Health System (*Sistema Único de Saúde* — SUS), which in theory covers the entire Brazilian population; the public education system, which covers 52 million students; and the Social Security system, which grants 21 million benefits.

aged 16 and 17 years old. The magnitude of the effect for the former group was 5.4 percentage points, implying a relative impact of almost 20% (the preprogram level was 27.8%); for girls, the point estimate was positive (1.8 percentage points) but not different from zero on statistical grounds.

Attanasio et al. (2005) uses difference-in-differences methodology to estimate the impact of the *Familias en Accion* program in Colombia. They found a positive impact on school enrollment of 14- to 17-years-olds of around 6 percentage points both in urban and rural areas. Given that school enrollment without treatment was approximately 72% and 55% in the former and latter areas, the estimated impacts correspond to 8% and 11% in relative terms in each area respectively. Schady and Araujo (2008) study the effects of the *Bono de Desarrollo Humano* in Ecuador on the school enrollment of the group of children 6 to 17 years old. The impact based on their instrumental variable estimate is around 10 percentage points for the whole group and, when considering heterogeneous effects by the highest grade completed, the estimated effect becomes approximately 13% for those who completed the ninth grade.

Exploiting the varying times at which the Female Secondary School Assistance Project was implemented across the districts of Bangladesh, Khandker et al. (2003) estimate an impact of 12 percentage points on secondary school enrollment of girls aged 11 to 18 years for each year of exposure to the program. As secondary school enrollment was around 45% for girls in the country, the impact of the intervention was quite high. In Turkey, the effect of the Social Risk Mitigation Project was investigated by Ahmed et al. (2007). Through an RDD strategy based on the proxy means test score that determines eligibility to the program, they estimate an effect of almost 11 percentage points on the secondary school enrollment of girls

11-18 years old in the country. The intervention also seemed to have raised the attendance of this group in secondary schools by 6 percentage points. However, the study does not find evidence that the program improved the progression from primary to secondary school, arguably because of the lower supply of the latter type of school in the country.

There are some studies that have investigated the impact of the PBF on school attendance. Costanzi et al. (2010) use cross-section data for 2008 to estimate the effect of the PBF (including the BVJ) on school enrollment and attendance. The evidence from the study indicates that the intervention has increased school enrollment of children between 7 and 17 years old. Their analysis also suggests the existence of an 'exposure/dose effect', in which the length of stay in the program leads to higher levels of school attendance.

Pellegrina (2011) uses different non-experimental methods and unveils positive effects of the PBF for students in São Paulo on variables that were directly tied to program conditions, such as enrolment and absence rates, but no effect on test score variables. De Janvry et al. (2007) use panel data collected in the Northeast of Brazil to estimate the effect of the *Bolsa Escola* (School Allowance) program, a precursor of the PBF. Their results evince that the program reduced drop-out rates by approximately 8 per cent in both primary and secondary school levels but had little effect on failure rates. Also evaluating the Bolsa Escola intervention, Bourguignon et al. (2003) uses ex-ante simulation methods and finds a decrease in drop-out rates too. Glewwe and Kassouf (2012) used a panel at the school level from 1998 to 2005 to evaluate the effects of the *Bolsa Escola/Família* programs and found a positive impact on school enrolment, a negative impact on drop-out and a positive effect on grade promotion.

3.2 Effects on labor supply

With respect to *Progresa*'s impact on the time allocation of beneficiary individuals, Skoufias and Parker (2001) found evidence that it reduced the labor force participation of children aged 12 to 17, both for boys and for girls. However, focusing on the 16-17 year-old subgroup, the estimated effect on the probability of working was negative (-5.2 and -2.0 percentage points for boys and girls respectively) but not statistically significant at conventional levels. The effect on daily hours of leisure was positive but again not different from zero in statistical terms for both subgroups of youths.

Skoufias and Maro (2008) found no significant effect of *Progresa* on adults' labor supply, in particular with respect to participation in the labor market. However, they show evidence that soon after the families began receiving the cash transfers, individuals used part of the subsidy to seek work in remunerated activities and reduced participation in less profitable family ventures. These impacts, however, disappeared with time. Alzua et al. (2010) estimated the effects on the labor market of three CCTs: the Mexican *Progresa*/*Oportunidades*, the Nicaraguan *Red de Protección Social* (RPS — Social Protection Network), and the *Programa de Asignación Familiar* (PRAF — Family Allowance Program) implemented in Honduras. The empirical results indicated that none of the three programs led to significant changes in adults' participation in the labor force. However, the analysis found a significant reduction in adult working hours in Nicaragua and a positive and significant effect on the wages of men in eligible households in Mexico.

Attanasio et al. (2006) found no effect of the Colombian *Familias en Acción* program on child work, although it seemed to have reduced the amount of time dedicated to domestic

chores. Interestingly, the study provides evidence that children partially substitute work for school, with at most 25 percent of an additional hour in school coming from work activities. This substitution effect seems to be higher for children aged 14 to 17 in urban areas.

Edmonds and Schady (2009) found evidence that, though the cash transfer paid by the *Bono de Desarrollo Humano* in Ecuador is less than the 20 percent of the child labor earnings, beneficiary families seem to delay the entry of the child into paid employment. The study also shows evidence of a large decline in child work, in particular for those that are most vulnerable to transitioning from schooling to work.

As for the effects of the PBF on labor supply in Brazil, Pedrozo (2010) found that the program led to a negative impact on adults' labor supply, especially that of single or divorced mothers. The study also found that the PBF selection rule can be circumvented by the voluntary reduction of labor supply. The author also presents evidence that children's participation in the labor market did not change.

Tavares (2008) found that mothers receiving PBF experienced a 5.6 per cent increase in the probability of participating in the labor market and extended their weekly working hours by 1.6 per cent as compared to non-beneficiary mothers. However, higher benefits were associated with a lower probability of participation and a lower level of weekly working hours. These results suggest that a negative income effect may be strong in some situations.

In a similar study, Ferro and Nicolella (2007) found that participation in PBF program did not affect the probability that parents participate in the labor force. However, the PBF led to changes in working hours, with the effect being positive for mothers in urban areas and negative for mothers in rural areas and fathers in urban areas. Further, the study shows

evidence that the program was more effective in reducing female child labor as compared to male child labor. Medeiros et al. (2007) computed the impact of the PBF at different deciles of the income distribution and showed that the labor market participation rate of beneficiary households was somewhat higher than that of non-beneficiary households in the first three deciles of the distribution.

Teixeira (2008) evaluates the effects of the PBF on labor supply taking into account the amount of the benefit relative to household income and demographic composition. The results obtained showed a reduction in the number of weekly working hours that could vary between 0 and 3.5 hours. However, the effects on labor supply were not equal: they were more intense for the benefits of R$15, R$50 and R$60, in households with only one child and in those household whose per capita income was less than R$20. The analysis also showed that the elasticity of supply of working hours varied by gender and across occupations. Among occupations, formal employment was less elastic, and self-employment had the highest elasticity.

Foguel and Barros (2010) found that the impact of the PBF on female participation in the labor force is not significant either on statistical grounds or in terms of magnitude. This was observed for all females and for those below median per capita income. As for males, there is evidence that the effect on the rate of participation is positive, though very small in magnitude. This result was observed for all males and for those below the median per capita income. In terms of the supply of hours, the results indicate a small negative effect on females but an insignificant impact on those living below the median per capita income. No impact of the program on the number of hours worked by males was found.

4. Data and descriptive statistics

The data used in the empirical analysis were drawn from the National Household Survey (*Pesquisa Nacional por Amostra de Domicílios* – PNAD), an annual survey conducted by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* – IBGE). PNAD is a cross-section survey that provides information on the demographic and socio-economic features of around 100 thousands households in whole country. We use the versions of PNAD for 2001, 2004, 2006 and 2009, with the last two years serving as the pre- and post-treatment periods in the estimation of the effect of the BVJ program.

To justify the use in the analysis of households among the poorest 20 percent, Table 2 shows the distribution of PBF beneficiaries by decile of the per capita family income distribution using the supplementary questionnaire available in version of PNAD in 2004.[8] The results show that more than 50 percent of beneficiary households were in the first two poorest deciles of the income distribution.

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A descriptive analysis of the data was performed to make a preliminary assessment of the effects of the PBF on the participation in the labor force of youths and other household members. For the analyses that follow, the treatment group comprises families with 16-year-olds that were among the poorest 20 percent according to per capita family income. The fact that 15-year-olds were not affected by the policy change allows us to construct a possible comparison group. Thus, the control group comprises families with 15-year-olds that were among the poorest 20 percent of the population. It is important to note that we excluded from

[8] The PNAD does not usually provide exact information about which households receive the PBF or any other social program.

the sample all households with adolescents of both 15 and 16 years of age, because these households would be in both the treatment and control groups, and the effect of the program on one youngster could affect the behavior of the other.

Table 3 shows a series of descriptive statistics for households that were in the treatment and control groups in 2006, the year preceding the introduction of the BVJ.

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As expected, the treatment and control groups were similar in many different characteristics. Regarding household composition, on average, both groups had 5.5 household members and the number of children averaged 3.6. We also do not see a relevant difference in the average amount of 'other income', a category that captures income received from saving accounts, dividends, and transfers. Around 2/3 of the control group lived in urban areas and the treatment group was slightly less urbanized. The age of the head of the household was higher in households with 16-year-olds. As might be expected, the age of the eldest (youngest) offspring was higher (lower) among households with 16(15)-year-olds. For these three variables associated with age, the differences between the groups were significant at the 1 percent level.

Regarding individual traits, on average, both mothers and fathers in the control group had slightly more years of schooling than the parents in treatment group. Mothers and fathers from the control group were older than their counterparts in the treatment group. Regarding the labor market variables, there was no statistical difference between the two groups for mothers' or fathers' labor supply and wage variables. In both the treatment and control

groups, over 60 percent of mothers and over 90 per cent of fathers were employed. On average, fathers worked more hours than mothers and commanded a higher wage.

Concerning the characteristics of children in the two groups, the results show that, on average, the education level was half a year higher for the children in the treatment (6.2 years of schooling) than in the control (5.7) group. The employment rate was also higher for the former group (41 percent) than for the latter (33 percent). These higher figures for the treatment group are significant at the 1 percent level. However, the higher figure for weekly working hours is significant only at the 10 percent level and the higher average wage is not significant at the usual levels. Given that treatment-group households have 16 year-olds and no 15 year-olds and that control-group households have the opposite, these marginal differences are not surprising.

We also compared the two groups in terms of time allocation decisions of household members in the period from 2001 to 2009. Table 4 shows the changes in school enrollment rates between 2001 and 2006 and between 2006 and 2009 for the treatment and control groups for each decile of the per capita family income distribution. Looking at the changes in the first interval, we see that the school enrollment rate for the 16 year-olds in the treatment group increased 8.9 percentage points in the first decile and decreased 1.3 per cent in the second decile. The corresponding figures for the 15 year-olds in the control group were 5.1 and 4.3 percentage points, respectively. Looking at the changes in the second interval, it seems that the BVJ has impacted positively the enrollment rate of the treatment group, because the relative variation for this group was 9.8 and 17.1 percentage points for the first and second deciles, respectively, while the control group continued the trend of increased school enrollment that had been observed in the previous interval.

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Table 5 consolidates these results. Considering that ΔFreq16 and ΔFreq15 represent the change in school enrollment rates for those aged 16 and 15 years in the treatment and control groups respectively between any two years, the double difference ΔFreq16-ΔFreq15 represents the difference between these two groups of youngsters for the same pair of years. The double differences for the 2001-2006 and the 2006-2009 intervals are shown in the second and third columns of Table 5, respectively.

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The results show that the treatment group exhibited a change in school enrollment between 2006 and 2009 for the first decile of the income distribution that was approximately 5.2 percentage points higher than that of the control group. The result is even more significant for the second decile, for which the variation in school enrollment for the treatment group was 13.9 per cent higher than that of the control group. Compared to the previous period from 2001 to 2006, the treatment group had a 5.6 percentage points lower variation in school enrollment than the control group in the second decile of the income distribution.

The fourth column of Table 5 compares the differences between these two time periods, that is, it shows the change in 16-year-olds' school enrollment between 2006 and 2009 subtracted from the 15-year-olds' variation in school enrollment in the same period, in relation to corresponding difference between 2001 and 2006: Δ(ΔFreq16-ΔFreq15). The results show that the difference in the change between the two groups of adolescents between 2006 and 2009 was greater than the difference in the changes between these groups between

2001 and 2006 in the first two deciles of the income distribution. Specifically, the results show a difference of 1.5 percentage points in the first decile and 19.5 percentage points in the second decile. We believe that the changes between the treatment and control groups that were observed for the first two deciles of the income distribution is a raw indication that the expansion of the PBF may have had a positive effect on the probability of school enrollment of poor youngsters aged 16 and 17 years.

5. Identification strategy

The effect of receiving the BVJ benefit on school attendance and labor supply was estimated through the method of differences-in-difference (DID). This method compares two groups, one of which was affected by a particular policy change (the treatment group) while the other (the control group) is not exposed to the policy change. The usual way to estimate a linear DID model including covariates is:

$$Y_{it} = \beta_0 + \beta_1 Treat_i + \beta_2 After_t + \beta_3 (Treat_i * After_t) + \beta_4' X_{it} + e_{it}, \qquad (1)$$

in which Y_{it} is the outcome of interest, $Treat_{it}$ is an indicator that takes on value 1 if individual i is in the treatment group and 0 otherwise, $After_t$ is dummy variable that equals 1 for post-intervention periods and 0 otherwise, X_{it} represents a vector of control variables for possible systematic differences across individuals in the treatment and control groups, and the term e_{it} absorbs unobserved components that affect the dependent variable. In this model, β_1 measures the group effect before the policy change, β_2 measures the time effect of aggregate factors that affect Y even in the absence of the policy change, and β_3, which captures changes in Y for the treatment group after treatment, is the DID estimator.

It is important to stress that this identification procedure allows to capture only the 'intention to treat' (ITT) effect of the BVJ for households in the bottom quantile of the income distribution. As we do not observe whether or not the households actually receive the transfer, we estimate the impact of being entitled to receive it on school attendance and time allocation. To the extent that a significant share of households that have become entitled to the transfer do not actually apply for it, we may be underestimating the impacts of the program.

Taking conditional expectations of equation (1) for each group and time period, we can obtain the usual double difference of the DID model:

$$E(Y_{i1} - Y_{i0} \mid X_{it}, Treat_i=1) - E(Y_{i1} - Y_{i0} \mid X_{it}, Treat_i=0) = \beta_3 + \{E(e_{i1} - e_{i0} \mid X_{it}, Treat_i=1) - E(e_{i1} - e_{i0} \mid X_{it}, Treat_i=0)\}, \quad (2)$$

where the subscripts 0 and 1 represent the pre- and post-treatment periods. Expression (2) shows that the DID identifies the effect of the treatment on *Y* if the term in brackets on the right-hand side is nil. This corresponds to the main assumption of the DID model and is usually known as the equal trend assumption. Though not directly testable, it requires that the control group trend be parallel to treatment group trend in the counterfactual situation of no treatment. As in all applications of the DID model we assume it holds.

6. Results

6.1. Impact on adolescents

Poor families must meet certain conditions with respect to education, health and social care to receive the PBF benefits. In particular, for eligible families to have the right to receive the BVJ, young people of 16 or 17 years of age must be properly enrolled in school and achieve attendance of at least 75 per cent. In this context, one of the main objectives of this paper is to examine the impact of the program on young people's school enrollment. But, after presenting evidence about this effect, we also investigate the possibility of heterogeneous impacts, by examining whether the effect varies according to the gender and age status of the youths in the within the treated households and also across different regions of residence.

The impact of the BVJ on the youngster's school enrollment was estimated using equation (1) of section 5. Specifically, the DID model used to estimate the effect of the BVJ has the following form:

$$Y_{it} = \beta_0 + \beta_1 Treat_i + \beta_2 2009 + \beta_3 Treat_i^{*} 2009 + \beta_4 X_{it} + e_{it} \quad (3)$$

where *i* represents the individual and *t* is time, Y_{it} is the dependent variable of interest (school enrollment or participation in the labor market), $Treat_i$ is the indicator for the treatment group (households with an adolescent aged 16), 2009 is the indicator for the second period (the first period is 2006), X_{it} represents the vector of control variables and e_{it} comprises random shocks. The controls include the number of children in the household, the educational level of the mother or father (whichever is greater), the age of the mother or father (whichever is greater), household composition, race and indicators for urban areas and state of residence.

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Table 6 shows the results of estimating equation (3) to obtain the effect of the introduction of BVJ on school enrollment. It shows that the estimated effect of the interaction between treatment and time is positive and significant at the 5 per cent level, regardless of whether the control variables are included (column 1) or not (column 2). The estimated effects evinces that the expansion of the PBF for young people of 16 years of age increased the probability attending school by approximately 4 percentage points with respect to 15-year-olds. This result is noteworthy because, in addition to the immediate relief of poverty, one of the main purposes of the PBF is to reduce the transmission of poverty in the medium and long terms by increasing school enrollment among the poorest households. The results suggest that the expansion of the PBF to 16-year-olds has contributed to that goal.

Figure 1 compares the average rates of school attendance in the bottom and in the top quintiles of the family income distribution. We can note that at age 16 there is a difference of about 16 percentage points between these two groups (80% versus 96%). Thus, the magnitude of the estimated effect means that BVJ has contributed to reduce this difference by about one quarter.

A multinomial logit model was then estimated to gauge the impact of the program on the young people's labor supply decisions. In this formulation, the dependent variable is participation in the labor market and consists of four categories: 'studying only', 'working only', 'studying and working', and 'neither studying nor working', with the last being considered the baseline category in the estimation.

As the multinomial model is non-linear, the marginal effect of the treatment in a DID model is not the marginal impact of the interaction between time and treatment, but the difference of the cross-differences, as described by Puhani (2012). The results of Table 7 (in terms of marginal effects) show that the BVJ has a significant effect on the probability studying and working at the same time, but not on the other outcome variables. The estimated marginal effects mean that the probability of a youngster studying and working increases by 4.2 percentage points with the BVJ, compared with a baseline of 30% in the control group in 2006. The estimated coefficients for the categories 'studying only' and 'working only' were negative but not statistically significant. It seems, therefore, that treated adolescents do not quit their jobs to study because of the program, but do both activities at the same time. This raises questions about the long run impacts of the program, since the quality of the night classes is notoriously low in Brazil.

PLACE TABLE 7 HERE

The effects of the expansion of the PBF can be heterogeneous, that is, may depend on the characteristics of the beneficiaries. We examined this possibility by splitting the sample of youngsters by gender and by considering only those who were the youngest child in the household in which they resided, for both the treatment and the control groups. According to the results reported in Table 8, the probability of attending school increased by 5.4 percentage points for young males as a result of the benefit, while for young females the effects were not statistically significant. In the cases where the beneficiaries were the youngest child in the

household, the program caused an increase of more than 11 percentage points in the probability of attending school. One possible reason for this increase in the estimated impact is the fact that his/her family is only receiving any transfers from the *Bolsa Familia* program because he/she is attending school. The fear of losing access to the program, which means that it may take time to come back to it in case of harder times ahead, may stimulate parents to monitor their kids' school attendance more strongly. When these two features were combined — i.e. male youngsters who were the youngest child — the probability of attending school increased by 16.2 percentage points and it is statistically significant at the 1 per cent level.

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We use the same procedure to check whether the impacts of BVJ on the adolescents' time allocation were also different by gender and the children's age composition within the household. The results of Table 9 show that this is indeed the case. The impact of BVJ on the probability of studying and working at the same time were stronger for girls and in the cases where the adolescent in treatment group was the youngest person in the household. Again, the effects were even stronger for boys who were the youngest. It seems therefore that the expansion of the *Bolsa Familia* program impacted more strongly the probability of working and studying for this specific group of youngsters.

PLACE TABLE 9 HERE

6.2. Impact on parents

In addition to analyzing the direct impact that granting the BVJ may have on the young people decisions, it is important to carefully examine how the program impacts the family's time allocation, in particular the time allocated to the labor market. To verify whether there is a disincentive for other beneficiary household members to work, the so-called 'laziness effect', the impact of the BVJ on the labor supply of fathers and mothers was assessed both in terms of their participation in the labor market and the number of hours worked.

We first investigate the effects of the BVJ on the probability of working and then on hours worked, for both mothers and fathers in the treatment group. The DID model has the same form as described in Equation (3) for youngsters. We used the same controls as before, with the difference that the dummy for households with only a father was omitted in the regressions of mothers, and the dummy for households with only a mother was omitted for the regressions of fathers.

First, we examine the impact of expanding the PBF on the labor supply of mothers. It can be observed in Table 10 that, though the point estimates were positive, there was not a statistically significant change in the behavior of mothers regarding either their labor force participation or the number of working hours.

PLACE TABLE 10 HERE

It is possible that this increase in mothers' labor supply occurred to compensate for the reduction in household income due to the youngsters' reduced labor supply. Another plausible explanation for this phenomenon is that because young people are now spending more time in

school, their mothers have more free time and, consequently, could increase their labor supply. When the same exercise was developed for fathers in beneficiary households (columns 3 and 4), no significant result was found in relation to either participation in the workforce or working hours.

Although most of the results in the regressions were not statistically significant, the fact that most of point estimates were positive suggests that the so-called 'laziness effect' does not seem to be prevalent in the beneficiary households. This can also be interpreted as an indication that the substitution effect is predominant in other household members' labor supply decisions. By separating the sample according to the regions of Brazil, no significant effects of the program were found for any variable of interest, either for mothers or for fathers.

6.3. Regional differences

We also checked whether the program's effects were different across the geographical regions of Brazil. This may be important because the Brazilian regions are quite heterogeneous in many cultural and social development aspects. According to the MDS data, the spatial distribution of the PBF's transfers is highly uneven across regions of the country. Indeed, the main destination of program resources is the Northeast region (53.2 percent), followed by the Southeast region (23.4 percent). Far from representing a failure in the distribution of resources, this is a result of the program's objective to reduce poverty levels in the country:

because, according to the MDS, almost three quarters of poor families in Brazil in 2006 were concentrated in these two regions.[9]

The impact of the expansion of the PBF on the school enrollment of youths by region is shown in Table 11. The results evince that the granting of the new benefit only had a significant impact in the Northeast region. The probability of attending school four our group of interest in this region increased by 6.5 percentage points after the expansion of the *Bolsa Família* program in 2007 and this effect is significant at the 1 per cent level.

PLACE TABLE 11 HERE

6.4. A Placebo test

To test the robustness of the results, we estimated the same models using samples from a previous time period. Again, the treatment group was composed by households among the poorest 20 percent according to the per capita family income with 16-year-olds youths as members. The control group included 15-year-olds and they were also among the poorest 20 percent. For this exercise, the years 2003 to 2006 were used, which are periods prior to the creation of the BVJ. This is a placebo test, in which 2006 was defined as the post-treatment year. Thus, we substituted the dummy variable for the post-program in equation (3), making it now equal to 0 when the year is 2003, and equal to 1 when the year is 2006.

PLACE TABLE 12 HERE

Table 12 shows that the interaction between the (pseudo) indicator of treatment and time did not attract a significant coefficient for this sample, irrespective of whether the control

[9]A brief analysis of the sample we use also corroborates these facts. When considering the families belonging to the first two deciles of per capita family income with 15- and 16-year-olds, it was found that more than half of the individuals were residents in the Northeast region (52.9 per cent).

variables were included or not. This shows that the effects estimated thus far do not seem the result of a statistical artifact. The same robustness test was then applied to verify the effects on young people's time allocation (results not shown) and there were no statistically significant effects of the treatment either, which strengthens the causal interpretation of the results found in this study.

7. Final considerations

The objective of this study was to evaluate the impact of the expansion of the PBF, which occurred from 2007 on with the creation of the BVJ, on the time allocation of the beneficiary household members. The establishment of this new type of benefit sought to help poor young people aged between 16 and 17 years to stay in school because there is an increase in the dropout rate in this age group.

The effects of the benefit were investigated with regard to not only the school enrollment of these young people but also to their time allocation decisions, in particular to their participation in the labor force and the amount of time they spend working. We further investigate the effects of the expansion of the PBF on potential behavioral changes of their fathers and mothers with respect to participation in the workforce and working hours. The data used were taken from PNAD, the main household survey in the country, and the analysis covered the years 2006, before the creation of the benefit, and 2009, following the introduction of the BVJ.

Regarding the program's effects on school enrollment, the results showed that the creation of the BVJ had a positive impact on the probability that 16-year-olds from poor families stay in school. When separating the sample by the regions of Brazil, positive effects were found on

young people's school enrollment especially in the Northeast region. Moreover, the effects on school enrollment were greater for young males (5.4 p.p.) and for individuals who were the youngest child in the household in which they resided (11 p.p.). When considering only male youngsters who were the youngest child, the effect was even greater (16 p.p.).

Additional exercises showed that the effects of increasing school enrollment occurred mainly through the rise in the probability of studying and working at the same time. The marginal effects indicated that the probability of young people in the treatment group choosing to study and work, instead of the other options, increased approximately 4.5 p.p. after allowing for the control variables.

The econometric results also showed that the program hardly impacted the parents' labor supply decisions. Indeed, the results showed that neither the labor market participation nor the working hours of parents were affected by the BVJ, even when the sample was separated by region.

The results as a whole show that the creation of the BVJ seems to have accomplished its main goal, which was to increase school attendance and thus the accumulation of human capital among poorer young people, thereby reducing the intergenerational transmission of poverty. The magnitude of the impact is substantial, as it allows to bridge 25% of the gap in the rates of school enrollment at age 16 between household in the top and bottom deciles of the income distribution. Although most of the results regarding mothers and fathers were not statistically significant, they indicate a slightly increase in workforce participation and working hours.

References

Ahmed, A., M. Adato, A. Kudat, D. Gilligan, T. Roopnaraine, and R. Colasan (2007): "Impact Evaluation of the Conditional Cash Transfer Program in Turkey: Final Report", IFPRI Report, Washington, D.C.

Alzúa, M.L., G. Cruces and L. Ripani (2010). "Welfare Programs and Labor Supply in Developing Countries: Experimental Evidence from Latin America', *CEDLAS Working Paper*, No. 0095. La Plata, CEDLAS, Universidad Nacional de La Plata.

Attanasio, O., E. Fitzsimmons, and A. Gómez (2005), 'The Impact of a Conditional Education Subsidy on School Enrollment in Colombia", Report Summary Familias 1, Center for Evaluation of Development Policies, Institute for Fiscal Studies.

Bourguignon, F., F. Ferreira, and P. Leite (2003): "Conditional Cash Transfers, Schooling, and Child Labor: Micro-Simulating Brazil's Bolsa Escola Program." *World Bank Economic Review* 17(2): 229-54.

Costanzi, R.N., F.L. de Souza and H.V.M. Ribeiro(2010). "Efeitos do Programa Bolsa Família no Acesso à Educação entre os Mais Pobres", *Informações Fipe – Temas de economia aplicada*, (360):28–32.

Edmonds, E. and N. Schady (2009): "Poverty Alleviation and Child Labor", Working Paper 15345, NBER, Cambridge.

Ferro, A.R. and A.C. Nicolella (2007). "The Impact of Conditional Cash Transfer Programs on Household Work Decisions in Brazil", mimeo, Department of Economics, University of São Paulo.

Fizbein, A. and N. Schady (2009): "Conditional Cash Transfers: Reducing Present and Future Poverty", World Bank Policy Research Report 47603, World Bank, Washington, D.C.

Foguel, M. N. and R.P. Barros (2010). 'The Effects of Conditional Cash Transfer Programmes on Adult Labour Supply: An Empirical Analysis Using a Time-Series-Cross-Section Sample of Brazilian Municipalities', *Estudos Econômicos*, 40: 259–293.

Glewwe, P. and A.L. Kassouf (2012). "The Impact of the *Bolsa Escola/Família* Conditional Cash Transfer Program on Enrollment, Dropout Rates and Grade Promotion in Brazil". *Journal of Development Economics*, 97: 505-517.

de Janvry, A., F. Finan, and E. Sadoulet (2007). "Local Governance and Efficiency of Conditional Cash Transfer Programs: Bolsa Escola in Brazil". Technical Report. Department of Agricultural and Resource Economics.

Khandker, S. R., M.M. Pitt, and N. Fuwa (2003): "Subsidy to Promote Girls' Secondary Education: The Female Stipend Program in Bangladesh", unpublished manuscript, World Bank, Washington, DC.

Medeiros, M., T. Britto and F. Soares (2007): "Programas Focalizados de Transferência de Renda no Brasil: Contribuições para o Debate", *Discussion Paper*, No. 1283. Brasília, Instituto de Pesquisa Econômica Aplicada.

Pedrozo, E. (2010): "Efeitos de Elegibilidade e Condicionalidade do Programa Bolsa Família sobre a Alocação de Tempo dos Membros do Domicílio", PhD Thesis. São Paulo, Escola de Economia de São Paulo.

Pellegrina, H. S. (2011). "Impactos de Curto Prazo do Programa Bolsa Família sobre o Abandono e o Desempenho do Alunado Paulista", Master Dissertation, Department of Economics , University of São Paulo.

Puhani, P. (2012): "The Treatment Effect, the Cross Difference, and the Interaction Term in Nonlinear ''Difference-in-differences'' Models", Economic Letters, 115: 85-87.

Schady, N. and M.C. Araujo, "Cash Transfers, Conditions, and School Enrollment in Ecuador", *Economía*, 8(2): 43-70.

Skoufias, E. and V.D. Maro (2008). "Conditional Cash Transfers, Adult Work Incentives, and Poverty", *Journal of Development Studies*, 44 (7): 935–960.

Skoufias, E. and S. Parker (2001): "Conditional Cash Transfers and Their Impact on Child Work and Schooling: Evidence from Progresa Program in Mexico", *Economía*, 2(1): 45-96.

Table 1: Evolution of the Eligibility criteria and Benefits of the PBF (R$)

	2004	2005	2006	2007	2008	2009
(1) Extremely Poor	50	50	60	60	60	70
(2) Poor	100	100	120	120	120	140
(3) Basic Benefit	50	50	50	58	62	68
(4) Variable Benefit	15	15	15	18	20	22
(5) Variable Benefit for Youngsters	0	0	0	0	33	33

Notes: Rows (1) and (2) show the eligibility criteria for receiving Bolsa Familia Transfers. Rows (3), (4) and (5) show value of transfers. The extremely poor families receive the basic benefit independently of the number of children. The poor families only receive the variable benefits and in the case they have children. Data from the Ministry of Social Development (Ministério do Desenvolvimento Social e Combate à Fome — MDS).

Table 2: Distribution of Beneficiary Families

Deciles of Family Income Distribution	**2004**	
	Frequency	**Cumulative**
1 (poorest)	26.0	26.0
2	24.4	50.4
3	19.5	69.9
4	12.9	82.7
5	8.5	91.3
6	4.4	95.7
7	2.5	98.1
8	1.1	99.2
9	0.5	99.7
10 (richest)	0.3	100
Total	100	100

Notes: Entries show the distribution of all Bolsa Familia Beneficiaries across the per capita family income distribution. Data from PNAD 2004

Table 3: Descriptive statistics - treatment and control groups - 2006

	15 years-old Control Group	16-years-old Treatment Group	Difference
Household:			
Household size	5.55	5.57	-0.02
	(1.88)	(1.95)	
Number of children	3.63	3.62	0.01
	(1.77)	(1.82)	
Age of the head of household	43.56	44.82	-1.25***
	(8.37)	(8.19)	
Age of the youngest child	9.10	9.85	-0.75***
	(4.67)	(4.89)	
Age of the oldest child	17.22	18.35	-1.13***
	(3.29)	(3.65)	
Urban	0.66	0.62	0.04**
	(0.47)	(0.49)	
Other income	87.48	88.39	-0.91
	(67.55)	(66.57)	
Individuals:			
Mother:			
Age	40.18	41.56	-1.38***
	(6.85)	(6.92)	
Educational level	3.75	3.49	0.26**
	(3.27)	(3.22)	
Employment	0.65	0.63	0.02
	(0.48)	(0.48)	
Weekly working hours	27.56	27.50	0.06
	(16.87)	(16.45)	
Wage from main job	188.18	189.42	-1.25
	(129.32)	(129.02)	
Father:			
Age	44.19	45.76	-1.57***
	(8.79)	(8.45)	
Educational level	3.14	2.88	0.26*
	(3.21)	(3.17)	
Employment	0.93	0.91	0.02
	(0.26)	(0.28)	
Weekly working hours	44.22	43.77	0.46
	(12.67)	(12.52)	
Wage from main job	283.82	293.77	-9.96
	(147.99)	(154.7)	
Childrens:			
Educational level	5.68	6.17	-0.49***
	(2.01)	(2.26)	
Employment	0.33	0.41	-0.08***
	(0.47)	(0.49)	
Weekly working hours	24.28	26.05	-1.77*
	(14.03)	(13.78)	
Wage from main job	97.99	109.92	-11.92
	(70)	(76.14)	

Notes: Sample of households among the poorest 20 per cent in 2006 with children aged 15 and 16 years only. Standard deviation in parentheses. Stars reflect statistical significance at *** 1 per cent, ** 5 per cent and * 10 per cent

Table 4: Changes in School attendance by deciles of per capita family income (%)

	Changes : 2001 to 2006		Changes: 2006 to 2009	
Income decile	15-years-old adolescents	16-years-old adolescents	15-years-old adolescents	16-years-old adolescents
1 (poorest)	5.1	8.9	4.6	9.8
2	4.3	-1.3	3.2	17.1
3	3.6	7.4	3.9	1.1
4	4.4	3.3	2.4	3.4
5	3.9	-1.8	1.7	2.4
6	1.8	5.3	0.1	0.7
7	-1.1	-1.2	3.9	3.7
8	2.7	2.7	-1.1	-2.5
9	-0.5	4.1	0.3	-1.9
10 (richest)	-0.3	-0.7	-1.0	0.8
Total	2.4	1.9	2.0	3.5

Notes: Entries are changes in percentage of youngsters attending school by deciles of family income distribution.

Table 5: Double Changes in School attendance by deciles of family income (%)

Income decile	Δfreq16 - Δfreq15		Δ(ΔFreq16- ΔFreq15)
	2001 and 2006	2006 and 2009	
1 (poorest)	3.7	5.2	1.5
2	-5.6	13.9	19.5
3	3.8	-2.8	-6.6
4	-1.2	1.0	2.2
5	-5.8	0.7	6.4
6	3.5	0.7	-2.8
7	0	-0.2	-0.2
8	0	-1.4	-1.4
9	4.6	-2.2	-6.8
10 (richest)	-0.5	1.8	2.3
Total	-0.5	1.6	2.0

Notes: Entries are double changes in percentage of youngsters attending school by deciles of family income distribution.

Table 6: Impact of BVJ on school attendance

Variable	(1)	(2)
Treated	-0.070*	-0.066*
	(0.014)	(0.014)
2009	0.035*	0.028*
	(0.011)	(0.011)
Treated*2009	0.044*	0.040*
	(0.018)	(0.018)
Constant	0.88*	0.921*
	(0.008)	(0.040)
Observations	5451	5441
R^2	0.013	0.049

Notes: Dependent variable is a binary indicator of school attendance. Sample includes households among the poorest 20 per cent with children aged 15 and 16 years only. Robust standard errors in parentheses. Column (2) includes controls for number of children, education, age and race of head, household composition, urban areas and state dummies. Starred coefficients are significant at the 5% level (*).

Table 7: Impact of the BVJ on Time Allocation

Variables	Not Studying nor Working	Studying Only	Working Only	Studying and Working
Treated	0.028*	0.031*	-0.086*	0.027
	(0.015)	(0.012)	(0.020)	(0.017)
2009	-0.007	-0.030	0.069*	-0.032
	(0.010)	(0.006)	(0.016)	(0.014)
Treated*2009	-0.026	-0.001	-0.015	0.042*
	(0.020)	(0.013)	(0.021)	(0.021)
Observations	5441	5441	5441	5441

Notes: The dependent variable is time allocation (four options). Sample includes households among the poorest 20 per cent with children aged 15 and 16 years only. Robust standard errors in parentheses. Entries are marginal effects of each variable on the predicted probability of each option. Columns report results of a single (multinomial logit) regression and include controls for number of children, education, age and race of head, household composition, urban areas and state dummies. Starred coefficients are significant at the 5% level (*).

Table 8: Impact of BVJ on School Attendance by Characteristics

Variables	Boys	Girls	Youngest	Boys and Youngest
Treated	-0.081*	-0.046*	-0.126*	-0.179*
	(0.021)	(0.019)	(0.032)	(0.045)
2009	0.030	0.023	-0.016	(0.046)
	(0.017)	(0.015)	(0.025)	(0.039)
Treated*2009	0.054*	0.027	0.113*	0.162*
	(0.026)	(0.024)	(0.041)	(0.059)
Constant	0.933*	0.894*	0.852*	0.815*
	(0.061)	(0.051)	(0.100)	(0.151)
N	2,922	2,519	1,182	639
R^2	0.062	0.041	0.07	0.101

Notes: Dependent variable is school attendance. Sample includes households among the poorest 20 per cent with children aged 15 and 16 years only. Robust standard errors in parentheses. All columns include controls for number of children, education, age and race of head, household composition, urban areas and state dummies. Each column reports the results a different regression. Starred coefficients are significant at the 5% level (*).

Table 9: Impact of BVJ on Time Allocation by Children Characteristics

Alternative	Boys	Girls	Youngest	Boys and Youngest
Not Studying nor Working	-0.027	-0.021	-0.058	-0.052
	(0.026)	(0.027)	(0.061)	(0.090)
Studying Only	-0.014	0.004	-0.088	-0.196
	(0.025)	(0.010)	(0.077)	(0.128)
Working Only	0.021	-0.038	0.080	0.134
	(0.035)	(0.033)	(0.071)	(0.089)
Studying and Working	0.020	0.054**	0.066**	0.115**
	(0.033)	(0.021)	(0.033)	(0.055)
N	2,922	2,519	1,182	639

Notes: Dependent variable is time allocation (four options). Sample includes households among the poorest 20 per cent with children aged 15 and 16 years only. Robust standard errors in parentheses. Entries are marginal effects of treatment interacted with time on the predicted probability of each option. All columns include controls for number of children, education, age and race of head, household composition, urban areas and state dummies. Each column reports the results a different regression (multinomial logit). Starred coefficients are significant at the 5% level (*).

Table 10: Impact of the BVJ on Parental Time Allocation

Variables	Mothers		Fathers	
	Probability of Work	Working Hours	Probability of Work	Working Hours
Treated	-0.016	-0.186	-0.011	-0.306
	(0.018)	(0.869)	(0.011)	(0.610)
2009	-0.035*	-0.479	-0.006	-1.412
	(0.017)	(0.810)	(0.010)	(0.572)
Treated*2009	0.044	1.302	-0.006	0.124
	(0.025)	(1.186)	(0.017)	(0.858)
Constant	0.800*	29.75*	1.167*	50.14*
	(0.059)	(2.754)	(0.043)	(1.876)
Observations	5280	2788	5270	2783

Notes: Dependent variable is a binary indicator for work (columns 1 and 3) and a continuous variable for hours of work (columns 2 and 4). Sample includes households among the poorest 20 per cent with children aged 15 and 16 years only. Robust standard errors in parentheses. All columns include controls for number of children, education, age and race of head, household composition, urban areas and state dummies. Each column reports the results of a different regression. Starred coefficients are significant at the 5% level (*).

Table 11: Impact of the BVJ on school attendance by region

Variables	Midwest	Northeast	North	Southeast	South
Treated	-0.048	-0.062*	-0.041	-0.114*	-0.061
	(0.056)	(0.019)	(0.038)	(0.035)	(0.043)
2009	-0.003	0.027*	0.058*	0.019	0.012
	(0.043)	(0.015)	(0.028)	(0.025)	(0.028)
Treated*2009	0.013	0.065*	-0.009	0.076	-0.032
	(0.074)	(0.023)	(0.046)	(0.044)	(0.025)
Constant	0.859*	0.958*	0.777*	0.981*	0.904*
	(0.142)	(0.042)	(0.084)	(0.090)	(0.000)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	342	2884	906	913	396
R^2	0.063	0.036	0.069	0.065	0.057

Notes: Dependent variable is school attendance. Sample includes households among the poorest 20 per cent with children aged 15 and 16 years only. Robust standard errors in parentheses. All columns include controls for number of children, education, age and race of head, household composition, urban areas and state dummies. Each column reports the results a regression using a different sample. Starred coefficients are significant at the 5% level (*).

Table 12: Placebo - Impact on school attendance – 2003-2006

Variables	Without Controls	With Controls
Treated	-0.062	-0.062
	(0.014)***	(0.014)***
2006	-0.004	-0.012
	(0.012)	(0.012)
Treated*2006	-0.009	-0.004
	(0.020)	(0.020)
Constant	0.885	0.853
	(0.008)***	(0.043)***
Observations	5277	5264
R^2	0.009	0.043

Notes: Dependent variable is school attendance. Sample includes households among the poorest 20 per cent with children aged 15 and 16 years in 2003 and 2006 only. Robust standard errors in parentheses. Column (2) includes controls for number of children, education, age and race of head, household composition, urban areas and state dummies. Starred coefficients are significant at the 5% level (*).

Figure 1 – School Attendance by Age in Bottom and Top Quintiles