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Impact of the Bolsa Família Program on Children and Adolescents' Educational Level

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Juliane Borchers [α] & Marina Silva da Cunha [σ]

Abstract- This study aims to analyze the impacts of the *Programa Bolsa Família* (PBF) on educational indicators for Brazilian children and adolescents aged six to seventeen. The methodology used to investigate the impacts of the PBF was the Propensity Score Matching method according to data from the 2019 National Continuous Household Sample Survey. The results of the impact of the PBF indicated that beneficiaries are more likely to attend school and less likely to fall behind in school and drop out. It was also possible to observe that the program shows a greater impact on the older-age group, boys, non-whites and students from rural areas in relation to school attendance and dropout. Regarding the results of the impact on school delay, they are also higher for the older-age group, especially for girls, in the Central-West and Northeast regions and in the rural area. Thus, there is confirmation of the hypothesis that the PBF has impacts on educational indicators, improving the performance of its beneficiaries. The contribution is the analysis of the impact of the current PBF, after sixteen years of its implementation, the results of the work suggest the relevance of the cash transfer program as, in the absence of the PBF, school evasion and delay would be at levels even bigger.

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I. Introduction

Poverty is an economic and social development problem in countries and still remains an important issue in many of them (Bourguignon & Chakravarty, 2003). In Brazil, the incidence of poverty was reduced by almost 68% between 1990 and 2018, going from 20.6% to 6.5% (World Bank, 2018). However, the country still has a significant percentage of the population in poverty and extreme poverty. In addition, the expectation of years of schooling for Brazil is 15.4 years, according to the 2019 United Nations Development Program (UNDP) report, being a higher level than the one registered for the world, which is 12.7 years, but still lower than for some South American neighbors, as Argentina (17.6 years old), Uruguay (16.3 years old) and Chile (16.5 years old).

These high levels of poverty are problematic not only in the social area, as high inequality is associated with the poverty trap, but also highlight a negative relationship between inequality and economic growth (Perry et al., 2006; Myrdal, 1968). Economic development, income inequality and poverty are often associated with educational differences. Individuals from poor families enter the labor market with lower educational level than richer families and, as a result, earn lower wages. When families with lower income have restrictions in the credit market and, therefore, cannot anticipate the income needed to invest in their children's education, it creates a cycle in which poverty is carried from generation to generation. Thus, one of the solutions raised by the economic literature to reduce income inequality and also break the intergenerational transmission of poverty is the promotion of policies that increase the accumulation of human capital in the poorest families (Heckman & Masterov, 2007), as education has the capacity to break vicious circles (Nurkse, 1969; Myrdal, 1968), boost the process of economic growth and productive restructuring (Kuznets, 1955) and generate the processes of access to the labor market, gains productivity and wage improvements (Becker, 1964; Mincer, 1958). Access to education has been evidenced alongside public policies that favor the reduction of income inequality and poverty, such as income transfer policies like the Bolsa Família Program.

Thus, the fight against poverty requires specific actions capable of interrupting this trap between generations, among which the role of targeted cash transfer programs stands out. Aimed at needy families, the objective of these policies is to eliminate and/or alleviate, in the short term, the difficulties caused by the condition of poverty. Furthermore, by enabling direct income transfer with conditionalities, such as school attendance and medical care, the programs combat two aspects that characterize the reproduction of the intergenerational cycle of poverty: they ensure the minimum level of subsistence income for poor families and preserve the attainment of human capital of its beneficiaries.

These cash transfer programs were widespread in underdeveloped countries, mainly after the 1990s. In Latin America, conditional cash transfer programs were initially carried out in Mexico (Oportunidades, 1997), Chile (Chile Solidario, 2004), Argentina (*Asignación Universal Por Hijo*, 2009), Uruguay (*Nuevo Régimen de Asignaciones Familiares*, 2008) and Brazil (Bolsa Família Program, 2003).

On October 20th, 2003, Brazil created the PBF with the objective of reducing poverty and, consequently, income inequality, as it transfers income

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to a group of eligible families, establishing some conditionalities that encompass basic rights, such as education and health. The purpose of the program's conditionalities is to ensure the offer of basic actions to health and education services and to social policies of a more structural nature (microcredit, cooperativism, literacy, etc.), as well as enhance the improvement of quality of life of families and contribute to their social inclusion. The number of families benefiting from the PBF grew progressively between 2003 and 2006, when it reached 11 million families; in 2011, it increased to 13.8 million beneficiary families (Paiva et al., 2013). At the end of 2019, the program served approximately 13.2 million families, which represents 19.13% of the total of 69 million Brazilian families (Ministry of Social Development).

There is currently an extensive literature that estimates the impact of these cash transfer programs highlighted above on different variables of interest. Studies suggest that there are no negative incentives to work (Parker & Skoufias, 2000; Larrañaga et al., 2009; Machado et al., 2012; Martínez & Trajtenberg, 2016). Regarding child labor, the results show very clear negative impacts of the programs on participation in the child labor market (Skoufias & McClafferty, 2001; Salvia et al., 2015). In the health area, it was found that the participants of the Oportunidades and Chile Solidario Program are experiencing improvements in health (Gertler, 2000; Galasso, 2006). In the area of food security, Progresa also had important impacts on food consumption, with higher calorie consumption and a more diversified diet (Hoddinott et al., 2000). For the Bolsa Família Program (Brazil) in these same areas, the works by Jannuzzi et al. (2012), Soares et al. (2010), Marinho and Mendes (2013), Barbosa and Corseuil (2014) and De Brauw et al. (2015) found the same results obtained in the other conditional cash transfer programs presented above.

Therefore, the objective of this work is to evaluate the impact of the Bolsa Família Program (PBF) on educational indicators, attendance, dropout and school delay, of beneficiary children and adolescents, from six to seventeen years old, according to the most recent data made available by the National Survey by Continuous Household Sample (PNADC) of 2019 for the whole country, being able to even analyze the dimension of impacts regionally, using the method of Propensity Score Matching, since the PBF is a public policy aimed at improving access to education in the country.

II. Cash Transfer Programs and Impacts on Education

The works of Schultz (2000a), Behrman et al. (2001), Behrman et al. (2009) and Parker (2011) found that the Oportunidades program had positive and significant impacts on the education and school enrollment of beneficiaries. For the Chile Solidario program, the results of the study by Galasso (2006) indicate significant and consistent increases in the enrollment of children and adolescents participating in the program in relation to non-participation in the program. Participation in the *Nuevo Régimen de Asignaciones Familiares* program represented an increase in the service provided by the educational center for adolescents aged twelve to seventeen years old. In terms of school permanence, it appears that the greatest impact is for adolescents between sixteen and seventeen years old (Machado et al., 2012). The *Asignación Universal por Hijo* program shows a reduction in school dropout, and at the aggregate level, this impact was more favorable for men than for women and greater for adolescents aged sixteen and seventeen when compared to those aged fourteen and fifteen (Salvia et al., 2015; Jiménez & Jiménez, 2016).

There are studies that seek to explore the effects of the PBF on education. The work of Pellegrina (2011) sought to assess the impact of the PBF on school performance variables on benefited students in the State of São Paulo and found a reduction in school dropout of around 20%, a reduction of 3% on absences and no change in student performance on report card or standardized exams. The work by Oliveira and Soares (2013) analyzed the impact on school failure using the Cadastro Único database of 2008 and 2009, performing a logistic regression, and found out that the program has a significant impact on children's progression, although it was relatively modest: when simulating the probability of predicted repetition, it is 14.6% for non-beneficiaries belonging to the Cadastro Único against 13.2% for beneficiaries.

There are also studies that analyze the relationship between education and the labor market, observing the impact of the PBF on the relationship between school and youth work. The work by Silveira et al. (2014) using the 2010 Demographic Census through the Propensity Score Weighting, found evidence that program beneficiaries have greater possibilities of studying than non-beneficiaries, being 80% against 70% when considering for young people between ten and eighteen years old. The study by Pedrozo (2007) using a multinomial logit model built through the National Household Sample Survey (PNAD) of 2004 observed a reduction in the decision to study and work, while those who only study grew significantly. And it concluded that there was a decrease of about 2/3 in the number of children between ten and fifteen years of age who do not study, and this effect is even greater for the lower income groups.

In addition to works that assess the impact of the program on school performance, there are also works that analyze the impact of the program on school attendance, as in the case of the work by Neto et al.

(2020), which aims to investigate the impact of the PBF on educational indicators, enrollment rate and school gap, of children aged six to seventeen, but only for the states and mesoregions of the Northeast region, from the Propensity Score Matching method and from the 2010 Demographic Census information. The results showed that the PBF has a significant impact on the enrollment rate. Furthermore, it was observed that the impact is higher for adolescents between fifteen and seventeen years old. However, for school lag, the effects in general were not significant.

The study by Chitolina et al. (2013a) also verified a positive and significant effect of the PBF on school attendance and that this effect was greater among young males and the youngest children of families, considering the information from the 2006 and 2009 PNAD through the estimator of difference in differences. Kern et al. (2017) aimed to assess the impact of the PBF on school enrollment on educational indicators such as progression, repetition and dropout of children aged six to seventeen in Brazil and large regions. It was observed through longitudinal panel data at the individual level, based on the AIBF I and AIBF II data[1], that the PBF did not impact the school enrollment of children from 2005 to 2009 when it was disaggregated by gender. However, the PBF increased the probability of children enrollment, especially in rural areas of the North and Central-West region. Regarding progression and repetition, the program impacted children aged fifteen to seventeen from the rural area of the Northeast region and in the urban area of the South/Southeast, expanding progression and reducing the probability of repetition. The PBF also reduces the likelihood of children in the rural area of the Northeast to drop out of school.

The work by Cacciamali et al. (2010), which analyzes the impact of the PBF on the incidence of child labor and school attendance by children, using microdata from the 2004 PNAD with a bivariate probit model, found that the PBF increases the school attendance of children. However, they found perverse effects on the incidence of child labor as they obtained results that, for the poorest children, the probability of its occurrence is higher. Another study that analyzed the impact of the PBF on school attendance is the one by Melo and Duarte (2010), who evaluated the impact of the program on the school attendance of children and adolescents aged five to fourteen in family farms in the states of Pernambuco, Ceará, Sergipe and Paraíba. The authors used primary data (field research) and secondary data (PNAD, 2005) to obtain estimates of the Propensity Score. The results of the study indicate, in general, that the program raises the school attendance of these children in the range of 5.4 to 5.9 percentage points.

However, Ribeiro and Cacciamali's work (2012) did not find significant differences between beneficiary and non-beneficiary families in relation to school attendance indicators and age-grade gap when using data from the 2006 PNAD and the Propensity Score Matching method. Cavalcanti et al. (2013), who verified the impact of the PBF on families in the Northeast of Brazil using PNAD data from 2004 and 2006, applied to the Propensity Score Matching methodology, observed that there were 19% more children and young people attending school in families beneficiaries in a situation of poverty in 2004. This result, however, is proportionally lower (15%) in 2006, suggesting that the program has a positive impact on the number of children and young people who attend school, but this increase occurs at decreasing rates.

Thus, it does not seem to be a consensus regarding both the direction and the size of the impact of the PBF on variables that measure school performance among beneficiary families as the aforementioned works show positive, negative or non-significant results in these variables, since it directly impacts on child labor and on the persistence of poverty. However, these results change in relation to the location analyzed, the database and the methodology used in the studies. In addition, these works analyzed an initial period of the PBF, from 2004 to 2010.

III. Methodology

The impact analysis of the PBF, like any other public policy, is not a simple task due to the impossibility of observing the same individual in different situations, that is, as treated and not treated. Thus, it is necessary to find a control group formed by those who do not receive the benefit but have similar characteristics to the beneficiaries. In this work, the Propensity Score Matching (PSM) is used as a methodological approach, seeking to obtain more robust estimates due to the problem of self-selection bias present in more traditional approaches.

a) Propensity Score Matching

Propensity Score Matching (PSM) is an econometric method that aims to find control groups comparable to treatment groups by matching them by their observable characteristics. This method emerged to solve the problem of selection bias that some methodologies encountered when making this comparison, as they did not have a common support between among groups. In other words, "Propensity Score" estimates, through a logit/probit regression, the probability of belonging to the treatment group and "Matching" associates the untreated units with a more approximate propensity score so that the comparison is

[1] Impact Assessment of the Bolsa Família Program (AIBF), a database that aims to monitor beneficiaries of the PBF, developed under the command of the Ministry of Social Development and Fight against Hunger in 2005 and 2009.

the best possible. Originally developed by Rosenbaum and Rubin (1983), the propensity score is defined as the conditional probability of receiving a treatment, given pretreatment characteristics:

$$p(X)=Pr\left(B=\frac{1}{X}\right)=E\left(\frac{D}{X}\right) \quad (1)$$

Where Y_{1i} is the result variable when family i participates in the program and Y_{0i} denotes the result variable when family i does not participate in the PBF. X is a vector of observable household characteristics where D is an indicator of exposure of the treated (0 [zero] for untreated and 1 [one] for treated). Thus, the average of the treatment effect on the treated (*ATT*) is given by:

$$\tau = E\{\Delta \mid D_i=1\}=E[\{Y_{1i}-Y_{0i} \mid D_i=1, p(X_i)\}] \therefore$$

$$\tau = \mathrm{E}[\{Y_{1i}|D_i=1, p(X_i)\} - \{Y_{0i}|D_i=0, p(X_i)\}|\mathrm{D_i}=1] \quad (2)$$

It is worth noting that a propensity score estimate is not enough to estimate the *ATT* of equation (2), it is necessary to combine it with the matching because the probability of observing two units with exactly the same propensity score is, in principle, zero, given that $p(X)$ is a continuous variable. In this regard, the literature has developed several matching methods, the most used are, according to Becker and Ichino (2002), Stratification Matching (SM), Nearest Neighbor Matching (NNM), Radius Matching (RM) and Kernel Matching (KM).

For the present study, Kernel Matching is the main algorithm. It was chosen because it does not present the problem of matching among families with different propensity scores, given that this is done via the weighted average of the control group, making the two compared groups more homogeneous, and it was the matching method that presented the lowest selection bias.

According to Oh et al. (2009), in Kernel Matching, all benefited individuals are paired with the weighted average of non-benefited individuals, with weights inversely proportional to the distance between the propensity score of benefited and non-benefited individuals.

b) Database

The database used to achieve the objective of this work was the PNADC, made available by the Brazilian Institute of Geography and Statistics (IBGE), regarding the second quarter of 2019, the most current period with available data. The sample used is restricted to households that responded to the first interview in 2019 with per capita family income up to half the minimum wage (R$499.00). This amount above the PBF eligibility line (R$178.00) seeks to control the cyclical nature of income, as at some point the poor family may receive more than the limit amount. In any case, cutoff tests based on the PBF eligibility line generally do not change the results.

The research focus on children and adolescents from six to seventeen years old in PBF beneficiary residences, which were also analyzed separately, considering the initial and final years of basic education. The first group is made up of children from six to fourteen years old and a second one by those from fifteen to seventeen years old. This separation is necessary due to the fact that there are unobservable variables depending on the age group, for example, the first group is formed by individuals who necessarily have a higher probability of attending school in relation to the second, since the age group from six to fourteen is characterized by children who are or should be attending elementary school and the age group from fifteen to seventeen are teenagers who are or should be attending high school. Thus, it is possible to verify at which school level the impact of the PBF is greater or has a greater level of significance. It was considered 8,973 total observations.

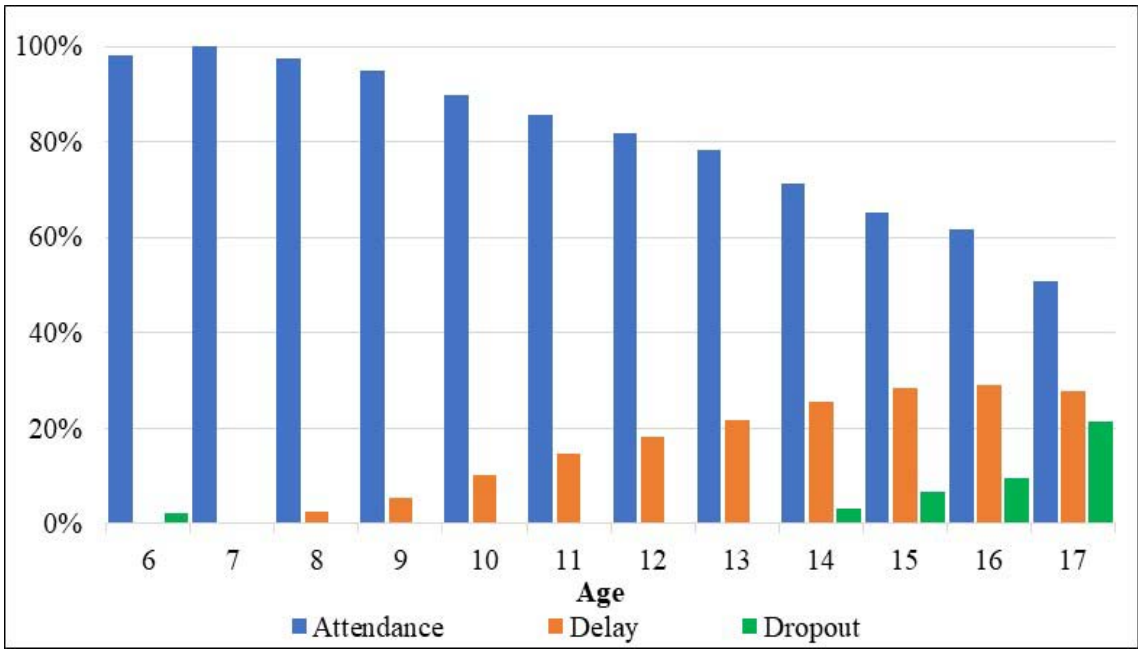
The choice of the sample is based on variable V5002A, which asks "whether, in the reference period, the household had received income from the Bolsa Família Social Program. In turn, the impact variables that can be observed according to the PNADC are: School Attendance, which considers individuals duly enrolled in school on the day of the survey, with a value of 1 for those enrolled and 0 otherwise; School Dropout, which considers individuals who were not enrolled in school on the day of the survey, with a value of 1 for those not enrolled and 0 otherwise; and School Delay, which considers all individuals who were enrolled in school on the day of the survey, with 1 for those who are behind in school taking into account the grade/age ratio and 0 otherwise and contemplating the purpose of capturing those individuals with two years of delay or more. The decision to consider as lagged those aged two or more was made since in some cases the date of birth of the children would prevent the identification of lagged ones in just one year. In addition, variables associated with the characteristics of the child or adolescent, the reference person in the family and the household were included in the equation of impact of participation in the program, as shown in Table 1, to ensure that the model captured the effect of the program on the variables previously presented.

Table 1: Control Variables

Variable	Description
Characteristics of the child or adolescent	
Sex	Binary variable equal to 1 if female.
Race/color	Binary variable equal to 1 if Non-White (includes black, brown and indigenous).
Age	Age in years.
Teaching network	Binary variable equal to 1 if the child attends a private education system.
Characteristics of the reference person	
Sex	Binary variable equal to 1 if female.
Race/color	Binary variable equal to 1 if Non-White (includes black, brown and indigenous).
Age	Age in years.
Married	Binary variable equal to 1 if married
Scholarity	Binary variable equal to 1 if incomplete elementary school
Characteristics of the residence	
Number of residents	Number of people in the household
Poor	Binary variable equal to 1 if per capita income is less than R$179
Central-West	Binary variable equal to 1 if it resident in the Central-West region of the country
Northeast	Binary variable equal to 1 if it resident in the Northeast region of the country
North	Binary variable equal to 1 if it resident in the North region of the country
South	Binary variable equal to 1 if it resident in the South region of the country
Metropolitan	Binary variable equal to 1 if it resident in the metropolitan region
Urban	Binary variable equal to 1 if it resident in the urban area

Source(s): Own elaboration.

In Figure 1, the behavior of the impact or outcome variables analyzed in this work can be observed over the years of the Brazilian educational cycle, in which there is a higher school attendance at the beginning of basic education. However, it presents a more significant reduction from the age of fifteen and the age group of seventeen has the lowest school attendance, around 80%. In turn, it appears that Brazil has a lower school delay in the age groups from eight to fourteen years, which corresponds to elementary education, but in the age groups from fifteen to seventeen years it presents a high level of school delay, highlighting the age group of seventeen years old that presents the highest percentage of school delay. Regarding school dropout, it is noticed that it exists from the age of fourteen onwards and increases until it reaches the highest level in the age group of seventeen, in which 21.36% of adolescents have dropped out of school.



Source(s): Own elaboration from PNADC

Figure 1: Attendance, dropout and school delay by age group in Brazil (%) in 2019

IV. Analysis of the Program's Impact on the Educational Level of Children and Adolescents

This section discusses the impact of the PBF on educational indicators, measured through the average treatment effect on the treaties (*ATT*). The results were first estimated for children and adolescents from six to seventeen years old and, later, the age groups from six to fourteen years old and fifteen to seventeen years old were also considered. Additionally, these impacts were estimated segmentally by sex, race/color, regions and by urban/rural area in order to capture different effects of the program on these subgroups of the population.

Estimates of the impacts of the PBF on school attendance, dropout and delay can be seen in Table 2. Analyzing the results for school attendance, it appears that the PBF has a positive impact on it since, as, as noted, the program increases the probability of school attendance among beneficiaries for children and adolescents aged six to seventeen when compared to the control group. The program had a positive impact of 2.48 pp on school attendance considering all ages and an impact of 0.62 pp for children aged six to fourteen. On the other hand, the impact is greater for adolescents aged fifteen to seventeen, around 6.14 pp.

Regarding the results for school delay, it can be seen that the program reduces school delay by around 4.74 pp for the age group from fifteen to seventeen years old, the overall impact is a reduction of 2.09 pp. The PBF has no significant effect on the eight to fourteen age group. Regarding the results for school dropout, it is observed that the PBF reduces school dropout by 2.20 pp for all ages and it reduces 0.62 pp for the age group from six to fourteen years old. The age group from fifteen to seventeen show greater reduction, around 6.14 pp. The results in Table 2 show that the PBF increases school attendance and reduces school delay and dropout, with the expected results for both the frequency and for the delay and for the school dropout.

Table 2: Effect of the Bolsa Família Program on attendance, dropout and school delay

Segmentation	Treatment Group	Group Control	Difference	Standard Deviation	t-value	In Support	
						Not Treated	Treated
School Attendance							
6-17 years	0.9672	0.9424	0.0248***	0.0058	4.27	3,281	5,666
6-14 years	0.9956	0.9894	0.0062**	0.0030	2.06	2,333	4,285
15-17 years	0.8789	0.8175	0.0614***	0.0186	3.29	948	1,379
School Delay							
8-17 years	0.2055	0.2264	–0.0209*	0.0126	–1.66	2,704	4,628
8-14 years	0.1485	0.1693	–0.0208	0.0130	–1.59	1,874	3,400
15-17 years	0.3578	0.4052	–0.0474*	0.0287	–1.65	830	1,213
School Dropout							
6-17 years	0.0327	0.0547	–0.0220***	0.0058	–3.77	3,281	5,683
6-14 years	0.0044	0.0106	–0.0062**	0.0030	–2.06	2,333	4,285
15-17 years	0.1211	0.1825	–0.0614***	0.0186	–3.29	948	1,379

Source(s): Own elaboration from PNADC (2019).
Note(s): (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%.

Table 3 shows the results on educational indicators while considering the segmentation by sex, race/color, regions of the country and by household situation. In the case of school attendance for boys, there are higher and significant results than those for girls. According to the estimates presented, the PBF supported by its conditionalities increases the school attendance of beneficiary boys from six to seventeen years old by 3.10 pp. For beneficiary girls, the probability of being attending school is 2.13 pp more. As expected, the impact among young people is higher, as a beneficiary boy is more likely to be enrolled, reaching 7.35 pp. Considering the results for race/color, it appears that for all age groups only the results for non-whites were significant. Analyzing the age group from six to fourteen years old, it is observed that the impacts are smaller than for the age group from six to seventeen years old, the impact of receiving benefits increases school attendance by only 0.65 pp in this group. However, in the age group of fifteen to seventeen, the impact is quite expressive, showing a probability of 7.23 pp more.

Regarding the regions of the country, only the Central-West and Southeast regions did not show statistically significant results for ages six to seventeen. Regarding the ones that showed significant results, the greatest impact occurs in the Northern region of the country, in which participating in the program increases school attendance by 3.00 pp, followed by the Northeast region with an impact of 2.81 pp. Considering ages from six to fourteen, none of the regions showed a significant result, but for ages from fifteen to seventeen, only the Northeast region has a statistically significant result, in which the impact is greater than when considering all ages. Regarding the situation of the household, only the estimate for ages six to fourteen for

the rural area was not significant. In relation to the ones that were significant, the greatest impact occurs for ages fifteen to seventeen living in rural areas, in which a beneficiary of the program residing in rural areas is 7.08 pp more likely to enroll in school.

Examining the same subgroups, the results for school delay for girls show that the program has worked to reduce it, since the chances of delay are lower among those who receive the benefit than for non-beneficiaries. The ages from eight to fourteen years old are the only ones that do not present statistical significance, but in the age group from fifteen to seventeen by the end of basic education, the impact of the program on school delay is a reduction of 13.96 pp. The results for boys show no significance for all age groups, suggesting that the program is not proving effective for them. Regarding race/color, it appears that only for the age group from eight to fourteen years old the results were significant for whites. For the result that showed statistical significance, the impact for whites is that a beneficiary has a lower probability of 4.85 pp of not being enrolled in the correct grade. Again, the estimates highlight that the PBF is not effective in reducing school delay, especially for non-whites, a group that historically presents the highest percentage of students who are lagging behind in school.

Analyzing the results for the regions, it appears that only the Central-West and Northeast regions presented statistically significant results for all age groups. The significant results show that the greatest impacts are found in the Central-West region of the country and especially in the ages of fifteen to seventeen, where the probability of not being enrolled in the correct grade is 14.12 pp less. The results for urban and rural areas showed only significance for the rural area and when considering all ages and the age group between fifteen and seventeen years old. The greatest impact is found for young people living in rural households, which probability of not being enrolled in the correct grade is 10.62 pp less.

Finally, the results for school dropout show that the PBF supported by its conditionalities reduces school evasion of beneficiary boys from six to fourteen years old by 2.75 pp. For beneficiary girls, the probability of dropping out of school is 1.85 pp less. As expected, the impact among young people is more expressive, as a beneficiary boy is less likely to drop out of school, reaching 7.35 pp. While observing the results for race/color, it appears that for all ages only the results for non-whites were significant: the negative impact for non-white beneficiaries is 2.68 pp from dropping out of school. Analyzing children from six to fourteen years old, it is observed that the impacts are smaller than for the age group from six to seventeen years old, the impact of receiving benefits reduces school evasion by only 0.65 pp in this group. However, in the ages referring to the final years of basic education, the impact is quite expressive, with a lower probability of dropping out of school of 7.23 pp.

For regional differences in the country, it appears that only the Northeast and North regions showed statistically significant results, with the greatest impact occurring in the Northern region of the country, where participating in the program reduces school dropout by 2.78 pp. Initial years of basic education, from six to fourteen years old, have no significant results and in the final years, from fifteen to seventeen years old, only the Northeast and North regions have statistically significant results, in which the impact is greater than considering all the ages. Regarding the household situation, all estimates were significant. The greatest impact occurs for adolescents aged fifteen to seventeen living in rural areas, in which a program beneficiary residing in the rural area has a lower probability of dropping out of school than 7.08 pp.

Based on these results, the need for the continuity of the PBF is evident, and it can even be expanded. In this process of continuation and expansion of the program, it would be interesting to add objectives, in partnership with other public policies in order to improve the indicators of school delay and the school performance of children and adolescents benefiting from the program.

Table 3: Effect of the Bolsa Família Program on attendance, dropout and school delay for gender, race/color, regions and household situation

Group	School Attendance			School Delay			School Dropout		
	6-17 years	6-14 years	15-17 years	8-17 years	8-14 years	15-17 years	6-17 years	6-14 years	15-17 years
Characteristics of the child or adolescent									
Boys	0.0310*** (3.58)	0.0030 (0.82)	0.0735*** (2.73)	0.0104 (0.55)	–0.0102 (–0.52)	0.0338 (0.80)	–0.0275*** (–3.14)	–0.0030 (–0.82)	–0.0735*** (–2.73)
Girls	0.0213*** (2.75)	0.0091* (1.89)	0.0555** (2.14)	–0.0509*** (–3.12)	–0.0262 (–1.55)	–0.1396*** (–3.63)	–0.0185** (–2.39)	–0.0091* (–1.89)	–0.0555** (–2.14)
White	0.0077 (0.73)	0.0046 (0.85)	0.0222 (0.61)	–0.0303 (–1.29)	–0.0485** (–2.00)	–0.0311 (–0.54)	–0.0011 (–0.10)	–0.0046 (–0.85)	–0.0222 (–0.61)
Non-White	0.0295*** (4.24)	0.0065* (1.80)	0.0723*** (3.35)	–0.0142 (–0.97)	–0.0116 (–0.76)	–0.0404 (–1.23)	–0.0268*** (–3.85)	–0.0065* (–1.80)	–0.0723*** (–3.35)

Characteristics of the residence									
Central-West	–0.0052 (–0.42)	0.0020 (0.34)	–0.0370 (–0.64)	–0.0775* (–1.83)	–0.0986** (–2.17)	–0.1412** (–2.05)	0.0078 (0.62)	–0.0020 (–0.34)	0.0370 (0.64)
Northeast	0.0281*** (2.83)	0.0034 (0.72)	0.0884*** (2.93)	–0.0505** (–2.56)	–0.0409** (–2.06)	–0.0875* (–1.95)	–0.0241** (–2.42)	–0.0034 (–0.72)	–0.0884*** (–2.93)
North	0.0300** (2.25)	0.0103 (1.05)	0.0915** (2.22)	0.0112 (0.41)	0.0046 (0.16)	0.0262 (0.41)	–0.0278** (–2.07)	–0.0103 (–1.05)	–0.0915** (–2.22)
Southeast	–0.0006 (–0.06)	–0.00003 (-0.01)	–0.0339 (–0.88)	–0.0190 (–0.79)	–0.0299 (–1.19)	0.0468 (0.85)	0.0091 (0.81)	0.0000 (0.00)	0.0339 (0.88)
South	0.0217* (1.69)	0.0038 (0.77)	0.0144 (0.20)	–0.0128 (–0.33)	0.0157 (0.43)	–0.0715 (–0.60)	–0.0193 (–1.48)	–0.0038 (–0.77)	–0.0144 (–0.20)
Urban	0.0219*** (3.36)	0.0088** (2.57)	0.0525** (2.41)	–0.0081 (–0.54)	–0.0213 (–1.37)	0.0139 (0.40)	–0.0182*** (–2.79)	–0.0088** (–2.57)	–0.0525** (–2.41)
Rural	0.0264** (2.57)	0.0055 (1.14)	0.0708** (2.13)	–0.0436** (–2.11)	–0.0309 (–1.41)	–0.1062** (–2.17)	–0.0241** (–2.34)	–0.0055 (–1.14)	–0.0708** (–2.13)

Source(s): Own elaboration from PNADC (2019).
Note(s): (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1%. t-value in parentheses.

V. Discussion of Results

The results of the study suggest that participation in the PBF increases school attendance and reduces school dropout, especially for non-white boys, aged between fifteen and seventeen, living in rural areas and in the Northeast and North regions. In addition, participation in the PBF also reduces school delays, but it happens especially for girls, whites, adolescents aged between fifteen and seventeen and residents of rural areas and in the Central-West and Southeast regions of the country.

These results are similar to those obtained in studies of cash transfer programs in Mexico, Chile, Uruguay and Argentina. In Mexico and Chile, Oportunidades and Chile Solidario have increased school enrollment (Schultz, 2000a; Behrman at al., 2001; Behrman et al., 2009; Parker, 2011; Galasso, 2006). In Uruguay, the work by Machado et al. (2012) also observed an increase in school enrollment, but mainly in adolescents between sixteen and seventeen years old, which is also observed in this work for the Brazilian program. Regarding the results of school dropout, they are consistent with those found in the study by Salvia et al. (2015) and Jiménez and Jiménez (2016) for the Argentinean program, in which they point out that school dropout rates for program participants have reduced, being the greatest reduction for men and for the sixteen to seventeen age groups, this impact is similar to the one from PBF on its beneficiaries.

The general results for school attendance are in agreement with most studies found in the Brazilian literature, regardless of the database and methodology adopted. However, these results are in the opposite direction to those found by Ribeiro and Cacciamali (2012), since, for the authors, there is no distinction between the rates of school attendance and school delay of beneficiaries and non-beneficiaries of the program. The difference between genders is significant, once the program has more expressive and positive effects among boys for school attendance, a result different from that presented in Melo and Duarte (2010) and Kern et al. (2017) since in their results, those for boys were not statistically significant.

Evidence for dropping out of school suggests that the program has achieved its main objective, which is to reduce school dropout rates among benefited children and adolescents and, consequently, increase school attendance. These results for school dropout, when confirming those obtained for attendance, indicate the robustness of the analysis. In turn, the results for school delay do not follow the literature, probably due to the use of a different methodology and database for a more recent period. The analysis period for school delay is a very important factor, as the improvement in school performance happens in the long term, unlikely the impacts on school attendance. For example, the most recent study, Neto et al. (2020), used data from the 2010 Demographic Census, carrying out the study only for the Northeast region of the country, in which it did not find significant effects on school lag.

The results show that progressing in school has a more significant effect on young beneficiaries aged fifteen to seventeen. The cost of staying in school seems higher for young people in this age group, especially those living in rural areas, who often lose interest in school or do not give up working. It shows that the creation of the Youth Variable Benefit meant that these young people, who had often already left school or needed to work to supplement the family income, dedicated more time to school, thus increasing their progress and keeping them in school.

In this sense, it is important to emphasize that the PBF is an income transfer program that is still showing significant effects on educational indicators, that is, attendance, dropout and school delay as this study analyzed data from 2019 and showed that an increase is occurring in school attendance and a reduction in dropouts and school delays, and that the PBF is still working to break the generational cycle of poverty, bearing in mind that the results of the objectives

of the income transfer programs will be achieved in the long term.

VI. Conclusions

This study aimed to investigate the impact of the PBF on educational indicators for children and adolescents aged six to seventeen in Brazil, considering that the program has a conditionality directly related to education. Additionally, seeking to identify and highlight heterogeneities and specificities, these estimates were also obtained for the initial and final years of basic education, the country's macro-regions, race/color and gender.

The effect of the program, initially estimated for children aged between six and seventeen, confirmed that there is a significant impact on educational indicators, showing an increase in school attendance and a reduction in dropout and school delays among its beneficiaries. However, this effect is greater at the end of basic education, for adolescents. Furthermore, the results also showed differences in the effects of the Bolsa Família Program when considering some subgroups. The impact on school attendance and dropout is more relevant for boys, non-whites and residents of the North and Northeast regions and rural areas. In the case of school delay, its reduction is more significant for girls, whites and residents of the Central-West and Northeast regions and rural areas of the country.

Thus, the results of this study allow us to state that the PBF, through educational conditionality, has a positive impact on school attendance, indicating that beneficiaries are more likely to attend school, although important heterogeneities are also observed when considering macro-regions, gender, race/color or area of residence. In turn, in the case of school delay and school evasion, the effect is negative, indicating a smaller delay and school evasion than the group of non-beneficiaries. Thus, it is necessary to expand public policies for this portion of the population, since the current ones are causing an increase in attendance and consequently reducing school dropouts and school delays, thus making it possible to interrupt the intergenerational cycle of poverty.

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