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Assessing the Impacts of *Mais Educação* on Educational Outcomes

Evidence between 2007 and 2011

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Abstract

To address the educational gap, many Latin American countries are focusing on extension of the school day and enrichment of the curriculum. In Brazil, a nationwide policy—*Mais Educação*—was implemented in 2008 with this objective. This paper explores the nationwide rollout of the program across the country and compares the performance of schools before and after implementation of the program. The paper quantifies the impacts of the program on student learning and dropout rates in urban areas, and investigates the heterogeneity of impacts by several characteristics of the program's implementation. Participating schools are compared with nonparticipating schools after controlling for school selection into the program based on observable characteristics using propensity score matching. The analysis finds that participation in *Mais Educação* has on average no impacts on school dropout rates and average negative impacts on mathematics test scores. The negative impacts on student achievement are stronger in the short term, which suggests that the negative effects may be reduced as the program improves its implementation. In addition, especially for fifth-grade schools, the level of student spending is associated with reduced dropout rates. Interestingly, in schools choosing the fields of Portuguese and/or sports in the added hours, the program is associated with lower test scores in Portuguese and mathematics. inally, for the sample of fifth-grade schools, heterogeneous impacts are seen in the program according to the GDP per capita of the city where the school is located. The higher the GDP per capita, the greater the positive impact of the program on mathematics test scores and on dropout rates.

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Assessing the Impacts of *Mais Educação* on Educational Outcomes: Evidence between 2007 and 2011

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1. Introduction

Several Latin American countries recently implemented full-time schooling programs with the objective of reducing dropout rates and improving student learning, ultimately reducing income inequalities. However, in part given their high per student costs, these tend to be controversial reforms. Surprisingly, few rigorous studies have assessed the impacts of these reforms on educational outcomes in a context of middle-income countries. In this paper, we evaluate the impact on educational outcomes by the Brazilian federal program of extension of the school day, *Mais Educação* (*"More Education"*). Starting in 2008, the program gradually expanded nationwide, covering more than 65 percent of municipalities in 2013.[2] We exploit administrative data between 2007 and 2011 and a differences-in-differences matching estimator to assess the impact of the program on educational outcomes (Portuguese and mathematics test scores and dropout rates). We selected these indicators because the ultimate goal of *Mais Educação* is to improve schooling outcomes among public schools, reduce evasion and dropout rates, and improve learning.

In recent decades, Brazil has made large progress in access to basic education, but this was not accompanied by higher quality education.[3] The 2012 Program for International Student Assessment (PISA) results show that the quality of education in the country remains far below international standards.[4] Aiming to improve Brazilian public education, in 2008 the Ministry of Education (MEC) created *Mais Educação*, a nationwide program supporting the expansion of the school day in public basic education schools.[5] Although not yet covering the entire school system, the program has been growing at a fast pace and covers the three education networks: federal, state, and municipal. *Mais Educação* has been one of the main federal policies to incentivize and expand the provision of full-time education and ultimately achieve the *Plano Nacional da Educação* (PNE) targets.[6]

Mais Educação extends the school day by financing extra activities scheduled before or after the regular class hours. Public schools joining the program can choose the extracurricular activities to be carried out, but the pedagogic supervision-related activities are mandatory.[7] Although the criteria for selection of schools changed over time, de facto priority was given to schools in socially disadvantaged areas or schools with low learning achievements. *Mais Educação* started in 2008 and gradually expanded from 1,380 schools in 2008 (corresponding to 2.1 percent of state schools[8] and 0.4 percent of municipal

[2] As of 2013, 3,665 out of 5,570 Brazilian municipalities had schools enrolled in *Mais Educação.*
[3] According to the *Pesquisa Nacional de Amostra por Domicílios* (PNAD), in 2006, 98 percent of children between ages 7 and 14 attended school.
[4] In the fields of reading, math, and the sciences, Brazil ranked 59th in student achievement. Furthermore, compared to the 2009 PISA results, Brazil worsened its position across the three knowledge areas assessed.
[5] The regular school day in Brazil lasts on average 4.5 hours (Brazilian School Census 2007).
[6] PNE establishes that 50 percent of public schools and 25 percent of public school students should have a full-time education.
[7] Schools could choose mathematics, reading and writing, history, geography, and sciences activities.
[8] In 2008, only the state of São Paulo did not participate in *Mais Educação*.

schools)[9] to 12,924 schools in 2011 (14.5 percent of state schools and 4.4 percent of municipal schools).

The aim of this paper is to evaluate the short- and medium-term impacts of *Mais Educação* on school outcomes. We exploit publically available data from *Prova Brasil* and from the annual Brazilian school census. We also exploit administrative data on program participation provided by MEC. Because the program was rolled out over time, we compare the average educational outcomes of students in participating and in nonparticipating schools between 2007 (before the program was implemented) and 2011 (when the program reached a total of 6.2 percent of Brazilian public schools).

The main challenge, however, is that participating schools, and their students, are likely to have different abilities and come from different socioeconomic backgrounds and thus have different outcomes than nonparticipating schools. Actually, our evidence shows that, on average, participating schools had worse outcomes than schools not participating in 2007. This is partly a consequence of the selection criteria into the program: Targeting is aimed at schools with a low *Índice de Desenvolvimento da Educação Básica* (IDEB) and/or located in areas of social vulnerability, and within schools at students with learning deficits. Hence, to assess the impact of the program we cannot simply compare participating and nonparticipating schools. Instead, we compare the performance over time in participating schools and nonparticipating schools that are as similar as possible to participating schools both in observable and unobservable characteristics.

We exploit propensity score matching to select schools that do not participate in *Mais Educação* and ensure that they are very similar to treatment schools. We use this method to attempt ultimately to control for the selection bias by selecting a control group of schools that are very similar in a wide set of observable characteristics to those participating in *Mais Educação*. The differences-in-differences estimator (comparing the changes in outcomes for the same schools before and after the program) allows us to control for unobserved characteristics of schools, potentially correlated with the take up of *Mais Educação*, and that are constant over time. Unfortunately, it is possible that time-varying characteristics—correlated with program take up—exist that we cannot account for and that could be biasing the results. These include, for instance, possible changes in the profile of the school directors or in the support provided by subnational *Secretarias de Educação*, providing closer monitoring and support to schools.

Our findings show that in the medium term, participation in *Mais Educação* has, on average, no impact on school dropout rates, which suggests reduced impacts of the program in student composition during this period. We also do not find evidence that the program tends to be more effective earlier in the fundamental education cycle. Nevertheless, the program shows a statistically significant and negative impact on mathematics test scores and no average impact on Portuguese test scores. This holds for both the fifth and the ninth grades. We also show that the negative impacts on mathematics achievement are stronger in the short term and for schools that joined the

[9] The program covered 1 percent of Brazilian municipalities in 2008.

program in 2008 (compared with schools that joined the program later in 2010). In addition, the negative effects are concentrated on those schools that had students with initially worse mathematics performance (before the program's implementation).

We conjecture that the large negative impacts in the short term are related to challenges in the initial implementation of the program nationwide, affecting the habits of students, teachers, and schools and possibly replacing study at home. Nonetheless, as the program consolidates over the years and improves implementation, the results suggest that impacts may improve and that the negative effect on student learning achievement may be reversed. Impact evaluation results are consonant with this hypothesis: The negative impacts on learning in the short term (one year after program implementation) were stronger and more negative than the medium-term impacts (that is, three years after program implementation). Moreover, schools that joined *Mais Educação* in the first year of the program (2008) also had greater negative impacts in the short term.

For the sample of fifth-grade schools, we find heterogeneity of the impact of the program also depending on the way the program was implemented, including the type of courses used to extend the school day, average per student spending, and municipal gross domestic product (GDP) per capita. We find that the average school dropout rates decrease as the spending per student increases. In particular, for each R$100 per student transferred to schools participating in *Mais Educação,* a one percentage point decrease is seen in dropout rates. Heterogeneous impacts are also seen in the program according to the GDP per capita of the city where the school is located. The higher the GDP per capita, the greater the positive impact of the program on mathematics scores and on dropout rates. Finally, schools choosing pedagogical support in Portuguese[10] and/or sports tend to have larger negative impacts on learning outcomes.

In interpreting these results, it is important to recognize some important caveats of our empirical approach, some of which are driven by the lack of data. First, for robustness, we focused on the sample of schools that joined *Mais Educação* in 2008 and remained in the program until 2011. This sample corresponds to a small group of participating schools and may differ from schools that have joined *Mais Educação* in recent years (differences may appear in characteristics such as students' socioeconomic background, schools' size, location, etc.). Thus, results cannot be generalized to all schools that currently participate in the program. Second, our findings refer to the average impact on participating schools, but it is possible that impacts vary within each school according to the characteristics of participating students. Moreover, it is possible that time-varying unobserved factors are correlated with the dependent variables (such as changes in teachers' characteristics), which could affect the estimated results. In addition, it is possible that our results capture differences in the composition of students and their socioeconomic background after the program was implemented. Unfortunately we were not able to identify which students were actually enrolled in the program. In addition, it

[10] Pedagogical support is compulsory in *Mais Educação*, but schools can choose which subjects will be offered (Portuguese, history, mathematics, sciences).

is possible that our results are at least partly explained by a changing share of students participating in *Prova Brasil* over the period analyzed.[11] Finally, we assessed the impacts of *Mais Educação* on educational outcomes, acknowledging that the program's main goals are broader, such as improving students' health, reducing rates of teenage pregnancy, and introduction of mothers and caregivers into the labor market.

Our results are critical to evaluate the effectiveness of public policies, to improve the quality of basic education in Brazil, and to show how different regions are differently affected depending on the implementation of the program. Increasingly states and municipalities within Brazil are also implementing and thinking about new subnational interventions (for several case studies on subnational implementation see Almeida et al. 2015; Fundação Itaú Social and World Bank 2015).

The structure of the report is as follows. Section 2 reviews the international literature, summarizing the main impacts of full-time schooling on educational outcomes. In section 3 we briefly describe the Brazilian federal policy, *Mais Educação*. Section 4 describes the methodology used to assess the impacts of *Mais Educação* on different educational outcomes and the identifying assumptions. Section 5 describes the main data sets used and presents simple descriptive statistics for the main sample. Section 6 describes the propensity score matching results and analyzes the sample balancing. Section 7 discusses the main findings, and section 7.3 presents the heterogeneity analysis by school characteristics. Section 8 discusses the main policy implications.

2. Literature Review

Policies to increase instructional time usually cover different policies, including increasing the number of school days per year,[12] increasing the duration of each class,[13] and increasing total school hours. Our paper relates to the literature looking at the impacts of the extension of the school day reforms on educational outcomes in developing countries. In this section, we briefly summarize the international literature on the extension of the school day, assessing the impacts on different educational outcomes. We

[11] In the fifth-grade sample of schools, treated schools had a greater increase in the percentage of students taking *Prova Brasil* tests between 2007 and 2009. Although in treated schools this proportion increased 10 percentage points (statistically significant at a 1 percent level), in control schools the increase was 6 percentage points (statistically significant at a 10 percent level). The percentage of students attending *Prova Brasil* between 2009 and 2011 remained stable for both groups. In the sample of ninth-grade schools, the percentage of students taking *Prova Brasil* tests increased at the same rate in treatment and control groups between 2007 and 2009. However, between 2009 and 2011, the percentage fell by 5 percentage points in treated schools, whereas it remained stable in the control group.

[12] For impact evaluation of extension of the scholar year see Pischke (2007) and Fitzpatrick, Grissmer, and Hastedt (2011).

[13] Rice, Croninger, and Roellke (2002) analyze block scheduling, which involves a reallocation of instructional time to longer classes, reducing the fragmentation of each class.

focus on works that have used rigorous empirical approaches and micro-data sets,[14] with special emphasis on methodologies that exploit treatment and control groups to solve the unobserved contrafactual problem. The vast majority of papers to date that evaluated policies of the extension of the school day have exploited quasi-experimental methodologies based on school-level data similar to what we exploit in this report.

Many papers to date have analyzed the relation between full-time schooling and cognitive outcomes,[15] but conclusions are mixed. Although most papers found positive effects of extending the school day on student scores, others found no impact of such educational policies.

De Cicca (2007) analyzed full-day kindergartens in the United States. The paper estimated the effect of full-time schooling on standardized test scores in mathematics and reading and found a positive impact on student achievement in both subjects. In the Netherlands, Meyer and Van Klaveren (2013) evaluated the impact of a full-time schooling program for children aged 8 to 12 years old and found no significant effects on student learning. The lack of results could, however, be linked to the small duration of the program (11 weeks), which may have been insufficient to produce the desired performance improvement.

For Latin America, results vary widely mainly depending on the country and on the full-time schooling program analyzed. Holland, Alfaro, and Evans (2015) summarize the findings of evaluation studies of full-time schooling in Latin America. All studies available and reviewed here exploit quasi-experimental methods, either propensity score matching (Cerdan-Infantes and Vermeersch 2007; Llach, Adrogué, and Gigaglia 2009; Mendes 2011; Oliveira 2010) or a differences-in-differences approach (Arzola 2010; Bellei 2009; Pereira 2010). A smaller number of studies, like ours, combined both a differences-in-differences approach and a propensity score matching estimator (see De Aquino and Kassouf 2011; Marín 2006; Xerxenevsky 2012).

In Chile, for instance, most studies found positive impacts of the Chilean program of extension of the school day (*Jornada Escolar Completa*) on student performance (Bellei 2009; Marín 2006; Valenzuela 2005).[16] Arzola (2010) is an exception.[17]

[14] Some international studies on this topic are Baker *et al*. (2004) and Lavy (2010). Both studies use cross-country data to investigate the relation between instructional time and student performance. However, as mentioned before in our review, we will focus on studies that use microdata.

[15] Some studies investigate effects on other socioeconomic outcomes such as crime rates, adolescent motherhood and labor market outcomes (see Berthelon and Kruger 2010; Contreras, Cabreara, and Sepúlveda 2010; Pires and Urzua 2011).

[16] Pires and Urzua (2011) use a retrospective survey applied to individuals aged 25 to 30 to assess the impact of the Chilean full-time school program on learning outcomes. Their findings show that the extension of school day during high school increased student academic achievement, measured by tests taken during adulthood.

[17] Although all studies exploit data from Education Quality Measurement System (SIMCE)Arzola (2010) analyzed a different time-period than the other two studies (focusing on the period 2005–9 instead of 2001–3). Llambí (2013) also evaluated the Chilean program of extension of the school day and found mixed results, depending on the econometric method used.

In Uruguay, a study of the impact of full-time schooling on student standardized test scores showed that students in socially vulnerable schools increased their test scores by 0.007 of a standard deviation per year in mathematics for participation in the full-time school program (see Cerdan-Infantes and Vermeersch 2007). The impact was 0.04 of a standard deviation in language. In Colombia, Hincapié (2013) evaluated the impact of longer school days on average test scores of students from the fifth and ninth grades and found positive effects on both language and mathematics.

This paper is related more closely to the literature investigating the impacts of the extension of the school day for Brazil. Previous studies looking at impacts of Brazilian programs of full-time schooling also found mixed results. Oliveira (2010) evaluates the impact of extending the school day from four to five hours a day, comparing Brazilian public schools with different school hours. She finds that the extension of school hours led to an increase of 0.2 standard deviation in mathematics scores. Aquino and Kassouf (2011) examine the effects of a state-level full-time schooling program (*Programa Escola de Tempo Integral*) in São Paulo on average scores in mathematics and Portuguese. Results showed no significant improvement in academic achievement of students that attended the program when compared with those that attended regular education.

Mendes (2011), Pereira (2011), and Xerxenevsky (2012) found different impacts of *Mais Educação* on Portuguese and mathematics test scores. Like us, Mendes (2011) evaluated the nationwide impact of *Mais Educação* on educational student outcomes. She exploited propensity score matching to investigate the short-term causal effects of extension of the school day on student achievement for students in the fifth and ninth grades of public primary schools in Brazil, measured by *Prova Brasil* 2009 test scores. The paper finds no statistically significant effect of *Mais Educação* on the academic achievement of students in Portuguese and a significant decrease in the mathematics test scores. The paper found a positive impact of *Mais Educação* on pass rates, which could explain the negative effect on mathematics scores, under the assumption it was due to a reduction of dropout rates and so to the maintenance of academically weaker students.

The other studies look at the state level impacts of *Mais Educação*, but again results are mixed. Pereira (2011) looks at the impact of *Mais Educação* on student achievement in Minas Gerais. The study found no significant effect of extension of the school day on Portuguese and mathematics scores. Xerxenevsky (2012) estimated the impact of *Mais Educação* in Rio Grande do Sul. For treated schools, in the fifth grade a positive and statistically significant effect was found on Portuguese test scores. The impact is greater for schools that started the program in 2008 and had a longer exposure to the program. However, in mathematics scores the effect of the program was negative in the fifth grade. No significant results on test scores were seen for the ninth-grade students.

Our study also relates to the literature assessing the impact of full-time schooling on enrollment and dropout rates. This literature also found mixed results. Llach, Adrogué, and Gigaglia (2009) evaluated the impact of a reform that increased daily school hours in

primary schools in Buenos Aires (Argentina) on completion rates. The paper found that students who attended full-time primary schools had a secondary school completion rate 21 percent higher than those who attended schools that had a shorter day. Aquino and Kassouf (2011) analyzed the effects of a full-time schooling policy in São Paulo (*Programa Escola de Tempo Integral*) on schools' average pass rates for ninth-grade students and found no effect on schools' pass rates. Mendes (2011) found a positive impact of *Mais Educação* on pass rates nationwide, but Pereira (2011) found that, in Minas Gerais, *Mais Educação* reduced dropout rates but had no significant effect on pass rates.

Many authors argue that existing evidence on the impacts of full-time schooling are mixed because of the stark differences in how schools use the additional time. *Mais Educação* contains several extra activities selected by schools, including pedagogical monitoring, sports activities, and culture and arts. We summarize next the papers looking specifically at the impact of offering these activities in the additional school hours.

Although schools enrolled in *Mais Educação* can choose which activities to provide to their students, it is mandatory to select at least one activity focused on pedagogical support, choosing only the subject for mentoring. Kraft (2013) estimated the effect of additional time in school used for daily tutorials on 10th-grade student achievement in a charter school in Boston. The results show that tutorials integrated into the school day increased student performance in English and the arts by 0.15 to 0.25 standard deviations per year, but no effect was found on mathematics. In Chicago, Matsudaira (2008) and Jacob and Lefgren (2004) found positive impacts of remedial courses on student scores.[18] In Italy, De Paola and Scoppa (2014) found a positive impact of remedial courses on the number of credits earned by participant students, as well as a negative impact on dropout rates.

Studies looking at the impact of extra school hours dedicated to sports activities on learning and attendance measures, found, generally, positive impacts on educational outcomes. For example, Lipscomb (2007), McNaughten and Gabbard (1993), and Shephard et al. (1994), found positive effects of these activities on student educational outcomes in Canada and United States. In contrast, Klaveren and Witte (2014) evaluated the impact of providing additional hours of soccer activities in the Netherlands and found no significantly improvement in student achievement, measured by their performance in mathematics and reading exams.

In addition to full-time schooling, *Mais Educação* provides meals to its students during the added hours, which alone could bring beneficial results for vulnerable students. The evidence to date suggests that this type of policy produces positive impacts on attendance but not on student learning (McEwan 2012; Powell et al. 1998).

In sum, the economic literature found distinct effects of full-time schooling on educational outcomes, depending on the country's educational background,

[18] They exploit discontinuities in the probability of entering in these courses around the cutoff.

characteristics of each program, outcome variables evaluated, or the specific scores analyzed. Like ours, most of the papers exploit quasi-experimental approaches although few rely simultaneously on propensity score matching and on differences-in-differences methods.

Our report contributes to this literature on extension of the school day in several ways. First, *Mais Educação* is a flagship program in Brazil, but to our knowledge, only one nationwide rigorous evaluation has been made of its impact on educational outcomes (Mendes 2011).[19] Our report differs from Mendes (2011) because we exploit a longer period (2007–11), allowing us to analyze the program impacts in the medium term, using a differences-in-differences matching estimator to compare schools that take up the program with schools that did not take up the program, before and up to three years after implementation. This methodology allows us to better account for the possible endogeneity of the "treatment" variable and its correlation with school unobserved characteristics. Moreover, we have more detailed information about the program (such as spending per student, percentage of students in each school participating in the program, and type of extra activities chosen by each school), so we also add to the literature by conducting a detailed investigation regarding the impacts' variation according to a range of characteristics and nuances of the program implementation. Also, because of the greater richness of our data set, the present study was able to verify the hypothesis stated in Mendes (2011) that part of the reason for the lower observed mathematics achievements following program implementation were driven by the lower dropout rates. In this analysis, we find that this is not the case because dropout rates are not affected on average.

3. The Federal Program *Mais Educação*

Mais Educação is a federal initiative to promote full-time schooling among Brazilian public schools. The program promotes the extension of the school day to at least seven hours a day.[20] The average daily duration of school day in Brazilian public schools has been 4.5 hours,[21] and so the extension of the school day promoted by *Mais Educação* represents an increase of more than 50 percent in instructional time. The ultimate goal of the program is to improve schooling outcomes among public schools, reducing evasion and dropout rates, and improving learning.[22]

Mais Educação promotes the extension of the school day through financial support to schools, enabling them to implement extra activities during the extended time.

[19] To our knowledge, other existing rigorous evaluations only look to state results of *Mais Educação.*

[20] Seven hours a day is the minimum period considered full-time education by the federal government.

[21] We calculate average duration of school day using the 2007 School Census.

[22] Additional goals of *Mais Educação* are to provide educational services for students with special educational needs, prevent and combat violence against children and teenagers, promote cultural diversity in public schools, encourage human development, citizenship, and solidarity through sports and other leisure activities, and create a closer bond between families/communities and schools.

The program finances[23] some of the costs associated with the extension of school day, such as payment of the assistants responsible for the extra activities, material required for program activity development, and school meals provided to students in extra class hours.[24] Federal transfers are granted annually, and schools have some autonomy on how to spend these resources. The amount assigned to each school will depend on the total number of students participating in the program, the number of teachers/assistants, and the selected extracurricular activities.

Mais Educação targets public schools at the state, municipal, and federal levels and covers primary and secondary schools,[25] focusing on fifth- and ninth-grade students,[26] which are the grades with higher dropout rates. MEC selects which schools may voluntarily join. Selection criteria include minimum number of students enrolled in the school, schools with low IDEB and/or located in areas of social vulnerability, and participation in the program in the previous year. Although no major changes exist in the overall targeting of these criteria, they are somewhat fuzzy, in the sense of not following strict rules or cutoffs de facto. The most relevant exception is in regard to the criteria of municipal population and urbanization, which have been significantly modified over the period.[27]

Schools enrolled in *Mais Educação* can choose which activities to provide to their students. MEC recommends that schools select activities according to their current educational project. Schools may select three or four fields of knowledge,[28] each comprising five or six activities.[29] The program is multisector,[30] containing activities related to a wide range of areas. Available fields of knowledge are pedagogical support (including mathematics, Portuguese, sciences, etc.); environmental education; sports and leisure; human rights education; culture and arts; digital inclusion; health, nutrition, and prevention; communication and media use; science education; civics; economic

[23] Program funding occurs through PDDE *(Programa Dinheiro Direto na Escola)*.
[24] PNAE (*Programa Nacional de Alimentação Escolar*) transfers resources for students' meals in a fixed amount for each student participating in the program.
[25] In 2008, only primary schools could adhere to *Mais Educação*. In 2009 the program was extended to secondary schools. However, even with this expansion, the focus of *Mais Educação* remained schools with fifth and ninth grades, because these are the grades with higher dropout rates.
[26] Basic education in Brazil includes early childhood education, primary and secondary levels. Primary school is compulsory for children between the ages of 6 and 14. There are nine years of schooling in basic education.
[27] Selection criteria for school enrollment between 2008 and 2011 were the following: signing the "*Compromisso Todos pela Educação*", participating in *Programa Dinheiro Direto na Escola* (PPDE) on a regular basis, having a minimum of 100 students enrolled, participation in *Mais Educação* in the previous year, having a low IDEB and/or located in areas of social vulnerability, and being capitals or cities of metropolitan regions. Municipal population criteria were the following: in 2008, cities larger than 200,000 inhabitants; in 2009, cities larger than 50,000 inhabitants; in 2010, cities larger than 90,000 inhabitants; and in 2011, cities larger than 18,844 inhabitants.
[28] In 2008, it was possible to choose only three fields of knowledge.
[29] In 2008 the minimum number of activities was three; and in 2009 the maximum was 10 activities.
[30] The program is jointly conducted by the Ministry of Education, Ministry of Social Development and Hunger Alleviation, Ministry of Sport, Ministry of Culture, Ministry of the Environment, Ministry of Science and Technology, National Youth Secretariat, and Ministry of Defense.

education; and creative economy.[31] Even though it is mandatory that the pedagogical support field is chosen by all schools, schools can then choose the specific subjects of the extracurricular supported activities (either Portuguese, mathematics, sciences). Activities can be carried out inside or outside the school area, often by establishing partnerships with NGOs or public/private entities.

Not all students within each participating school are necessarily part of *Mais Educação*. Student participation depends on his or her interests and on criteria used by the school for student participation, which may differ across schools. We note that each school can select which and how many students will participate in *Mais Educação* in a given year. Although each school is free to set its own student selection criteria, MEC provides general guidance on student selection, which focuses on students with disadvantaged backgrounds and/or with a higher probability of dropping out.[32] In general, the majority of students enrolled in a participating school end up joining the program. Data from MEC and INEP show that between 2008 and 2011 the average share of participating students per school is 77 percent and the median is 82 percent.

The program began in 2008 and has expanded gradually since then. Table 1 reports the coverage of *Mais Educação* nationwide and by regions between 2008 and 2011, with the number of schools enrolled in *Mais Educação* and the share of participating schools in Brazilian public schools.[33] Results show great heterogeneity in the proportion of participating schools across regions. For example, in 2011, the year with maximum program coverage over the analyzed period, whereas in the Midwest 11.2 percent of the public schools were enrolled in *Mais Educação*, in the Northeast this percentage was only 5.2 percent. Wide variation is also seen in program coverage over time. In 2008, 1,380 schools were enrolled in *Mais Educação*, with 924,584 students participating in the program. A great expansion of the program's coverage occurred, reaching 12,294 schools or 6.2 percent of the total number of Brazilian public schools in 2011 and 11.1 million students. The expansion in program's coverage between 2008 and 2011 was accompanied by a large increase in the resources transferred to schools. A significant increase is also seen in the transfer per student over the period, increasing from R$31.6 per student to R$74.8 per student.

4. Methodology

[31] Fields of knowledge changed slightly over the years. In some editions of the program, not all fields were available, but notable differences were not seen from one year to another.

[32] Criteria for selection of students suggested by MEC were the following: students who are at risk and/or social vulnerable, students with high levels of age-grade distortions; students from the final grades of the first and second cycles of basic education (fifth and ninth grades) where the dropout rates are higher and beneficiaries of *Bolsa Família* (Brazilian conditional cash transfer program).

[33] The share of schools enrolled in *Mais Educação* is the total number of schools participating in the program divided by the total number of public schools registered in the school census in the previous year. We exclude from the sample private schools.

We compare the performance of schools participating in *Mais Educação* to nonparticipating schools before and after the program implementation. Treated schools in our main sample are the schools that joined *Mais Educação* in 2008 and remained in the program until 2011. To select the control group, we used a sample of schools that until 2011 had not yet joined *Mais Educação*. Schools that joined the program only during 2009, 2010, and 2011 were excluded from this sample.[34]

The problem with this simple comparison across groups is that participation in the program is limited (schools are preselected by MEC) and voluntary. It is thus likely that both schools and students will be different depending on whether they participate in the program. Moreover, as schools must meet certain criteria to join the program, schools will surely differ in these features. This is a well-known problem in the empirical literature of program evaluation (see Mayer 1994). To minimize it, we exploit the propensity score matching methodology. This implies that among the eligible schools in the control group, we chose those schools similar in several observable characteristics to treatment schools, using their estimated implicit probability of participation. In addition, we exploit the fact that we can observe the same school over time and compare the change in educational outcomes between 2007 and 2011 across schools, for treatment and control schools.

Matching techniques consist in grouping treated units with nontreated units that are similar in terms of observable characteristics and thus construct a control group that properly represent what would happen to the treated if they were not enrolled in the program. Formally, under the assumption of conditional independence $(Y_{1i}, Y_{0i}) \perp T_i \mid X_i$, we have that $E(Y_0 \mid T = 1, X) = E(Y_0 \mid T = 0, X)$.

When we include a large number of variables in *X,* or continuous or multidimensional variables in *X,* it becomes increasingly difficult to match on *X.* Rosenbaum and Rubin (1983) prove that the assumption of conditional independence is valid if we condition on the estimated probability of participation in the program (called the propensity score). The use of the propensity score solves the problem of dimensionality of matching techniques.

This matching technique is called propensity score matching and has the following identifying assumptions: (1) conditional independence, $(Y_{1i}, Y_{0i}) \perp T_i \mid p(X_i)$; and (2) the hypothesis of common support, $0 < p(X_i) < 1$, where $p(X_i) = Prob\,(T_i = 1 \mid X_i)$. In practice, the conditional independence hypothesis means that we cannot have unobservable factors affecting participation in *Mais Educação*, such as self-selection of

[34] We compared schools that exited the program between 2008 and 2011 to schools that joined *Mais Educação* in 2008 and remained until 2011 (see table A2). In the fifth grade, from the subsample of schools that joined *Mais Educação* in 2008 and had no missing information, 88 percent remained in the program until 2011. In the ninth grade, this percentage was 82 percent. In 2007 schools that quit *Mais Educação* had, on average, a lower IDEB, and a higher percentage of them were state schools. In the fifth grade, remaining schools are similar to those that left *Mais Educação*, while in the ninth grade remaining schools are slightly different from those that quit the program.

schools or unobservable targeting criteria. The common support hypothesis requires that in the propensity score distribution we use a region where the estimated probabilities of participating in *Mais Educação* are similar in participating and nonparticipating schools.

The combination of conditions (1) and (2) is known as strong ignorability. Equation (3) below uses the result where, under ignorability, the independence between the potential results and the choice of treatment is maintained only when conditioned to the propensity score (Rosenbaum and Rubin 1983). That is, in subpopulations with the same *p(X)* value, the explanatory variables are independent of the choice of treatment and therefore cannot cause bias. In this study, this condition can be written as

$$(Y_1, Y_0) \perp T | X, 0 < Prob(T = 1|X) < 1 \qquad (3)$$

where *Y* represents outcome variables (Portuguese and mathematics test scores, dropout rates); *T* is a dummy that equals one if school joined *Mais Educação*, and zero otherwise; and *X* is a vector of pretreatment observable variables.

In practice, however, true *p(X)* is not known, so we must estimate a model for it. The *p(X)* function was estimated from a Probit model where the dependent variable is a binary *Mais Educação* participation indicator, and the control variables are schools and municipalities characteristics in 2007, before the policy's first implementation. Based on the estimated *p*-score ($\hat{p}(X)$) we performed matching with the nearest-neighbor method. We used matching with a single neighbor and with replacement; that is, we can consider the same control school in several matching cases with treatment schools. We also used the common support condition that restricts the sample of units in the control group to only those that are comparable with the treatment group (Caliendo and Kopeinig 2008; Dehejia and Wahba 2002).

We first estimate the propensity score using a Probit regression in which the binary variable *Mais Educação* is a dependent variable. In the Probit model, we assume that the probability of participating in *Mais Educação* assumes the following model:

$$Prob\ (Mais\ Educação = 1 \mid X) = \Phi\ (XB) \qquad (4)$$

where Φ (·) denotes the standard normal cumulative distribution function; all of the variables are as defined earlier, and *X* is a set of observable characteristics, including a set of variables used to select schools such as municipal population and a municipal measure of social vulnerability (measured by the *Índice de Desenvolvimento Humano Municipal* [IDHM]) and, at the school level, IDEB and total number of student enrollments. It also includes educational outcomes of students before the program was taken up (mathematics and Portuguese test scores and dropout rates in 2007) and changes between 2005 and 2007 (i.e., the pre-intervention trends in test scores).

In addition, we controlled for several school characteristics that could influence their decision to participate in *Mais Educação*, including the number of employees and whether the school has a sports court or a library and a science lab. We also controlled

for the fact that treatment and control schools may both have participated in previous full-time school initiatives. For that, we included in the Probit regression two variables, duration of school day and share of full-time classes, to capture respectively the average duration of the school day in a school and the percentage of classes in a school considered as full-time education (school day with seven hours' duration or more). Although the average school day in Brazilian schools remained stable between 2007 and 2011, the percentage of schools with full-time classes increased throughout the period.

The main reduced form of the equation is given by

$$Y_{it} = \beta_0 + \beta_1 D2011_t + \beta_2 (Mais\ Educação_i \times D2011_t) + S_i + \varepsilon_{it} \qquad (5)$$

where *Y* is the outcome of interest (*Prova Brasil* test scores or dropout rates) at the school level, *D2011* is a dummy variable that assumes a value of one for 2011 and zero for 2007, and S_i are school fixed effects. We estimate equation (5) with weighted least squares, where the weights are given by propensity score matching weights. All the standard errors ε_{it} are clustered at the school level to allow for serial autocorrelation of the errors over time. Standard error ε_{it} includes time-varying unobserved factors. If these unobserved time-varying factors are correlated with the treatment, this could bias the estimated results. The main coefficient of interest is β_2, which captures the average impact of the program on a range of school outcomes. The regression results in the report will always be presented separately across two different samples, the fifth and the ninth grades.

We define variable *Mais Educação* assuming a value of one for the set of schools that joined the program in 2008 and that remained in the program until 2011. We selected schools that joined the program in 2008 because these schools had a longer exposure time to the program. We note that the school selection criteria of a minimum municipal population changed over time,[35] so analyzing schools that joined the program in the following years could lead to different results.

We also note that our final reduced form equation compares participating and nonparticipating schools in *Mais Educação*, before and after the intervention is implemented, which is similar to a differences-in-differences matching estimator. The method of differences-in-differences compares treatment and control groups in terms of change in results over time, based on results observed in a period before the intervention. The method assumes unobserved heterogeneity in program participation, but that these factors are time invariant and not correlated with treatment over time. According to Khandker, Koolwall, and Samad (2010), the main advantage of this methodology is to relax the conditional independence assumption or selection on observables. The main identifying hypothesis of the differences-in-differences estimator is that the dependent variables follow a parallel time trend for the group of treated and untreated schools. We compare schools that joined *Mais Educação* with nonparticipating schools, but not all

[35] In 2008 the municipal population had to be larger than 200,000 inhabitants, whereas in 2011 the population cutoff was 18,844 inhabitants.

students of treated schools participated in the program (on average, about 80 percent of school students participated in *Mais Educação*). Thus, our estimated result relates to the program effect when only some students receive the treatment. Despite the selection criteria of students suggested by MEC, we have no available information to identify which students are participating in the program, and so we do not know their precise characteristics.

Often *Mais Educação* integrates with other subnational policies promoting the extension of the school day in municipal and state public schools. Unfortunately, because of data limitation, this is something we cannot control for. However, results from qualitative studies show that often these programs are implemented simultaneously. Therefore, our results may be capturing the impacts of other state- or municipal-level programs, implemented simultaneously with *Mais Educação*. However, for policy purposes, we maintain that our estimates are still very meaningful. Because *Mais Educação* aims at being a policy inductor, raising the demand for complementary subnational full-time education policies, it is legitimate to capture these correlated impacts and interpret them as being also part of the main impact of the federal program. No national record exists for these educational policies, but this mapping is part of our future research agenda.

We also estimate the average effect of the program in the short term for two school samples: (a) schools that joined *Mais Educação* in 2008 and remained in the program until 2011, for which we compare short-term performance in educational outcomes between 2007 and 2009; and (b) schools that joined the program in 2010 and remained until 2011, for which we compare the short-term educational performance of schools between 2009 and 2011, nearly one year after the program's implementation. The short-term estimates follow the same methodology used in the medium-term analysis, and the reduced form equation is analogous to the reduced form presented in equation (5). For sample (a) t = 2007, 2009, and for sample (b) t = 2009 and 2011.

In addition, for schools that joined *Mais Educação* in 2008, we also test the heterogeneity of the results depending of a number of program implementation characteristics captured by variable *Z*:

$$Y_{it} = \beta_0 + \beta_1 D2011_t + \beta_2 D2009_t + \beta_3 (Mais\ Educação_i \times D2011_t) + \beta_4 (Mais\ Educação_i \times D2009_t) + \beta_5 Z_{it} + S_i + \varepsilon_{it} \quad (6)$$

where Z is the heterogeneity variable (such as spending per student and program coverage). In this specification we use information for all available years (2007, 2009, and 2011), and so we add two temporal dummy variables: *D2011* is a dummy variable that assumes a value of one for 2011 and zero otherwise, *D2009* is a dummy variable that assumes a value of one for 2009 and zero otherwise, and the other variables are as defined above.

5. Data and Sample

5.1. Data

We exploit different sources of school-level data. We exploit school census data between 2007 and 2011. The school census is conducted annually by MEC-INEP[36] and focuses on basic education offered by both private and public schools. In particular, we exploit data on school characteristics and student enrollments. Our sample includes only schools from the regular educational system. Private schools and schools that were not operating in a given year were excluded from our sample. We also excluded schools offering specialized education for children with disabilities.

We use administrative data from MEC/FNDE[37] to gather information on schools enrolled in *Mais Educação* between 2008 and 2011. In particular, we identify for each school the program's total costs, divided into variable costs (e.g., payments to tutors, meals, transportation), fixed costs (e.g., related to inputs/materials and school buildings), and fields of knowledge selected in each school, as well as the number of students enrolled in the program. An important drawback in MEC/FNDE's dataset is that it provides the year that each school joined *Mais Educação,* but there is no information on when exactly the program's activities actually began. In our analysis, we assume a one-year lag between schools' entering the program and the actual implementation of *Mais Educação.* Nevertheless, it is important to stress that the difference in exposure time among schools can lead to heterogeneous impacts, especially in the short-term analysis.

In addition, we exploit the demographic census, collected by the *Instituto Brasileiro de Geografia e Estatística* (IBGE) in 2010 and data provided by *Instituto de Pesquisa Econômica Aplicada* (IPEA), to capture characteristics of the municipalities (IDHM), population, etc.[38] We have information only from the demographic census in 2010, and so we used population estimates for the other analyzed years (2007–11), calculated by IBGE.

We measure educational outcomes using three different data sets. First, we measure student academic achievement in Portuguese and mathematics with a national standardized test, *Prova Brasil*. *Prova Brasil* is a census evaluation of public primary school students from the fifth and ninth grades. Implemented in 2005, the evaluation takes place every two years. We thus will exploit the data for 2005, 2007, 2009, and 2011. In our main sample, we exclude schools in rural areas,[39] because it is not possible to gather information about their student scores in *Prova Brasil* over the analyzed period (2005–11).[40] Second, to measure the quality of education in a broader way, we use the Basic

[36] Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (INEP).
[37] Fundo Nacional de Desenvolvimento da Educação (FNDE).
[38] UNDP Atlas (2013) aggregates census data by municipality, and this dataset will be used in the analysis.
[39] In the short-term analysis, when estimating the average impacts for the sample of schools that joined the program in 2010, rural schools are included.
[40] Although in 2005 the sample of schools evaluated in *Prova Brasil* included only urban schools, with at least 30 students enrolled in each of the grades assessed, from 2007 on some rural public schools started participating in the evaluation, but only students enrolled in the fifth grade. In 2009 *Prova Brasil* began to

Education Development Index (IDEB). IDEB was created in 2007 by INEP and compiles in a single index the average scores obtained by students on standardized evaluations and the school flow.[41] The index is calculated using data from the school census and *Prova Brasil,*[42] and it is available at the school, municipal, and state level. This variable is used at the school level, for the years 2005, 2007, 2009, and 2011. Finally, we look at dropout rates at school level, provided by INEP; these data are available from 2007 to 2011. In our analysis, we focus on dropout rates in the first and second cycles of primary schools (first to fifth grade and sixth to ninth grades, respectively).

Our empirical analysis also looks at the heterogeneity of impacts across a number of program characteristics, such as *Mais Educação* coverage at the school level (percentage of students benefiting from the extended day), spending per student, and main thematic areas of activities available in the program. We compute spending per student using administrative data from MEC on the total financial transfer to the school divided by the number of students in the school participating in the program. Schools' thematic areas are also provided by MEC/FNDE. The program's coverage is calculated by dividing the total number of students enrolled in *Mais Educação* in a given year, gathered from MEC, by the total number of enrollments in school census in the previous year.[43]

We also assess whether the impacts of the program differ substantially depending on where the school is located, analyzing characteristics such as city population (IBGE), city GDP per capita (*Instituto de Pesquisa Econômica Aplicada* [IPEA]), and city spending on education and culture (National Treasury Secretariat). All these variables are available at the city level in IPEADATA. All nominal monetary variables are deflated by the IPCA[44] consumer price index.

Our final sample includes only schools that have information for the main variables of interest, listed in table A1 over the period 2007–11. Thus, our study uses a subsample of the schools that are actually participating.[45] Table A3 summarizes the characteristics of schools that joined *Mais Educação* in 2008 and remained until 2011 but have missing information for selected variables and were thus removed from the analysis. The table compares them to treated schools used in our analysis. In general, excluded schools had similar school infrastructure (library, basic sanitation, sports court, etc.) but presented worse educational outcomes, that is, lower test scores and higher dropout rates. If schools with initially higher performance students benefit more from the extension of

include the ninth grade of rural public schools. Hence, in our sample we exclude rural schools because it is not possible to follow the evolution of their student test scores between 2005 and 2011.

[41] School flow is the progression of students in school grades at any given level of education. In IDEB it is measured by pass rates.

[42] For schools and municipalities, IDEB uses *Prova Brasil*, but at the state level and nationwide SAEB is used instead.

[43] Reported number of enrollments in schools that joined *Mais Educação* considers the school census of the previous year.

[44] *Índice Nacional de Preços ao Consumidor Amplo* (IPCA).

[45] For the sample schools that joined the program in 2010 and remained until 2011, we exploit the sample of participating schools that have information for all variables of interest in the period 2009–11.

the school day, our results may be overestimating the program's impacts. However, if students with lower educational backgrounds are the ones who benefit more from *Mais Educação*, our results may be underestimating the impacts. The results reported in section 7.3 suggest that the first scenario is actually more likely. If anything, our results could be overestimating the average impact of the program, because students who benefit the most from the intervention are those with a better educational background.

5.2. Descriptive Statistics

Table 2 reports the difference across schools that joined *Mais Educação* and all the nonparticipating schools in our sample for the three main outcome variables of interest: results in *Prova Brasil* for Portuguese and mathematics and dropout rates.

Results show that schools selected into the program have lower average scores in mathematics and Portuguese and higher dropout rates when compared to nonparticipating schools. In the fifth grade, the gap between these schools in *Prova Brasil* test scores increased over the analyzed period, while dropout rates in treated schools decreased at higher rates. In the ninth grade, the difference in mathematics and Portuguese test scores remained stable over the years, and a higher decrease was seen in dropout rates in schools enrolled in *Mais Educação*.

However, this simple comparison does not imply any causality. As discussed above it is very likely that *Mais Educação* schools are very different from all other schools. In particular, in table 3 we present the characteristics of the schools that joined the program in 2007 before *Mais Educação* began. The main point of this table is to show that as of 2007, schools that joined *Mais Educação* in 2008 and remained in the program throughout 2011 were already substantially different from schools that did not join the program in a number of observable characteristics of interest.

Part of this difference may be related to the school voluntary participation. Furthermore, MEC defines certain criteria for school selection. In particular, it requires that schools that enroll have a minimum of 100 students, are schools with low IDEB and/or located in areas of social vulnerability, and are schools located in cities with more than 200,000 inhabitants. Hence, as expected, before the beginning of the program, treated schools had worse educational outcomes and higher enrollments and were located in bigger cities. However, between 2005 and 2007, treated schools had a greater improvement in educational outcomes, with higher increases in IDEB and *Prova Brasil*'s scores. Schools that will participate in *Mais Educação* have initially higher enrollments, and so they also have a higher number of employees, classrooms, computers, and some other facilities. In addition, nonparticipating schools had in 2007, on average, a slightly longer school day.[46]

[46] In 2010 *Mais Educação* selection criteria were the same, except for the population criterion, which was schools located in cities with more than 50,000 inhabitants. Hence, as expected, before the beginning of the

6. Propensity Score Matching and Sample Balancing

6.1. Propensity Score Matching

This section reports the results of estimating equation (4) with Probit methodology using data for 2007.[47] The results of the estimation are reported in table 4. Using these results, we compute the propensity score for schools to join *Mais Educação*. This propensity score is important because we do not know the true likelihood of schools taking up the program, and this likely varies depending on a number of school characteristics and will be correlated also with the educational outcomes at the school level in which we are ultimately interested.

Results show that schools with larger enrollments and lower IDEB Index have higher probabilities of participating in *Mais Educação*. Meanwhile, even if one of the program's selection criteria is that schools are located in cities with more than 200,000 inhabitants, *ceteris paribus*, municipal population decreases schools' propensity score. Although the estimated probability of a school joining *Mais Educação* is negatively associated to duration of the school day, it increases with the percentage of full-time schooling classes. Also, schools with lower average mathematics test scores and higher dropout rates have higher propensity scores. Nevertheless, schools' average Portuguese test scores are positively associated with the probability of adhesion to *Mais Educação*. Changes in IDEB and in mathematics scores between 2005 and 2007 have positive effects on the propensity score, and changes in Portuguese test scores have a negative effect.

6.2. Sample Balancing

Table 5 reports the differences in the characteristics of treatment and control schools as of 2007, after matching, weighted by propensity score matching weights. Student's *t* tests were performed to detect the mean differences of the variables between the two groups (control and treatment) after matching. If the quality of the matching is good, we expect a lack of statistically significant differences in these results. Indeed, compared to table 3, table 5 suggests a good balance in observable characteristics across treatment and control schools after matching, with few characteristics having statistically

program, schools that joined *Mais Educação* in 2010 had worse educational outcomes and higher number of enrollments and were located in bigger cities. Nevertheless, between 2007 and 2009, treated schools improved their educational outcomes, with higher increases in IDEB and *Prova Brasil*'s test scores (see table A4).

[47] For schools that joined *Mais Educação* in 2008 and remained until 2011, in our short-term analysis we use the same control group selected by propensity score matching in the medium-term analysis. Thus, in the short-term analysis for the 2008 sample the results of the estimation of the propensity score are reported in table 4. For schools that joined *Mais Educação* in 2010 and remained until 2011, a sample of schools used only in the short-term analysis, the results of the estimation of the propensity score are reported in table A5.

significant mean differences across the treatment and control groups in the fifth- and ninth-grade samples. After matching, schools in the control group are closely similar to treated schools. Table 5 shows that in the fifth grade, significant differences are found at a 5 percent level only in the following characteristics: municipal population, basic sanitation, kindergarten classes, and use of an overhead projector. Treated schools are located in bigger cities, and a higher percentage of them have kindergarten classes, an overhead projector, and appropriate basic sanitation. For the ninth grade, treated and control schools have more differences. Schools participating in *Mais Educação* have a higher number of students enrolled and more employees, a lower percentage of them have proper basic sanitation and a science lab, and a higher percentage provide meals to their students. Between 2005 and 2007, treated schools had a greater improvement in educational outcomes (IDEB, *Prova Brasil*'s test scores).

Most importantly, in figures 1 and 2 we report the trends in the outcomes for treatment and control, for the fifth- and ninth-grade school samples respectively. Results are reassuring and show are no major differences across the two groups in the pretreatment period, which suggests that the likelihood of having unobserved characteristics affecting the growth of learning variables in treatment and control schools is reduced. In figure 1 Portuguese and mathematics test scores in the fifth grade followed parallel trends for treatment and controls groups before the implementation of *Mais Educação,* when comparing 2005 and 2007. After the beginning of the program (2008), *Prova Brasil'*s scores started to follow different trends, with the control group having a better learning performance. For the dropout rate variable, no comparable data are found for 2005. Thus, we cannot verify the trend of this outcome before the program implementation. For the ninth grade, figure 2 shows that treated and control schools had similar average scores in Portuguese and mathematics before the beginning of the program, although they followed slightly different trends from 2005 to 2007. Portuguese scores followed similar trends all over the period (from 2005 to 2011), with both groups having similar levels in 2011. Until 2007, mathematics test scores were similar in treatment and control schools, but since 2009 control schools achieved higher levels on these test scores. Dropout rates followed parallel trends in treatment and control groups from 2007 to 2011.

Additionally, figures 3 and 4 show the kernel density of the propensity score for participating and nonparticipating schools after the propensity score matching. In both the fifth- and ninth-grade samples, treated schools and the control group selected by matching have a very similar propensity score distribution.

7. Average Impacts of *Mais Educação* on School Outcomes

7.1. Medium-Term Effects: Comparing 2007 and 2011

Table 6 reports the average impacts of participating in *Mais Educação* on school outcomes for the fifth- and ninth-grade school samples. The estimated impact in our analysis relates to the average impact on the educational outcomes of participating schools and can vary within each school according to the characteristics of participating students. Because there is no available information on which students within each school joined the program, we cannot estimate student average impact. The impacts are obtained by estimating equation (5) in our main school sample, where treatment schools are those that joined *Mais Educação* in 2008 and remained until 2011. We compare school results in 2007 (before program implementation) with the 2011 school outcomes (three years after treated schools joined the program).

For the sample of fifth-grade schools, we find no statistically significant effect of *Mais Educação* on Portuguese test scores or dropout rates. However, we see a negative impact of the program on mathematics test scores. The estimated effect of *Mais Educação* on mathematics scores is a decrease of 3.4 points, representing a 2 percent decrease when compared to 2007 average scores. The impacts of *Mais Educação* on ninth-grade outcomes followed the same pattern. Although no impacts of the program on dropout rates or Portuguese scores are seen, we find a consistent and negative effect of *Mais Educação* on mathematics test scores. Quantitatively it is a decrease of 3.8 points (which is equivalent to 1.7 percent of the average scores as of 2007). These negative impacts on learning suggest that the implementation of the program could imply disruptions in participating schools in the very short term, possibly changing students' and teachers' studying and teaching habits as the school day gets extended (see Fundação Itaú Social and World Bank 2015). Hence, it is possible that as the program is consolidated and improves its implementation, program impacts will improve, eventually reducing, in the long run, the negative impact on mathematics achievement. It is also possible that the negative impacts on learning are driven by a change in the composition of the students, although the lack of impacts on the dropout rates makes this argument less likely.

7.2. Short-Term Effects: Comparing 2009 and 2011

In table 7 we analyze the short-term impacts of *Mais Educação* by comparing the performance of schools between 2007 and 2009.[48] For the fifth-grade students, Panel A shows no significant impacts of the program on dropout rates or Portuguese scores. Nevertheless, when compared to the medium-term impact, in the short term we find a

[48] In the short-term analysis, we used the sample of schools that joined *Mais Educação* in 2008 and remained until 2011. Thus, the control group was the same used in the medium-term analysis selected using the propensity score, described in section 6.

greater negative impact on mathematics achievement. Treated schools showed a four-point decrease in mathematics scores (equivalent to a 2.2 percent decrease in comparison with 2007 scores). This result is statistically significant at a 5 percent level. Results are similar for the ninth grade, with a 5.3-point decrease in mathematics scores, significant at a 1 percent level, and no impact on Portuguese scores or dropout rates. Although it is hard to know the reasons, we conjecture that the greater impacts in the short term relate to challenges in the initial implementation of the program nationwide and possibly with the impacts of this different structured approach on the habits of students, teachers, and schools. However, over the years, as the program is consolidated and improves implementation, it is possible that impacts will improve, reducing the negative effect on student achievement.

To check whether the results could be driven by the fact that the program was just starting to be implemented, we also look at the short-term impacts of *Mais Educação* for schools that joined the program only in 2010 and remained until 2011. This contrasts with the previous sample of schools that entered the program in 2008 and remained until 2011.[49] We assess the impact of joining *Mais Educação* in 2010 or 2011 on school outcomes, comparing 2009 to 2011 school outcomes. We exploited the same methodology presented in section 4 (i.e., propensity score matching) and a reduced form equation analogous to equation (5). The results, reported in table 8, show no statistically significant impact on dropout rates and Portuguese test scores for the ninth- and fifth-grade students, and for the fifth grade, the negative impact of *Mais Educação* on mathematics test scores tends to be smaller. In addition, for the ninth-grade sample of schools, no statistically significant impacts are seen on mathematics achievement. This can be related to improvements in implementation of the program or to differences in the characteristics of schools that joined the program in 2010, when compared to schools that joined *Mais Educação* in 2008.

To sum up, our analysis shows that in the medium term *Mais Educação* has a negative average impact on mathematics scores and no average impact on either Portuguese test scores or dropout rates. Average negative impacts of the program are stronger in the short term and for schools that joined the program in 2008 (when compared to the short-term impacts in schools that joined *Mais Educação* in 2010), suggesting that challenges in the initial implementation of the program nationwide may fade over time. In addition, it is possible that participation in *Mais Educação* increased student participation in *Prova Brasil* assessments.[50] If participation in the *Mais Educação* program promotes students with worse performance to stay longer in school and actually

[49] Tables A5 and A6 and figures A2 to A5 show the propensity score estimation, as well as the sample balancing for this sample. These results reported in the annex ensure no major differences in control and treatment groups in the 2010 sample.

[50] In the fifth-grade sample of schools, treated schools had a greater increase in the percentage of students taking *Prova Brasil* assessments between 2007 and 2009, and for the sample of ninth-grade schools, the percentage of students taking *Prova Brasil* fell in participating schools between 2009 and 2011, while it remained stable in the control group. Nevertheless, we do not have enough information to conclude that these trends are an impact of *Mais Educação*.

conduct the student assessments in *Prova Brasil*, this student composition effect could explain part of the negative impacts of the program found on mathematics results. It is unlikely, however, that this is a significant effect given the no impact of the program in the dropout rates.

Because of a large heterogeneity in Brazilian performance across students, schools, and municipalities, it is interesting to analyze how impacts of the program differ by school and municipal characteristics. Moreover, because of the large autonomy given to participating schools in the use of financial resources, such as activities offered and the percentage of participating students within each school, it is important to check whether the impact of the program differs according to these implementation characteristics. It is of course true that many of the characteristics related to the chosen activities are particularly susceptible to endogeneity, which we unfortunately cannot account for. However, the methodology we exploit—propensity score matching—allows us to control for some observable factors affecting the likelihood of a school choosing a given extra activity: for instance, if a school that has a sports court is more likely to choose sports activities than others.

7.3. Heterogeneity of Impacts

This section assesses whether the medium-term impact of the program differs by selected implementation characteristics that we can observe in our data (student program coverage, spending per student, and selected fields of knowledge) or by differences in the cities where schools are located (GDP per capita, municipal population, and spending on education and culture). We estimate the reduced form equation (6), reported in section 4. In all estimations, we use our main sample: schools that joined *Mais Educação* in 2008 and remained in the program until 2011, comparing 2007 to 2011 outcomes.

Table 9 reports the impacts of *Mais Educação* on school outcomes depending on the degree of program coverage (the percentage of students in the school participating in the program), for fifth and ninth grades, in Panels A and B, respectively. Results show that the medium-term impact of *Mais Educação* on educational outcomes is not affected by the program's coverage in schools.

Table 10 reports the results of estimating equation (6) when the variable Z is the average spending per student. As mentioned above, we compute the spending per student dividing the total financial transfer from MEC/FNDE by the number of participating students at the school level. Panel A reports the results for fifth grade and Panel B for the ninth grade. In the fifth grade, we see a negative impact of the spending per student on dropout rates, which is statistically significant at a 10 percent level. For each R$100/student transferred to schools participating in *Mais Educação*, *ceteris paribus*, we find a reduction of 1 percentage point on dropout rates. The average spending per student between 2008 and 2011 was about R$60, which leads on average to a reduction of 0.6 percentage point on dropout rates. In table 2 we see that the average dropout rate in 2007

was 5.9 percent, and thus the reduction by 0.6 percentage point represents a 10 percent decrease. For the ninth-grade sample, we find no heterogeneous effects of spending per student on educational outcomes.

We also analyze the heterogeneity of impacts of the program by a number of municipal characteristics: city GDP per capita, city spending on education and culture, and total city population. Table 11 reports the heterogeneous impacts for the city GDP per capita. For the sample of fifth-grade schools, we find that the higher the GDP per capita, the greater the effect of the program on mathematics scores. In addition, the higher the city GDP per capita, the higher the impact of the program on dropout rates. For the ninth grade, we see no heterogeneous impacts of the program by the city GDP per capita. In addition, the results reported in tables A7 and A8, show no heterogeneous effects on educational outcomes by the other municipal characteristics analyzed (population and spending on education and culture) for either the fifth or the ninth grade.

Next, we assess the program's impact depending on the fields of activity selected by each school. As described in section 3, *Mais Educação* offers schools the choice of selecting among several possible activities. We have grouped them into six categories: Portuguese pedagogical support, mathematics pedagogical support, sports activities, culture and arts, digital inclusion, and environmental education. Schools can select which activities to provide, choosing between three or four fields of knowledge, each comprising five or six activities. To investigate whether a school's choice of activity matters, we divided our main sample into subsamples of schools that selected each field of knowledge. Our subsamples contain schools that have offered activities (one or more) belonging to each field in at least three out of the four years in the period 2008 to 2011. We estimate equation (5) separately for each of these six subgroups, and the results are reported in tables 12 to 15. For each of these subsamples, we estimated the propensity score and selected a control group among nonparticipating schools, using the same previous propensity score matching methodology (see section 4 for details).

Pedagogical support must be one of the fields chosen by schools as one of the fields of knowledge, but schools can choose in which subjects they offer pedagogical support (Portuguese, mathematics, sciences, history, etc.). Table 12 presents the results for schools that chose Portuguese activities for pedagogical support. In the fifth grade, those schools show a negative effect of *Mais Educação* on Portuguese and mathematics test scores. Impacts in this subsample are more negative than the program's average impact. For the ninth grade, in schools that chose Portuguese activities we see no statistically significant effects of *Mais Educação* on educational outcomes. Table 13 shows no impact of *Mais Educação* on educational outcomes in the subsample of schools that chose pedagogical support in the mathematics field, for either the fifth or the ninth grade.

In table 14, for the group of schools that chose sports activities, we find a negative impact of *Mais Educação* on mathematics test scores. In the fifth grade, we also see a negative effect on Portuguese scores. These effects are statistically significant

at a 10 percent level. These negative effects on student achievement may be due to the substitution of hours of study or other academic activities for sports activities. It is also plausible, however, that taking up these activities produces positive impacts on nonobservable outcomes, such as students' health, or in other competencies such as ability to work in teams.

In table 15 we present the results for schools that selected culture and arts as one of the fields of knowledge. Panel A shows a negative impact of participation in the program on mathematics achievement in the fifth grade, but Panel B shows no effect on mathematics scores in the ninth grade. No impacts are found on dropout rates or in Portuguese test scores for both grades. The other thematic areas available were not chosen for a large number of participating schools. We present the results for schools that chose environmental education or digital inclusion in the annexes (tables A9 and A10). For these schools, we see no significant effects of *Mais Educação* on any of the school outcomes.

Finally, we look at whether the impacts of the program vary according to the educational background of students. We divided schools into groups according to the prior distribution of dependent variables (in 2007) and verified the effect of *Mais Educação* on these variables in 2011 for each of these groups. Before estimating equation (5) for these treated schools, we matched them to a group of similar nonparticipating schools also using the methodology of propensity score matching described in section 4. Tables 16 to 18 present these results.

Regardless of schools' previous performance on Portuguese test scores, no impact of *Mais Educação* on Portuguese achievement is seen. Nevertheless, when analyzing mathematics educational background of schools, we note no effect of the program in schools with best previous performance. Meanwhile, for schools with worse previous performance in this subject, we find a negative impact of *Mais Educação* on mathematics achievement.

When separating schools by levels of dropout rates before the program, we found in the fifth grade a positive impact of *Mais Educação* on dropout rates in schools that already had higher dropout rates. For schools with medium or low dropout rates in 2007, we find no impact on this response variable. Impacts on dropout rates for the ninth grade do not vary according to the previous distribution of this outcome.

8. Conclusion

This paper is to our knowledge the first evaluation assessing the impact of *Mais Educação* on different educational outcomes in both the short and medium term. The *Mais Educação* program is an initiative of the federal government of Brazil and aims at improving school outcomes through a longer school day based on a diverse set of activities and curriculum. The extended school day can be offered inside or outside the

school. We assess the average impact of the program on student learning (measured by *Prova Brasil*'s test scores) and on school dropout rates. We exploit administrative data sets on the program implementation and merge these with the Brazilian school census, comparing schools that voluntarily joined the program with schools that are reasonably similar in several observable characteristics but that did not join the program. To match treatment and control schools we exploit the propensity score matching methodology. We contrast the results before and after the program's implementation across the two groups of schools, treatment and control schools, all of which are in urban areas of Brazil.

The results show that participation in *Mais Educação* has, on average, no statistically significant impacts on school dropout rates and Portuguese test scores and produces average negative impacts on mathematics test scores in these schools. The negative effect on the mathematics learning assessment is stronger in the short term than in the medium term. In addition, the negative impacts are greater for schools that joined *Mais Educação* early on, in 2008, than for schools that joined the program later (in 2010, after it had been implemented in 396 municipalities). Taken together this evidence suggests different implementation challenges of applying a new school model to students and teachers, likely influencing student studying and teaching habits, and eventually replacing home studies. All these factors probably have influenced the impacts of the program in the initial phase of the program. Thus, as the program consolidates over the years, impacts may improve and the negative effect on student learning achievement on mathematics may be reversed. The establishment of more assertive and structured guidelines to schools along with close program monitoring would likely improve the program's implementation and effectiveness (Fundação Itaú Social and World Bank 2015).

We also find that the impact of *Mais Educação* differs depending on some school and city characteristics related to program implementation. For the sample of schools with fifth grades, the impacts are different depending on the type of courses used to extend the school day, the average per student spending, or city per capita GDP. In particular, we find a negative impact of increasing the per student spending on average school dropout rates. We also find that schools choosing Portuguese activities for pedagogical support and/or sports have a larger negative effect on both Portuguese and mathematics test scores. Finally, the program tends to produce less negative impacts on mathematics test scores in wealthier cities (measured by cities with a higher GDP per capita). On the other hand, in wealthier cities *Mais Educação* has a positive impact on dropout rates.

It is worth highlighting that our study assesses only the impacts of the program on educational outcomes. However, as described in Almeida et al (2015), the goals of *Mais Educação* are broader, aiming to promote a more comprehensive/integral educational program. Other studies have evaluated the impacts of full-time school programs on socioeconomic outcomes, such as their impacts on teenage pregnancy or on crime. The evidence suggests that full-time schooling programs do tend to reduce crime rates and the probability of becoming an adolescent mother and to increase female labor force participation (see Berthelon and Kruger 2010; Contreras, Cabrera, and Sepúlveda 2010).

Therefore, the establishment of more assertive and structured guidelines to schools along with close program monitoring would likely improve the program's implementation and effectiveness (Fundação Itaú Social and World Bank 2015).

One caveat of our report is that we focus only on the sample of schools that joined *Mais Educação* in 2008 and remained in the program until 2011. It is possible that impact evaluation of different samples of participating schools, for longer and more recent periods, could lead to different results. Another caveat, largely driven by the lack of data, is that our results reference schools' average impact. It is plausible that the impacts of the program vary within each school according to the characteristics of participating students. It is also possible that, if *Mais Educação* actually increased student participation on *Prova Brasil* assessments, the negative impacts could at least in part be driven by this composition effect, especially if the program increased participation of the most vulnerable students. Unfortunately, no data are at hand allowing us to fully test this hypothesis, but the lack of results on the dropout rates suggest this effect is not quantitatively strong. Finally, it is possible that time-varying unobserved variables are correlated with the outcomes of interest (such as changes in directors or teachers' characteristics), which could affect the estimated results.

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Table 1: Total schools enrolled in *Mais Educação* between 2008 and 2011

	2008	2009	2010	2011
	(1)	(2)	(3)	(4)
North	163	879	1,301	1791
	0.6%	3.1%	4.5%	6.1%
Northeast	791	1,893	3,511	4,770
	0.9%	2.1%	3.9%	5.2%
Southeast	207	1,105	3,066	3,544
	0.4%	2.1%	5.7%	6.6%
South	99	326	1,034	1,792
	0.4%	1.3%	4.1%	7.1%
Midwest	120	437	745	1,027
	1.4%	4.9%	8.2%	11.2%
Total	1,380	4,640	9,657	12,924
	0.7%	2.3%	4.7%	6.2%

Source: MEC/FNDE and School Census (INEP), 2008–2011.

Note: Table reports the total number of schools enrolled in *Mais Educação* between 2008 and 2011 in different regions and nationwide. Percentages show the share *Mais Educação*'s schools represent on the region's public schools and nationwide. We calculate the percentages by dividing the number of schools enrolled in *Mais Educação* by total public schools by regions and nationwide, using school census. Column (1) presents data for the year 2008, (2) for 2009, (3) for 2010, and (4) for 2011.

Table 2: Average student performance for participating and nonparticipating schools

	Schools in *Mais Educação*		Nonparticipating Schools		Mean differences between groups	
	2007	2011	2007	2011	2007	2011
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Averages for schools with fifth grades						
Portuguese grade	164	179	176	192	−11.9***	−13.3***
Mathematics grades	180	195	194	212	−14.2***	−17.6***
Dropout rates	5.9	3.1	2.1	1.1	3.8***	1.97***
No. observations	611	611	17263	17263		
Panel B: Averages for schools with ninth grade						
Portuguese grades	222	233	230	241	−8.4***	−8.6***
Mathematics grades	230	236	243	249	−13.4***	−13.1***
Dropout rates	12.0	7.2	5.2	3.6	6.8***	3.6***
N	555	555	13404	13404		

Sources: Prova Brasil and INEP.

Note: Table reports the average students' performance (*Prova Brasil*'s test scores and dropout rates) for the schools that joined *Mais Educação* in 2008 and remained until 2011 (columns (1) and (2)) and for nonparticipating schools (columns (3) and (4)). Columns (5) and (6) report the mean differences of the variables between the two groups. *T* tests were performed to detect the mean differences of the variables between the two groups. *significant at 10%; **significant at 5%; ***significant at 1%. Panel A reports these statistics for the schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample.

Table 3: Average school characteristics in 2007 (before the matching) by treatment status

Variable	Panel A: Fifth-grade schools			Panel B: Ninth-grade schools		
	Schools in *Mais Educação* (2008–2011)	Nonparticipating Schools	Difference (1)−(2)	Schools in *Mais Educação* (2008–2011)	Nonparticipating Schools	Difference (4)−(5)
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Portuguese grades	1.0	1.0	0.0	5.0	3.4	1.6***
Δ Mathematics grades	10.5	8.6	1.9***	1.6	1.0	0.6
IDEB Index	3.5	4.3	-0.8**	2.9	3.8	-0.9***
Δ IDEB	0.4	0.3	0.1**	0.3	0.2	0.2***
Municipal population	1,180,426	788,482	391,943***	1,364,439	777,606	586,833***
Students' enrollments	924	593	331***	1159	849	310***
IDHM	0.8	0.7	0.0**	0.8	0.7	0.0***
Urban	1.0	1.0	0.0	1.0	1.0	0.0
Basic sanitation	1.0	1.0	0.0***	1.0	1.0	0.0***
Library	0.8	0.6	0.1***	0.9	0.8	0.1***
Sports court	0.5	0.5	0.0	0.7	0.7	-0.1***
Number of classrooms	13.0	10.8	2.2***	14.3	12.7	1.6***
Number of computers	0.9	0.9	0.1***	1.0	0.9	0.0**
Science lab	0.1	0.1	0.0***	0.3	0.3	0.0
Computer lab	0.5	0.4	0.1***	0.6	0.7	-0.1***
Teachers room	0.9	0.8	0.1***	1.0	0.9	0.0***
DVD	0.9	0.9	0.0*	0.9	0.9	0.0
Overhead projector	0.7	0.6	0.1***	0.9	0.9	0.0**
Number of employees	65.3	44.8	20.5***	76.2	60.1	16.0***
School meals	0.9	1.0	0.0***	0.9	1.0	0.0***
Number of classrooms used	13.6	10.7	2.9***	14.4	12.5	1.9***
Morning lessons	0.5	0.6	-0.1***	0.5	0.6	-0.1***
Child care	0.0	0.0	0.0*	0.0	0.0	0.0***
Kindergarten	0.4	0.4	0.0	0.2	0.2	-0.1***
State schools	0.3	0.3	0.0	0.6	0.7	-0.1***
High school	0.1	0.1	0.0*	0.4	0.5	-0.1***
Share classes in school with full-time day (7 or more hours)	0.0	0.0	0.0	0.0	0.0	0.0
Total duration of school day (hours)	4.3	4.4	-0.1***	4.3	4.5	-0.2***
N	611	17,263		555	13,404	

Sources: Prova Brasil, School Census, and INEP.

Note: Table reports the average characteristics in 2007 for the schools that joined *Mais Educação* in 2008 and remained until 2011 (columns (1) and (4)) and for nonparticipating schools (columns (2) and (5)). Columns (3) and (6) report the mean differences of the variables between the two groups. *T* tests were performed to detect the mean differences of the variables between the two groups. *significant at 10%; **significant at 5%; ***significant at 1%. Panel A reports these statistics for the schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample.

Table 4: Estimation of propensity score, using pretreament data (2007)

	Panel A: Fifth-grade schools		Panel B: Ninth-grade schools	
	Coefficient	*P* value	Coefficient	*P* value
	(1)	(2)	(3)	(4)
Δ Portuguese grade	-0.02	0.00	-0.02	0.00
Δ Mathematics grade	0.04	0.00	0.02	0.00
Portuguese grade	0.03	0.00	0.04	0.00
Mathematics grade	-0.05	0.00	-0.05	0.00
Dropout rate	0.04	0.00	0.00	0.73
IDEB Index	-1.02	0.00	-1.34	0.00
Δ IDEB	0.48	0.00	1.09	0.00
Municipal population	0.00	0.00	0.00	0.00
Students' enrollments	0.00	0.00	0.00	0.00
IDHM	19.11	0.00	17.32	0.00
Urban	0.33	0.58	-0.65	0.06
Basic sanitation	-1.10	0.00	-1.13	0.01
Library	0.16	0.02	0.29	0.00
Sports court	-0.06	0.30	-0.17	0.02
Number of classrooms	-0.05	0.00	-0.04	0.00
Number of computers	0.19	0.07	0.08	0.60
Science lab	0.12	0.17	0.10	0.19
Computer lab	-0.15	0.01	-0.24	0.00
Teachers room	0.29	0.00	0.23	0.16
DVD	0.12	0.24	-0.09	0.44
Overhead projector	-0.01	0.92	0.03	0.76
Number of employees	0.00	0.45	0.00	0.35
School meals	-0.21	0.06	-0.02	0.89
Number of classrooms used	0.03	0.00	0.00	0.66
Morning lessons	-0.60	0.00	-0.50	0.02
Child care	0.14	0.33	0.67	0.00
Kindergarten	-0.11	0.06	-0.14	0.11
State schools	-0.27	0.00	-0.23	0.01
High school	-0.48	0.00	-0.43	0.00
Share classes in school with full-time day (7 or more hours)	2.51	0.00	3.77	0.00
Total duration of school day (hours)	-0.38	0.00	-0.67	0.00
Intercept	-5.80	0.00	-2.24	0.02
Number of observations	17874		13959	
Pseudo-R^2	0.48		0.53	

Sources: MEC/FNDE, *Prova Brasil,* School Census, and INEP.

Note: Propensity score was computed by estimating a Probit model (equation (4) in the paper) where the dependent variable is a dummy variable for schools that registered in *Mais Educação* in 2008 and remained until 2011. Our control group is the schools that, by 2011, had not yet joined *Mais Educação.* Schools that joined the program in 2009, 2010, and 2011 were excluded from the sample to define the control group. Table reports the estimated coefficients (columns (1) and (3)) and *p* values (columns (2) and (4)). Panel A reports these statistics for schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample.

Table 5: Sample balancing after matching—Average school characteristics in 2007, by treatment status

	Panel A: Fifth-grade schools			Panel B: Ninth-grade schools		
	Schools in *Mais Educação* (2008−2011)	Control group	*P* value	Schools in *Mais Educação* (2008−2011)	Control group	*P* value
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Portuguese grades	1.04	0.950	0.91	5.04	3.27	0.03**
Δ Mathematics grades	10.49	11.357	0.24	1.68	-0.19	0.01**
Portuguese grades	164	165	0.37	222	222	0.62
Mathematics grades	180	181	0.25	230	229	0.25
Dropout rates	5.89	6.72	0.08*	11.71	11.45	0.65
IDEB Index	3.51	3.50	0.91	2.87	2.80	0.14
Δ IDEB	0.36	0.43	0.06*	0.34	0.27	0.05*
Municipal population	1,200,000	850,000	0.00***	1,400,000	1,400,000	0.92
Students' enrollments	924	850	0.06*	1,160	1,084	0.01**
IDHM	0.76	0.75	0.11	0.76	0.76	0.39
Urban	1.00	1.00	0.16	0.99	1.00	0.18
Basic sanitation	0.98	1.00	0.01***	0.99	1.00	0.03**
Library	0.75	0.73	0.33	0.88	0.88	0.71
Sports court	0.55	0.55	0.91	0.69	0.74	0.07*
Number of classrooms	13.02	12.50	0.21	14.33	14.38	0.87
Number of computers	0.92	0.94	0.19	0.96	0.98	0.08*
Science lab	0.14	0.16	0.38	0.27	0.33	0.03**
Computer lab	0.50	0.45	0.06*	0.57	0.54	0.30
Teachers room	0.90	0.88	0.28	0.97	0.98	0.08*
DVD	0.90	0.92	0.37	0.92	0.94	0.34
Overhead projector	0.74	0.69	0.04**	0.88	0.90	0.38
Number of employees	65.29	62.73	0.38	76.27	69.96	0.0***
School meals	0.92	0.93	0.52	0.92	0.88	0.03**
Number of classrooms used	13.57	12.79	0.10	14.46	14.49	0.94
Morning lessons	0.53	0.53	0.60	0.51	0.50	0.66
Child care	0.04	0.04	0.56	0.03	0.03	0.86
Kindergarten	0.40	0.35	0.04**	0.21	0.21	0.94
State schools	0.27	0.23	0.09*	0.59	0.63	0.19
High school	0.09	0.08	0.40	0.41	0.41	0.85
Share classes in school with full-time day (7 or more hours)	0.02	0.03	0.50	0.01	0.01	0.88
Total duration of school day (hours)	4.31	4.34	0.53	4.30	4.30	0.83
Number of observations	611	385		546.00	319.00	

Sources: MEC/FNDE, INEP, *Prova Brasil,* and School Census.

Note: Table reports the average characteristics for the schools that joined *Mais Educação* in 2008 and remained until 2011 (columns (1) and (4)) and for the control group selected by propensity score matching (columns (2) and (5)). Columns (3) and (6) report the *p* value of the *t* test performed to check mean differences of the variables between the two groups. *significant at 10%; **significant at 5%; ***significant at 1%. In control group, the means are weighted using propensity score matching weights. Panel A reports these statistics for the schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample. Our sample include only schools that have information for all variables over all the analyzed period.This table compares treated to control schools in 2007, after propensity score matching.

Table 6: Medium-term impacts of *Mais Educação* on educational outcomes

Dependent variable	Dropout rates	Test score Math	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	1.265	−3.374*	−2.086
	(1.522)	(1.725)	(1.568)
R^2	0.686	0.817	0.823
Observations	1,992	1,992	1,992
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	−0.292	−3.821*	−0.664
	(1.265)	(2.011)	(1.898)
R^2	0.749	0.792	0.798
Observations	1,730	1,730	1,730
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, Prova Brasil, School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the program until 2011. This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper, where the dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* and in column (3) Portuguese grades in Prova Brasil. Panel A reports these estimates for the schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample. All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights.

Table 7: Short-term impacts of *Mais Educação* on educational outcomes

Dependent Variable:	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2009	1.057	−3.953**	−2.482
	(1.283)	(1.664)	(1.544)
R^2	0.796	0.807	0.809
Observations	1,992	1,992	1,992
Dummy year 2009	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2009	−0.137	−5.305***	−2.351
	(1.100)	(1.889)	(1.872)
R^2	0.81	0.818	0.797
Observations	1,730	1,730	1,730
Dummy year 2009	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the program until 2011. This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper, replacing the 2011 dummy variable by the 2009 year dummy variable. The dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **denotes significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for the schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 8: Short-term impacts of *Mais Educação* on educational outcomes for schools that joined in 2010

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	0.064	–1.431**	–0.676
	(0.164)	(0.710)	(0.653)
R^2	0.749	0.864	0.850
Observations	7,536	7,536	7,536
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–0.238	–0.682	–0.775
	(0.290)	(0.727)	(0.781)
R^2	0.796	0.847	0.804
Observations	6,886	6,886	6,886
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2010 and remained in the program until 2011. This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper. The dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for the schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 9: Heterogeneous impacts of *Mais Educação* by student coverage in the program

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	1.270	–6.231**	–5.135**
	(1.482)	(2.651)	(2.317)
Dummy *Mais Educação* * year 2009	1.063	–7.433**	–6.195**
	(1.391)	(3.003)	(2.654)
Dummy Mais Educação * *ME* student coverage	–0.00744	3.935	4.199
	(0.930)	(3.021)	(2.701)
R^2	0.666	0.786	0.789
Observations	2,988	2,988	2,988
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	0.948	–2.853	–1.009
	(1.494)	(2.414)	(2.486)
Dummy *Mais Educação* * year 2009	1.275	–4.202*	–2.744
	(1.474)	(2.510)	(2.682)
Dummy *Mais Educação* * *ME* student coverage	–1.855	–1.448	0.516
	(1.495)	(2.589)	(2.903)
R^2	0.736	0.755	0.741
Observations	2,595	2,595	2,595
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the program until 2011. This table reports coefficients from the ordinary least squares estimation of equation (6) in the paper. The dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for the schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 10: Heterogeneous impacts of *Mais Educação* by spending per student in school

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	1.932	–3.686**	–2.178
	(1.364)	(1.798)	(1.612)
Dummy *Mais Educação* * year 2009	1.579	–4.197**	–2.554*
	(1.144)	(1.628)	(1.487)
Dummy *Mais Educação* * *ME* spending per student	–0.0100*	0.00468	0.00137
	(0.00586)	(0.0176)	(0.0148)
R^2	0.667	0.786	0.789
Observations	2,988	2,988	2,988
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–0.822	–3.677*	–0.614
	(1.146)	(1.896)	(1.857)
Dummy *Mais Educação* * year 2009	–0.549	–5.193***	–2.312
	(0.994)	(1.741)	(1.729)
Dummy *Mais Educação* * *ME* spending per student	0.00820	–0.00222	–0.000773
	(0.00522)	(0.0125)	(0.0129)
R^2	0.736	0.755	0.741
Observations	2,595	2,595	2,595
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the program until 2011. Spending per student was deflated by IPCA, and is in 2007 prices. This table reports coefficients from the ordinary least squares estimation of equation (6) in the paper. The dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for the schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 11: Heterogeneous impacts of *Mais Educação by* city GDP per capita

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	0.703	–4.761***	–2.673*
	(1.353)	(1.711)	(1.530)
Dummy *Mais Educação* * year 2009	0.854	–4.453***	–2.694**
	(1.119)	(1.477)	(1.368)
Dummy *Mais Educação* * GDP per capita	0.199**	0.491*	0.208
	(0.0914)	(0.265)	(0.221)
R^2	0.667	0.786	0.789
Observations	2,988	2,988	2,988
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	-0.758	-4.376**	-1.834
	(1.198)	(1.914)	(1.912)
Dummy *Mais Educação* * year 2009	-0.313	-5.514***	-2.792*
	(0.970)	(1.664)	(1.674)
Dummy *Mais Educação* * GDP per capita	0.169	0.201	0.423
	(0.151)	(0.285)	(0.337)
R^2	0.736	0.755	0.742
Observations	2,595	2,595	2,595
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the program until 2011. GDP per capita was deflated by IPCA, and is in 2007 prices. This table reports coefficients from the ordinary least squares estimation of equation (6) in the paper. The dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for the schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 12: Medium-term impacts of *Mais Educação* on educational outcomes for schools opting for the Portuguese activity

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	0.157	–4.370**	–2.955*
	(0.829)	(1.764)	(1.666)
R^2	0.716	0.829	0.825
Observations	1,494	1,494	1,494
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–0.200	–1.022	0.107
	(1.350)	(2.223)	(2.461)
R^2	0.766	0.786	0.77
Observations	1,200	1,200	1,200
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined Portuguese activity in 2008 and remained in the activity until 2011. Pedagogical monitoring must be chosen by schools as one of the fields of knowledge, but schools can choose for which subjects they offer pedagogical support (Portuguese, mathematics, sciences, history, etc.) This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper, where the dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 13: Medium-term impacts of *Mais Educação* on educational outcomes for schools opting for the mathematics activity

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	0.864	–1.395	–0.770
	(1.355)	(1.914)	(1.783)
R^2	0.701	0.808	0.807
Observations	1,162	1,162	1,162
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	0.342	-3.386	0.111
	(1.375)	(2.117)	(2.199)
R^2	1,108	1,108	1,108
Observations	0.709	0.787	0.775
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined mathematics activity in 2008 and remained in the activity until 2011. Pedagogical monitoring must be chosen by schools as one of the fields of knowledge, but schools can choose for which subjects they offer pedagogical support (Portuguese, mathematics, sciences, history, etc.) This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper, where the dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 14: Medium-term impacts of *Mais Educação* on educational outcomes for schools that chose sports activities field

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	–0.126	–5.468***	–3.804**
	(0.702)	(1.952)	(1.820)
R^2	0.732	0.825	0.836
Observations	1,476	1,476	1,476
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	0.120	–4.185*	–2.121
	(1.401)	(2.204)	(2.000)
R^2	0.728	0.773	0.787
Observations	1,238	1,238	1,238
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined sports and activities field in 2008 and remained in the activity until 2011. This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper, where the dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil,* and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 15: Medium-term impacts of *Mais Educação* on educational outcomes for schools that chose culture and arts field

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	0.432	–4.559**	–2.563
	(0.991)	(1.865)	(1.651)
R^2	0.703	0.809	0.819
Observations	1,688	1,688	1,688
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–0.00425	–3.045	–0.194
	(1.030)	(2.174)	(2.025)
R^2	0.745	0.779	0.784
Observations	1,340	1,340	1,340
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined culture and arts field in 2008 and remained in the activity until 2011. This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper, where the dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil* , and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 16: Medium-term impacts of *Mais Educação* on 2007 Portuguese test scores

Dependent variable	High Portuguese test scores in 2007	Medium Portuguese test scores in 2007	Low Portuguese test scores in 2007
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	–2.153	–3.266	–2.458
	(3.357)	(2.047)	(2.070)
R^2	0.816	0.801	0.798
Observations	624	732	760
Dummy year 2011	YES	YES	YES
School fixed effects	YES	YES	YES
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–5.676	–2.510	–1.999
	(4.287)	(2.614)	(2.451)
R^2	0.743	0.744	0.778
Observations	574	666	640
Dummy year 2011	YES	YES	YES
School fixed effects	YES	YES	YES

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the field until 2011, divided into groups according to their Portuguese achievement in 2007. This table reports coefficients from the ordinary least squares estimation of equation (1) in the paper, where the dependent variable in all columns is the Portuguese test scores. In column (1) we show results for treated schools with high Portuguese test scores in 2007, in column (2) schools with medium Portuguese test scores, and in column (3) schools with low Portuguese test scores. All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weightsts. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these

Table 17: Medium-term impacts of *Mais Educação* on 2007 Portuguese test scores

Dependent variable	High mathematics test scores in 2007	Medium mathematics test scores in 2007	Low mathematics test scores in 2007
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	–2.062	–4.549*	–3.951*
	(2.938)	(2.337)	(2.280)
R^2	0.784	0.788	0.800
Observations	612	740	766
Dummy year 2011	YES	YES	YES
School fixed effects	YES	YES	YES
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–1.819	–2.921	–4.629*
	(3.957)	(2.909)	(2.460)
R^2	0.625	0.734	0.791
Observations	584	656	670
Dummy year 2011	YES	YES	YES
School fixed effects	YES	YES	YES

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the field until 2011, divided into groups according to their mathematics achievement in 2007. This table reports coefficients from the ordinary least squares estimation of equation (1) in the paper, where the dependent variable in all columns is the mathematics test scores. In column (1), we show results for treated schools with high mathematics test scores in 2007, in column (2) schools with medium mathematics test scores, and in column (3) schools with low mathematics test scores. All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table 18: Medium-term impacts of *Mais Educação* on 2007 dropout rates

Dependent variable	High dropout rates in 2007	Medium dropout rates in 2007	Low dropout rates in 2007
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	0.614*	1.446	1.517
	(0.312)	(0.969)	(2.033)
Rsquared	0.625	0.686	0.769
Observations	780	730	642
Dummy year 2011	YES	YES	YES
School fixed effects	YES	YES	YES
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–0.448	2.059	1.472
	(0.838)	(1.519)	(3.417)
Rsquared	0.601	0.746	0.765
Observations	672	654	552
Dummy year 2011	YES	YES	YES
School fixed effects	YES	YES	YES

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the field until 2011, divided into groups according to their dropout rates level in 2007. This table reports coefficients from the ordinary least squares estimation of equation (1) in the paper, where the dependent variable in all columns is the dropout rates. In column (1) we show results for treated schools with high dropout rates in 2007, in column (2) schools with medium dropout rates, and in column (3) schools with low dropout rates. All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table A1: Main variables

Database	Source	Variable	Description
School Census	INEP	Dropout rates	Percentage of students who drop out of school in a given grade or school cycle
		Urban	Dummy variable, equals one if schools are in urban areas
		Basic sanitation	Dummy variable, equals one if schools have appropriate conditions of basic sanitation
		Library	Dummy variable, equals one if school has a library
		Sports court	Dummy variable, equals one if school has a sports court
		Number of classrooms	Number of classrooms available in the school
		Number of classrooms used	Number of classrooms used in the school
		Computers	Computers available in the school
		Science lab	Dummy variable, equals one if school has a science lab
		Computer lab	Dummy variable, equals one if school has a computer lab
		Teachers' room	Dummy variable, equals one if school has teachers rooms
		DVD	Dummy variable, equals one if school has a DVD
		Overhead projector	Dummy variable, equals one if school has an overhead projector
		School meals	Dummy variable, equals one if school provides meals to its students
		Number of employees	Number of employees working at the school
		Morning lessons	Dummy variable, equals one if schools have morning lessons
		Child care	Dummy variable, equals one if schools have child care (for babies)
		Kindergarten	Dummy variable, equals one if schools have kindergartens
		High school	Dummy variable, equals one if schools have high school
		State schools	Dummy variable, equals one for state schools
		Duration of school day	Average duration of school day in hours
		% of classes with full-time education	Percentage of classes with at least 7 hours duration of school day
		Students' enrollments	Number of students enrolled in the school in a given year
Prova Brasil	INEP	Portuguese grades	Schools' average grades in Portuguese
	INEP	Δ Portuguese grades	Difference between schools' average grades in Portuguese in t and t-1
	INEP	Mathematics grades	Schools' average grades in mathematics
	INEP	Δ Mathematics grades	Difference between schools' average grades in mathematics in t and t-1
IDEB	INEP	IDEB Index	Educational quality index, aggregating students' learning and school flow measures
Mais Educação	MEC/FNDE	*Mais Educação*	Dummy variable, equals one if schools adhered to *Mais Educação*
		Fields of knowledge	Dummy variable, indicating which fields of knowledge schools had chosen
		Activities	Dummy variable, indicating which *Mais Educação* activities are being offered
		Program's costs	Total program's costs by school, divided into fixed and variable costs
		Students enrolled in *Mais Educação*	Number of students from the school that enrolled in *Mais Educação*
IPEA		GDP per capita	Gross Domestic Production divided by population
National Treasury Secretariat		Spending on education and culture	Municipal spending on education and culture
Demographic Census	IBGE	Population	Population estimates for 2007, 2009, and 2011
	UNDP/UN	IDHM	Municipal human development index (2010)

Table A2: School Characteristics for the sample of schools that quit *Mais Educação* between 2008 and 2011

Variable	Panel A: Fifth-grade schools			Panel B: Ninth-grade schools		
	Schools in *Mais Educação* (2008–2011)	Schools dropped from *Mais Educação* between 2008 and 2011	Difference (1)−(2)	Schools in *Mais Educação* (2008–2011)	Schools dropped from *Mais Educação* between 2008 and 2011	Difference (4)−(5)
	(1)	(2)	(3)	(4)	(5)	(6)
Portuguese grade	164	162	1.6	222	221	1.0
Mathematics grade	180	178	2.0	230	229	0.6
Dropout rate	5.9	7.3	-1.4**	12.0	12.2	-0.2
Δ Portuguese grade	1.0	0.3	0.8	5.0	4.3	0.7
Δ Mathematics grade	10.5	8.8	1.7	1.6	0.8	0.8
IDEB Index	3.5	3.3	0.2**	2.9	2.6	0.2***
Δ IDEB	0.4	0.4	-0.1	0.3	0.2	0.1**
Municipal population	1,180,426	1,286,878	-106,452	1,364,439	1,558,995	-194,556**
Students' enrollments	924	999	-75	1159	1330	-171***
IDHM	0.8	0.8	0.0	0.76	0.76	0.0**
Urban	1.0	1.0	0.0**	1.0	1.0	0.0
Basic sanitation	1.0	1.0	0.0	1.0	1.0	0.0
Library	0.8	0.7	0.0	0.9	0.8	0.1**
Sports court	0.5	0.6	0.0	0.7	0.7	0.0
Number of classrooms	13.0	12.8	0.2	14.3	14.4	-0.1
Number of computers	0.9	0.9	0.0	1.0	1.0	0.0
Science lab	0.1	0.1	0.0	0.3	0.3	0.0
Computer lab	0.5	0.5	0.0	0.6	0.6	0.0
Teachers room	0.9	0.9	0.0	1.0	1.0	0.0
DVD	0.9	0.8	0.1**	0.9	0.9	0.0
Overhead projector	0.7	0.8	0.0	0.9	0.9	0.0
Number of employees	65.3	64.9	0.4	76.2	75.3	0.8
School meals	0.9	0.9	0.0	0.9	0.9	0.0
Number of classrooms used	13.6	13.7	-0.1	14.4	14.6	-0.1
Morning lessons	0.5	0.5	0.0	0.51	0.48	0.0**
Child care	0.0	0.0	0.0	0.0	0.0	0.0
Kindergarten	0.4	0.3	0.1	0.2	0.1	0.1***
State schools	0.3	0.7	-0.4***	0.6	0.9	-0.3***
High school	0.1	0.2	-0.1***	0.4	0.6	-0.2***
% of classes with full-time education	0.0	0.0	0.0	0.0	0.0	0.0
Duration of school day	4.3	4.4	-0.1	4.3	4.4	-0.1**
N	611	84		555	127	

Sources: Prova Brasil, School Census, and INEP.

Note: Table reports the average characteristics for the schools that joined *Mais Educação* in 2008 and remained until 2011 (columns (1) and (4)) and for the schools that joined the program in 2008 but left the program over the period (columns (2) and (5)). Columns (3) and (6) report the mean differences of the variables between the two groups. *T* tests were performed to detect the mean differences of the variables between the two groups. *significant at 10%; **significant at 5%; ***significant at 1%. Panel A reports these statistics for the schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample. Our sample include only schools that have information for all variables over all the analyzed period.

Table A3: Schools in *Mais Educação* in the period 2008–2011 with missing information

Variable	Panel A: Fifth-grade schools			Panel B: Ninth-grade schools		
	Schools in *Mais Educação* with complete information	Schools in *Mais Educação* with missing information	Difference (1)−(2)	Schools in *Mais Educação* with complete information	Schools in *Mais Educação* with missing information	Difference (4)−(5)
	(1)	(2)	(3)	(4)	(5)	(6)
Portuguese grade	164	163	1.0	222	218	4.3***
Mathematics grade	180	179	0.8	230	227	3.2***
Dropout rate	5.9	8.4	-2.5***	12.0	16.2	-4.2***
Δ Portuguese grade	1.0	-1.0	2.0*	5.0	3.4	1.5
Δ Mathematics grade	10.5	6.9	3.6***	1.6	1.1	0.6
IDEB Index	3.5	3.3	0.2***	2.9	2.6	0.2***
Δ IDEB	0.4	0.3	0.0	0.3	0.2	0.2***
Municipal population	1,180,426	1,051,670	128,756*	1,364,439	1,290,785	73,654
Students' enrollments	924	953	-28.8	1159	1090	68.6*
IDHM	0.8	0.7	0.0***	0.76	0.75	0.0***
Urban	1.0	1.0	0.0**	1.0	1.0	0.0
Basic sanitation	1.0	1.0	0.0	1.0	1.0	0.0
Library	0.8	0.8	0.0	0.9	0.8	0.1*
Sports court	0.5	0.6	-0.1	0.7	0.7	0.0
Number of classrooms	13.0	13.0	0.1	14.3	14.2	0.1
Number of computers	0.9	0.9	0.0	1.0	0.9	0.0*
Science lab	0.1	0.2	0.0	0.3	0.2	0.1
Computer lab	0.5	0.5	0.0	0.6	0.6	0.0
Teachers room	0.9	0.9	0.0	1.0	0.9	0.0
DVD	0.9	0.9	0.0	0.9	0.9	0.0
Overhead projector	0.7	0.8	0.0	0.9	0.9	0.0
Number of employees	65.3	66.7	-1.4	76.2	75.8	0.4
School meals	0.9	0.9	0.0	0.9	0.9	0.0
Number of classrooms used	13.6	12.7	0.9	14.4	14.4	0.0
Morning lessons	0.5	0.5	0.0	0.51	0.51	0.0
Child care	0.0	0.0	0.0***	0.0	0.0	0.0
Kindergarten	0.4	0.2	0.2***	0.2	0.3	-0.1**
State schools	0.3	0.7	-0.4***	0.6	0.5	0.1*
High school	0.1	0.4	-0.3***	0.4	0.3	0.1
% of classes with full-time ed	0.0	0.0	0.0	0.0	0.0	0.0
Duration of school day	4.3	4.3	0.0	4.3	4.3	0.0
N	611	195		555	196	

Sources: Prova Brasil, School Census, and INEP.

Note: Table reports the average characteristics for the schools that joined *Mais Educação* in 2008 and remained until 2011 that have information for all variables in 2005, 2007, 2009, and 2011 (columns (1) and (4)) and for the schools that joined *Mais Educação* in 2008 and remained until 2011 but have missing information (columns (2) and (5)). Columns (3) and (6) report the mean differences of the variables between the two groups. *T* tests were performed to detect the mean differences of the variables between the two groups. *significant at 10%; **significant at 5%; ***significant at 1%. Panel A reports these statistics for the schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample.

Table A4: Characteristics of Schools in 2009 that joined Mais Educação in 2010, by treatment status

Variable	Panel A: Fifth-grade schools			Panel B: Ninth-grade schools		
	Schools in *Mais Educação* (2010–2011)	Nonparticipating schools	Difference (1)−(2)	Schools in *Mais Educação* (2010–2011)	Nonparticipating schools	Difference (4)−(5)
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Portuguese grades	11.0	7.7	3.3***	11.5	8.4	3.0***
Δ Mathematics grades	13.2	10.6	2.6***	3.7	1.7	2.0***
IDEB Index	4.3	4.6	-0.3***	3.5	3.9	-0.4***
Δ IDEB	0.5	0.4	0.1***	0.3	0.2	0.1***
Municipal population	959,776	716,126	243,650***	1,110,275	732,763	377,512***
Students' enrollments	701	543	158***	989	752	237***
IDHM	0.7	0.7	0.0***	0.7	0.7	0.0***
Urban	1.0	0.8	0.2***	1.0	0.8	0.2***
Basic sanitation	1.0	1.0	0.0***	1.0	1.0	0.0***
Library	0.8	0.6	0.1***	0.9	0.8	0.1***
Sports court	0.6	0.5	0.1***	0.8	0.7	0.1***
Number of classrooms	11.8	10.1	1.6***	13.9	11.8	2.1***
Number of computers	1.0	0.9	0.1***	1.0	1.0	0.0***
Science lab	0.1	0.1	0.1***	0.3	0.3	0.1***
Computer lab	0.6	0.5	0.1***	0.8	0.8	0.1***
Teachers room	0.9	0.8	0.1***	1.0	0.9	0.1***
DVD	1.0	0.9	0.0***	1.0	1.0	0.0***
Overhead projector	0.7	0.6	0.1***	0.9	0.8	0.1***
Number of employees	53.8	42.7	11.1***	70.9	55.1	15.8***
School meals	1.0	1.0	-0.0	1.0	1.0	0.0
Number of classrooms used	11.7	10.2	1.5***	13.5	11.8	1.7***
Morning lessons	0.6	0.6	-0.0***	0.6	0.6	-0.0***
Child care	0.0	0.0	-0.18***	0.0	0.0	-0.0***
Kindergarten	0.4	0.4	-0.0	0.15	0.2	-0.0***
State schools	0.3	0.2	0.0*	0.60	0.6	0.0***
High school	0.1	0.1	0.0***	0.5	0.4	0.0***
Share classes in school with full-time day (7 or more hours)	0.0	0.0	0.0	0.01	0.0	0.0
Total duration of school day (hours)	4.4	4.4	-0.0	4.46	4.4	0.0*
N	2,098	23,276		1,976	18,037	

Sources: Prova Brasil, School Census, and INEP.

Note: Table reports the average characteristics in 2009 for the schools that joined *Mais Educação* in 2010 and remained until 2011 (columns (1) and (4)) and for nonparticipating schools (columns (2) and (5)). Columns (3) and (6) report the mean differences of the variables between the two groups. T tests were performed to detect the mean differences of the variables between the two groups. *significant at 10%; **significant at 5%; ***significant at 1%. Panel A reports these statistics for the schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample.

Table A5: Estimation of propensity score for schools that joined Mais Educação in 2010, using pretreament data (2009)

	Panel A: Fifth-grade schools		Panel B: Ninth-grade schools	
	Coefficient	*P* value	Coefficient	*P* value
	(1)	(2)	(3)	(4)
Δ Portuguese grade	0.00	0.63	-0.01	0.00
Δ Mathematics grade	0.01	0.00	0.01	0.00
Δ Dropout rate	0.01	0.31	0.02	0.00
Portuguese grade	0.03	0.00	0.03	0.00
Mathematics grade	-0.05	0.00	-0.02	0.00
Dropout rate	0.04	0.00	-0.02	0.00
IDEB Index	-0.94	0.00	-1.18	0.00
Δ IDEB	0.56	0.00	0.80	0.00
Municipal population	0.00	0.00	0.00	0.00
Students' enrollments	0.00	0.00	0.00	0.00
IDHM	11.26	0.00	10.51	0.00
Urban	1.13	0.00	1.10	0.00
Basic sanitation	0.18	0.44	0.13	0.66
Library	0.15	0.00	0.01	0.81
Sports court	-0.08	0.01	-0.06	0.13
Number of classrooms	-0.01	0.06	-0.01	0.16
Number of computers	0.04	0.50	0.38	0.01
Science lab	0.16	0.00	0.08	0.02
Computer lab	-0.14	0.00	-0.09	0.03
Teachers room	0.08	0.07	0.15	0.04
DVD	0.21	0.01	0.02	0.87
Overhead projector	-0.12	0.00	-0.12	0.01
Number of employees	0.00	0.00	0.00	0.00
School meals	-0.11	0.50	0.24	0.21
Number of classrooms used	-0.01	0.14	-0.02	0.00
Morning lessons	0.28	0.00	-0.06	0.48
Child care	-0.17	0.03	0.06	0.64
Kindergarten	0.03	0.39	0.04	0.41
State schools	-0.02	0.67	-0.15	0.00
High school	-0.08	0.12	-0.18	0.00
Share classes in school with f	1.40	0.00	1.07	0.00
Total duration of school day (	-0.37	0.00	-0.18	0.00
Intercept	-5.80	0.00	-6.14	0.00
Number of observations	25374		20013	
Pseudo-R^2	0.24		0.28	

Sources: MEC/FNDE, *Prova Brasil,* School Census, and INEP.

Note: Propensity score was estimated using a Probit model and 2009 data. Treated schools are the schools that joined *Mais Educação* in 2010 and remained until 2011. Our control group is the schools that, by 2011, had not yet joined *Mais Educação.* Schools that joined the program in 2009, 2010, and 2011 were excluded from the sample to define the control group. Table reports the estimated coefficients (columns (1) and (3)) and *p* values (columns (2) and (4)). Panel A reports these statistics for the schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample.

Table A6: Sample balancing after matching for school that adhered to *Mais Educação* in 2010—Average school characteristics in 2009 by treatment status

	Panel A: Fifth-grade schools			Panel B: Ninth-grade schools		
	Schools in *Mais Educação* (2010–2011)	Control group	*P* value	Schools in *Mais Educação* (2010–2011)	Control group	*P* value
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Portuguese grade	11.03	11.15	0.79	11.47	10.95	0.25
Δ Mathematics grade	13.25	13.05	0.69	3.74	3.36	0.34
Δ Dropout rate	-0.66	-0.55	0.28	-1.00	-1.08	0.64
Portuguese grade	179	179	0.29	238	238	0.77
Mathematics grade	197	197	0.83	239	239	0.68
Dropout rate	2.43	2.52	0.44	5.67	5.48	0.34
IDEB Index	4.30	4.32	0.50	3.50	3.51	0.57
Δ IDEB	0.49	0.49	0.95	0.25	0.25	0.99
Municipal population	960,000	930,000	0.68	1,100,000	1,200,000	0.43
Students' enrollments	701	683	0.18	989	1000	0.51
IDHM	0.74	0.74	0.22	0.74	0.75	0.15
Urban	0.98	0.98	0.84	0.98	0.98	0.71
Basic sanitation	1.00	1.00	0.37	1.00	1.00	0.41
Library	0.76	0.75	0.67	0.89	0.88	0.62
Sports court	0.56	0.56	0.95	0.76	0.77	0.50
Number of classrooms	11.76	11.37	0.03**	13.88	13.94	0.75
Number of computers	0.95	0.96	0.653	0.99	0.99	0.74
Science lab	0.14	0.12	0.02**	0.34	0.35	0.39
Computer lab	0.58	0.59	0.573	0.82	0.82	0.71
Teachers room	0.86	0.86	0.823	0.97	0.96	0.17
DVD	0.97	0.97	0.302	0.98	0.98	0.72
Overhead projector	0.67	0.67	0.896	0.86	0.87	0.71
Number of employees	53.80	52.08	0.06*	70.86	71.26	0.71
School meals	0.99	1.00	0.16	0.99	0.99	0.68
Number of classrooms used	11.66	11.19	0.0***	13.48	13.45	0.87
Morning lessons	0.60	0.59	0.36	0.57	0.57	0.74
Child care	0.03	0.03	0.79	0.01	0.01	0.89
Kindergarten	0.38	0.36	0.26	0.15	0.16	0.22
State schools	0.26	0.28	0.25	0.60	0.62	0.28
High school	0.12	0.13	0.37	0.47	0.49	0.16
Share classes in school with full-time day (7 or more hours)	0.02	0.02	0.72	0.01	0.02	0.28
Total duration of school day (hours)	4.36	4.35	0.48	4.46	4.48	0.39
Number of observations	2,098	1,670		1,976	1,467	

Sources: MEC/FNDE, INEP, *Prova Brasil,* and School Census

Note: Table reports the average characteristics for the schools that joined *Mais Educação* in 2010 and remained until 2011 (columns (1) and (4)) and for the control group selected by propensity score matching (columns (2) and (5)). Columns (3) and (6) report the *p* value of the *t* test performed to check mean differences of the variables between the two groups. *significant at 10%; **significant at 5%; ***significant at 1%. In control group, the means are weighted using propensity score matching weights. Panel A reports these statistics for the schools from the fifth-grade sample. Panel B reports these statistics for schools from the ninth-grade sample. Our sample include only schools that have information for all variables over all the analyzed period.This table compares treated to control schools in 2009, after propensity score matching.

Table A7: Heterogeneous impacts of *Mais Educação* by municipal spending on education and culture

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	1.119	–3.974**	–1.987
	(1.325)	(1.553)	(1.413)
Dummy *Mais Educação* * year 2009	0.974	–4.292***	–2.426*
	(1.114)	(1.465)	(1.358)
Mais Educação * spending on education and culture	0.00272	0.0112	–0.00186
	(0.00207)	(0.00776)	(0.00680)
R^2	0.666	0.786	0.789
Observations	2,988	2,988	2,988
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–0.296	–3.636**	–0.311
	(1.125)	(1.808)	(1.692)
Dummy *Mais Educação* * year 2009	–0.140	–5.194***	–2.140
	(0.968)	(1.663)	(1.647)
Mais Educação * spending on education and culture	8.26e-05	–0.00331	–0.00633
	(0.00413)	(0.00877)	(0.00840)
R^2	0.736	0.755	0.741
Observations	2,595	2,595	2,595
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the program until 2011. Municipal spending on education and culture was deflated by IPCA, and is in 2007 prices. This table reports coefficients from the ordinary least squares estimation of equation (6) in the paper. The dependent variable is in column (1) is Portuguese grades in *Prova Brasil,* in column (2) mathematics grades in *Prova Brasil,* and in column (3) dropout rates. All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for the schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table A8: Heterogeneous impacts of *Mais Educação* by city size

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	1.151	–3.476**	–2.259*
	(1.321)	(1.498)	(1.361)
Dummy *Mais Educação* * year 2009	0.922	–4.074***	–2.689**
	(1.112)	(1.462)	(1.348)
Mais Educação * log(city population)	5.197	4.678	7.956
	(3.378)	(10.93)	(10.57)
R^2	0.667	0.786	0.789
Observations	2,988	2,988	2,988
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	–0.297	–3.852**	–0.766
	(1.097)	(1.746)	(1.649)
Dummy *Mais Educação* * year 2009	–0.148	–5.373***	–2.572
	(0.963)	(1.661)	(1.650)
Mais Educação * log(city population)	0.382	2.410	7.768
	(5.569)	(10.34)	(11.34)
R^2	0.736	0.755	0.741
Observations	2,595	2,595	2,595
Dummy year 2009	Yes	Yes	Yes
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined *Mais Educação* in 2008 and remained in the program until 2011. Municipal population variable is in log. This table reports coefficients from the ordinary least squares estimation of equation (6) in the paper. The dependent variable is in column (1) is Portuguese grades in *Prova Brasil,* in column (2) mathematics grades in *Prova Brasil,* and in column (3) dropout rates. All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for the schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample. City size is captured by city population.

Table A9: Medium-term impacts of *Mais Educação* on educational outcomes for schools that chose digital inclusion field

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	0.404	–1.927	–1.860
	(0.862)	(1.967)	(1.900)
R^2	0.702	0.817	0.814
Observations	978	978	978
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	-0.139	-2.015	-0.414
	(1.783)	(2.131)	(2.052)
R^2	0.694	0.804	0.807
Observations	916	916	916
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

Note: Treatment group are schools that joined digital inclusion field in 2008 and remained in the activity until 2011. This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper, where the dependent variable is in column (1) is dropout rates, in column (2) mathematics grades in *Prova Brasil* , and in column (3) Portuguese grades in *Prova Brasil.* All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

Table A10: Medium-term impacts of *Mais Educação* on educational outcomes for schools that chose environmental education field

Dependent variable	Dropout rates	Test score mathematics	Test score Portuguese
	(1)	(2)	(3)
Panel A: Impacts on fifth-grade variables			
Dummy *Mais Educação* * year 2011	2.346	–5.090	–1.626
	(2.009)	(3.967)	(3.373)
R^2	0.755	0.811	0.823
Observations	296	296	296
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes
Panel B: Impacts on ninth-grade variables			
Dummy *Mais Educação* * year 2011	3.569	–5.655	–6.054
	(2.650)	(4.563)	(4.450)
R^2	0.801	0.793	0.764
Observations	236	236	236
Dummy year 2011	Yes	Yes	Yes
School fixed effects	Yes	Yes	Yes

Sources: Authors' calculations using MEC/FNDE administrative data, *Prova Brasil,* School Census, and INEP.

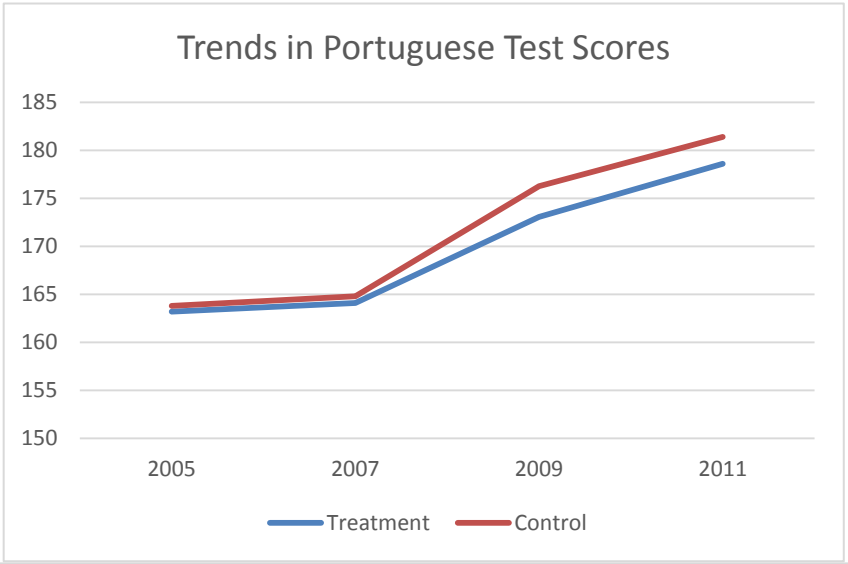
Note: Treatment group are schools that joined environmental education field in 2008 and remained in the activity until 2011. This table reports coefficients from the ordinary least squares estimation of equation (5) in the paper, where the dependent variable is in column (1) is Portuguese grades in *Prova Brasil* , in column (2) mathematics grades in *Prova Brasil* , and in column (3) dropout rates. All variables are at school level. ***significance at the 1% level; **significance at the 5% level; *significance at the 10% level. Robust standard errors, clustered at school level, are reported in parentheses. All regressions include school fixed effects and time dummies. All regressions are weighted by propensity score matching weights. Panel A reports these estimates for schools from the fifth-grade sample. Panel B reports these estimates for schools from the ninth-grade sample.

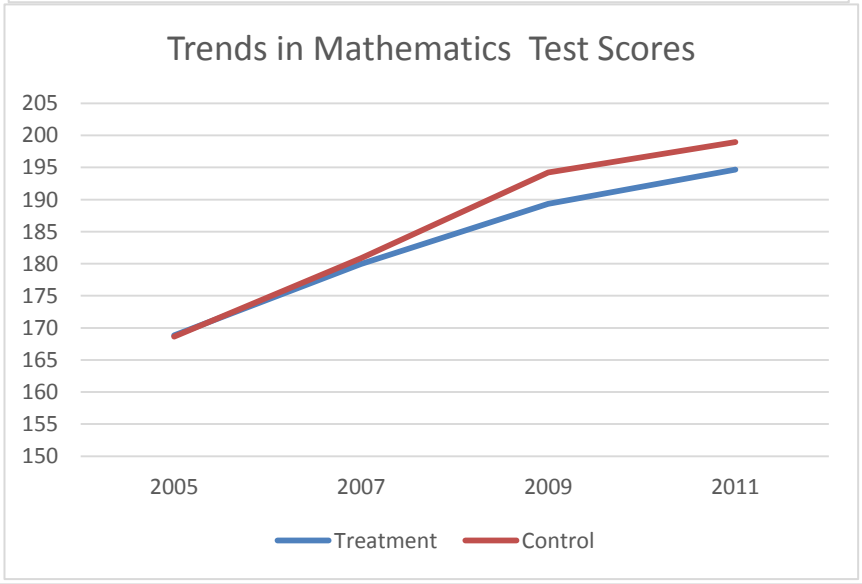
Table A11: Schools characteristics (2007) - Means and standard deviations for the Sample After Matching

	Panel A: Fifth-grade schools						Panel B: Ninth-grade schools					
	Schools in *Mais Educação* (2008−2011)		Control group		All schools		Schools in *Mais Educação* (2008−2011)		Control group		All schools	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Δ Portuguese grades	1.04	13.05	0.950	13.36	0.99	13.19	5.04	14.25	3.27	12.73	4.16	13.53
Δ Mathematics grades	10.49	12.79	11.357	13.10	10.92	12.95	1.68	13.03	-0.19	11.92	0.74	12.51
Portuguese grades	164	13	165	14.56	164.45	13.85	222.19	14.77	221.72	16.27	221.96	15.53
Mathematics grades	180	13	181	14.97	180.40	14.06	230.01	14.28	228.96	15.95	229.49	15.14
Dropout rates	5.89	5.40	6.72	10.45	6.31	8.32	11.71	8.68	11.45	10.68	11.58	9.73
IDEB Index	3.51	0.68	3.50	0.96	3.51	0.83	2.87	0.66	2.80	0.83	2.84	0.75
Δ IDEB	0.36	0.58	0.43	0.850	0.395	0.727	0.342	0.616	0.271	0.598	0.307	0.608
Municipal population	1,180,426	826,731	850,184	1,751,353	1,015,305	1,378,401	1,365,598	975,870	1,353,460	2,503,082	1,359,529	1,897,993
Students' enrollments	924	477	850	837.651	886.796	682.109	1160.026	484.935	1083.866	514.451	1121.946	501.020
IDHM	0.76	0.04	0.75	0.06	0.75	0.05	0.76	0.03	0.76	0.06	0.76	0.05
Urban	1.00	0.06	1.00	0.00	1.00	0.04	0.99	0.09	1.00	0.04	1.00	0.07
Basic sanitation	0.98	0.14	1.00	0.057	0.989	0.106	0.991	0.095	1.000	0.000	0.995	0.068
Library	0.75	0.43	0.73	0.45	0.74	0.44	0.88	0.32	0.88	0.33	0.88	0.32
Sports court	0.55	0.50	0.55	0.50	0.55	0.50	0.69	0.46	0.74	0.44	0.72	0.45
Number of classrooms	13.02	5.65	12.50	8.45	12.76	7.19	14.33	5.18	14.38	5.18	14.36	5.18
Number of computers	0.92	0.28	0.94	0.24	0.93	0.26	0.96	0.20	0.98	0.15	0.97	0.17
Science lab	0.14	0.35	0.16	0.36	0.15	0.36	0.27	0.44	0.33	0.47	0.30	0.46
Computer lab	0.50	0.50	0.45	0.50	0.47	0.50	0.57	0.50	0.54	0.50	0.56	0.50
Teachers room	0.90	0.31	0.88	0.33	0.89	0.32	0.97	0.18	0.98	0.13	0.98	0.16
DVD	0.90	0.30	0.92	0.27	0.91	0.29	0.92	0.27	0.94	0.24	0.93	0.25
Overhead projector	0.74	0.44	0.69	0.46	0.72	0.45	0.88	0.32	0.90	0.30	0.89	0.31
Number of employees	65.29	29.66	62.73	65.78	64.01	51.00	76.27	28.88	69.96	27.44	73.11	28.33
School meals	0.92	0.28	0.93	0.26	0.92	0.27	0.92	0.28	0.88	0.33	0.90	0.30
Number of classrooms used	13.57	6.95	12.79	9.77	13.18	8.48	14.46	6.13	14.49	5.76	14.48	5.94
Morning lessons	0.53	0.12	0.53	0.14	0.53	0.13	0.51	0.13	0.50	0.17	0.50	0.15
Child care	0.04	0.21	0.04	0.19	0.04	0.20	0.03	0.16	0.03	0.17	0.03	0.17
Kindergarten	0.40	0.49	0.35	0.48	0.37	0.48	0.21	0.41	0.21	0.41	0.21	0.41
State schools	0.27	0.45	0.23	0.42	0.25	0.43	0.59	0.49	0.63	0.48	0.61	0.49
High school	0.09	0.28	0.08	0.26	0.08	0.27	0.41	0.49	0.41	0.49	0.41	0.49
Share classes in school with full-time day (7 or more hours)	0.02	0.12	0.03	0.15	0.02	0.14	0.01	0.08	0.01	0.08	0.01	0.08
Total duration of school day (hours)	4.31	0.64	4.34	0.72	4.32	0.68	4.30	0.49	4.30	0.50	4.30	0.49
Number of observations	611		385		996		546		319		865	

Sources: MEC/FNDE, INEP, *Prova Brasil,* and School Census.

Figure 1 : Trends in the Portuguease and Math test scores and in the dropout rates, for the sample of 5th grade schools after the matching (2005-2011).





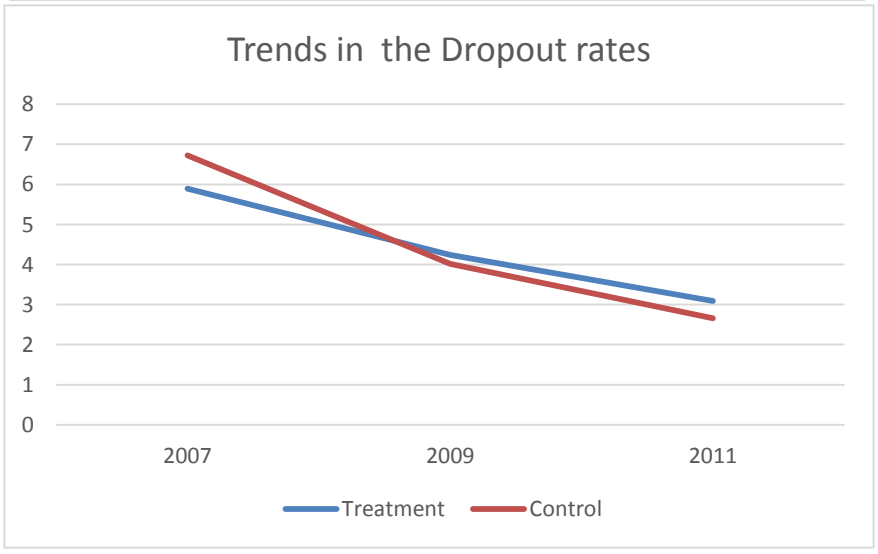
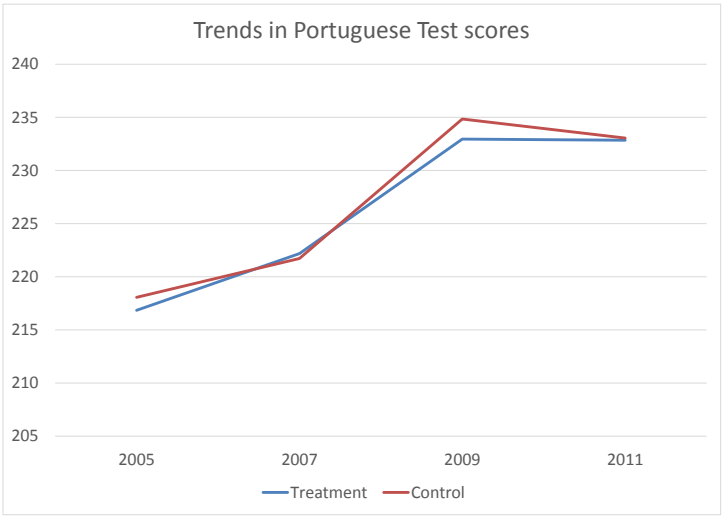
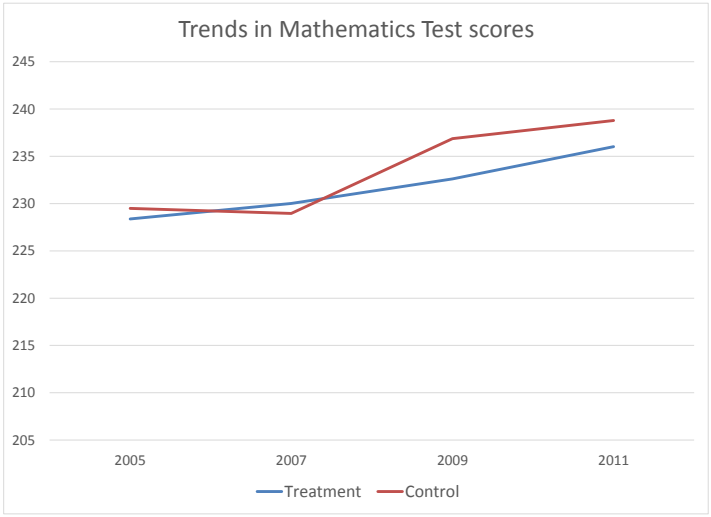


Figure 2 : Trends in the Portuguease and Math test scores and in the dropout rates, for the sample of 9th grade schools after the matching (2005-2011).





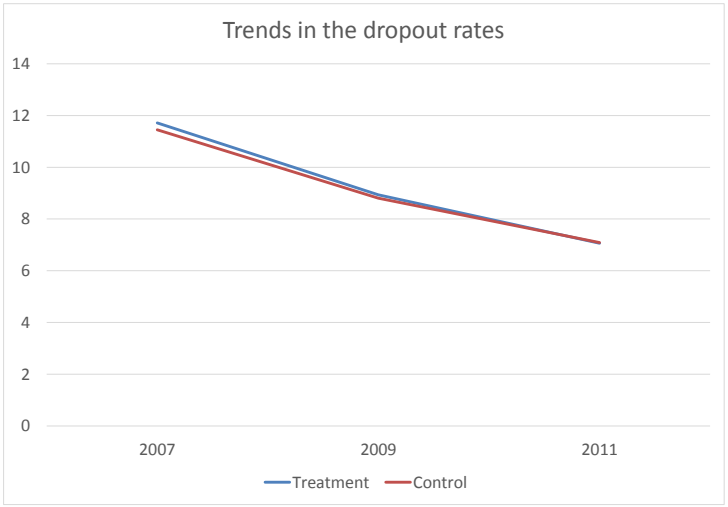
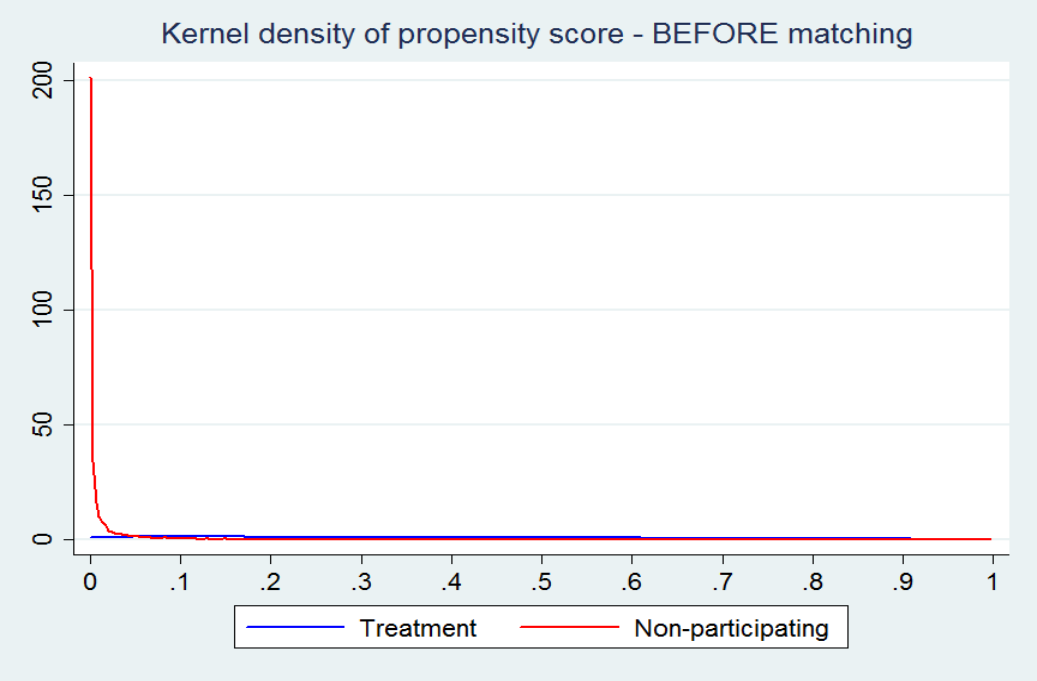


Figure 3. Kernel Density of Propensity Score, Ninth-Grade Schools



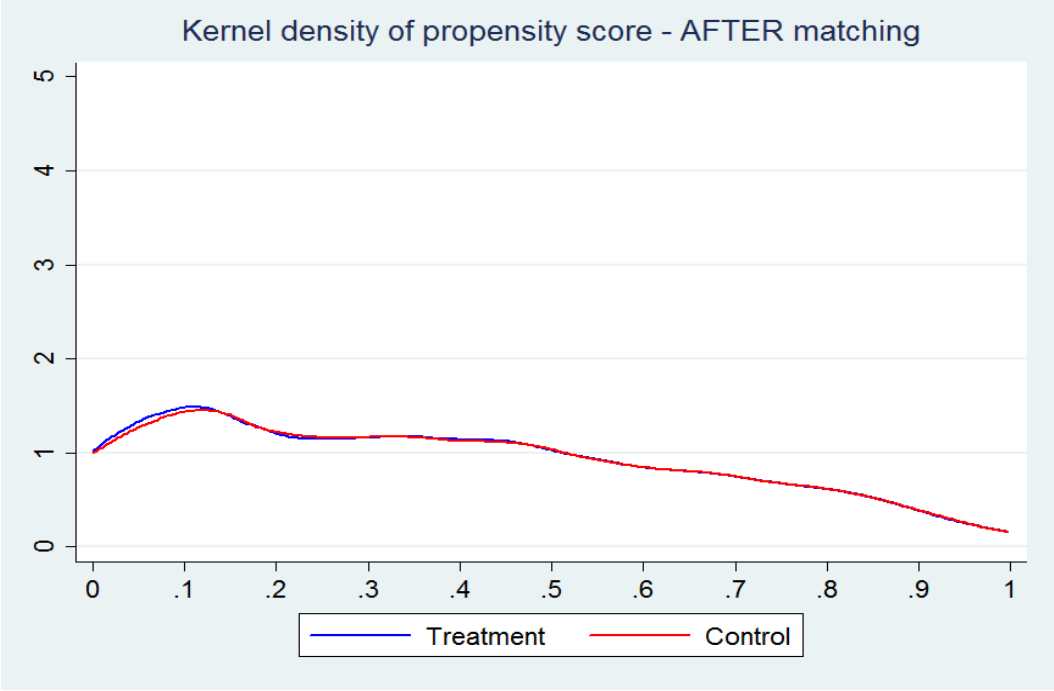
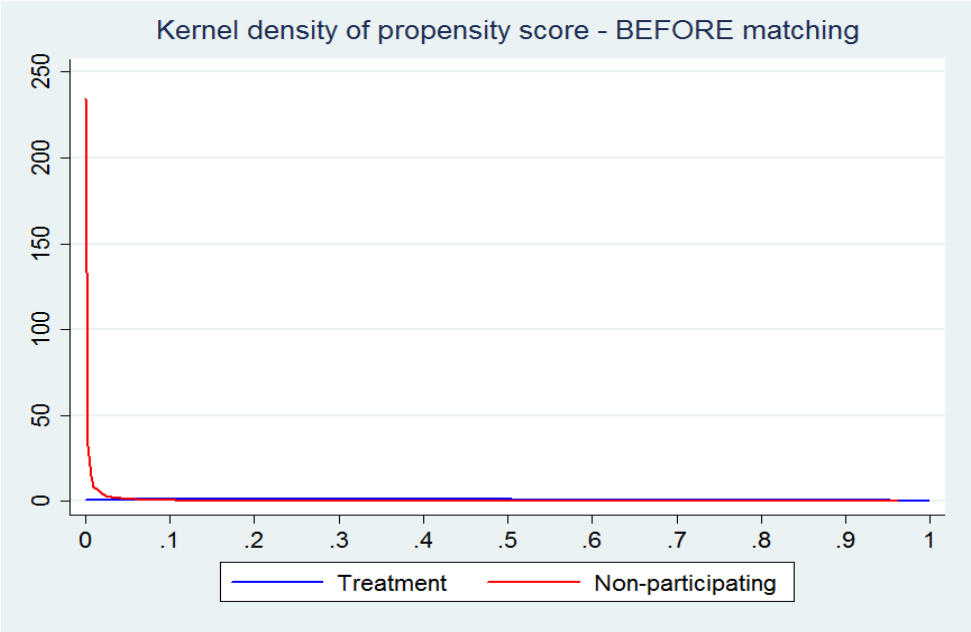


Figure 4. Kernel Density of Propensity Score, Ninth-Grade Schools



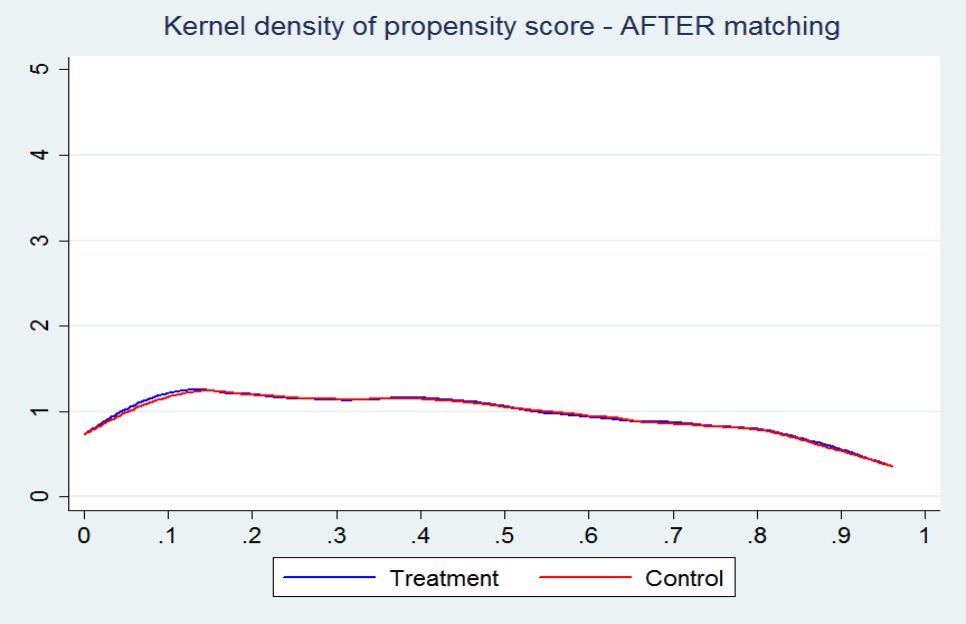


Figure A2: Fifth-grade

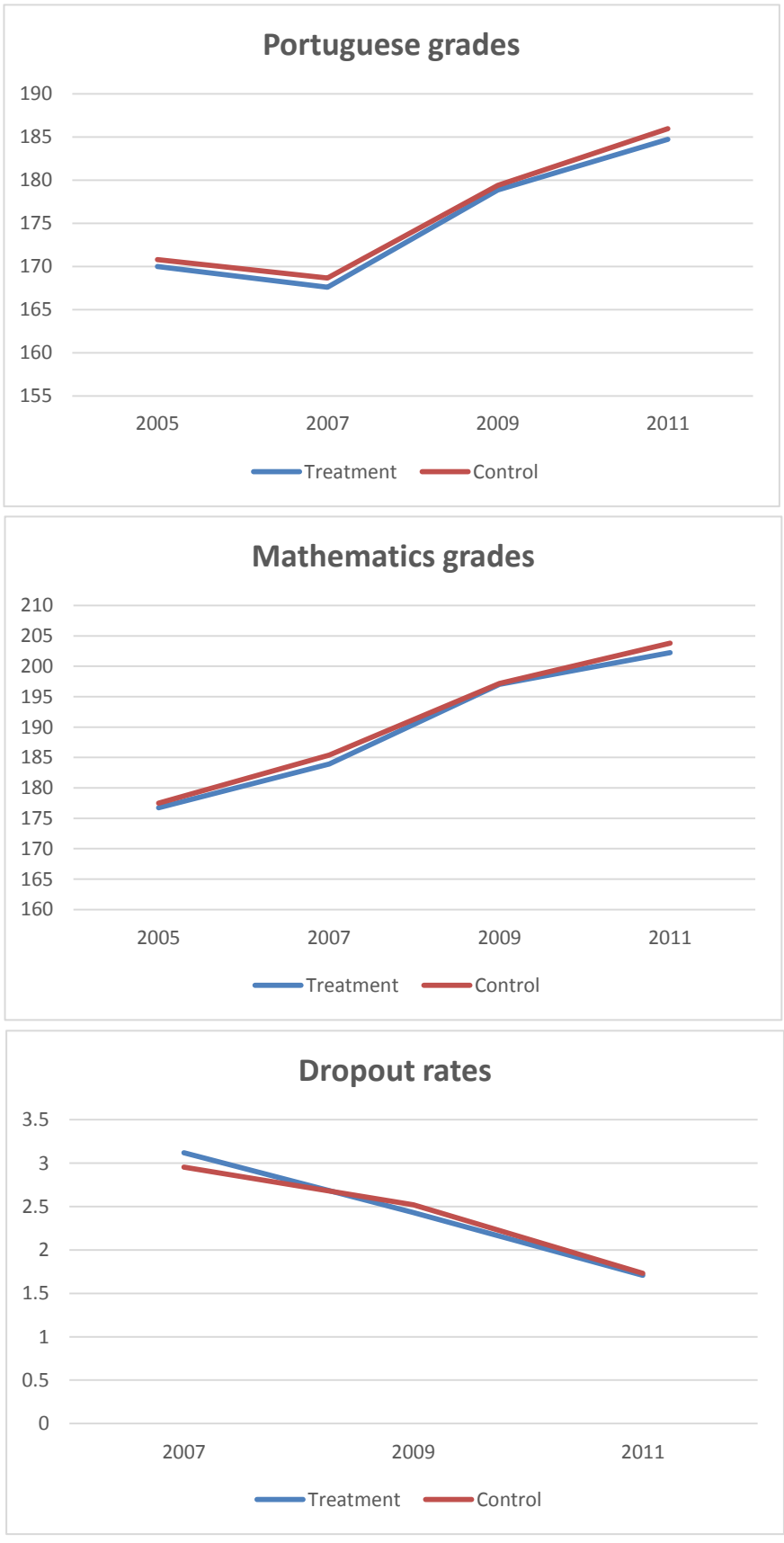
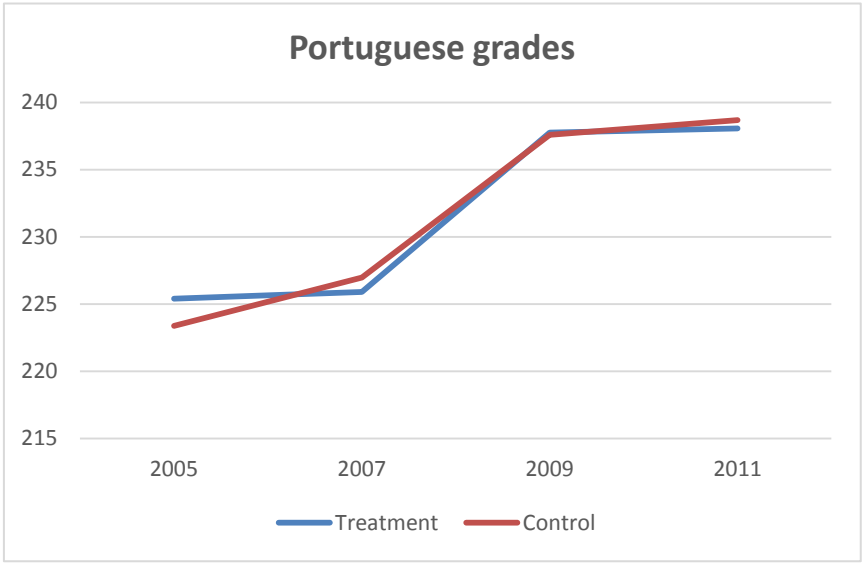
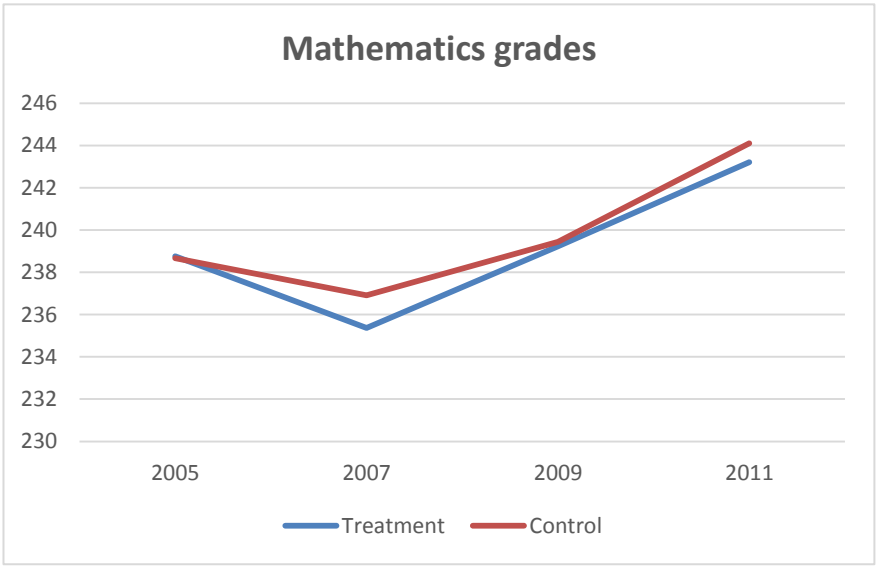


Figure A3: Fifth-grade





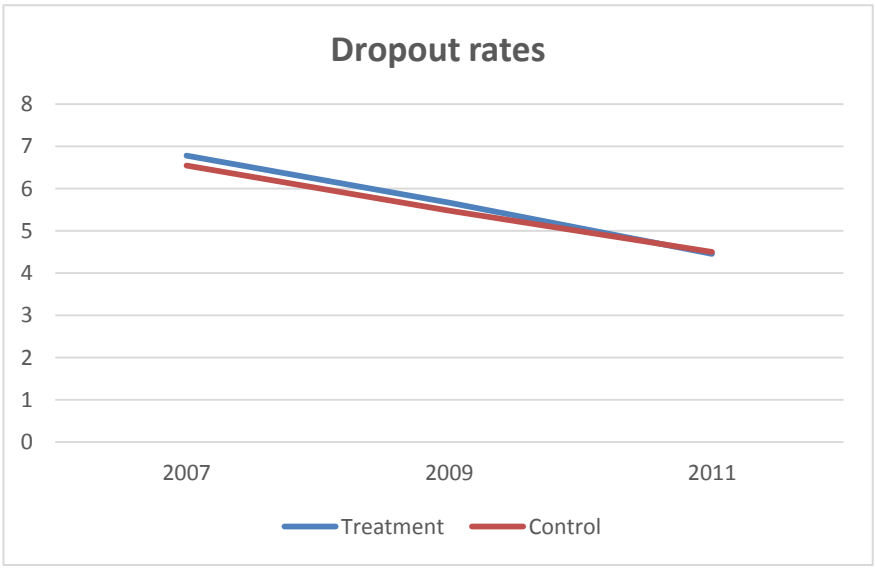
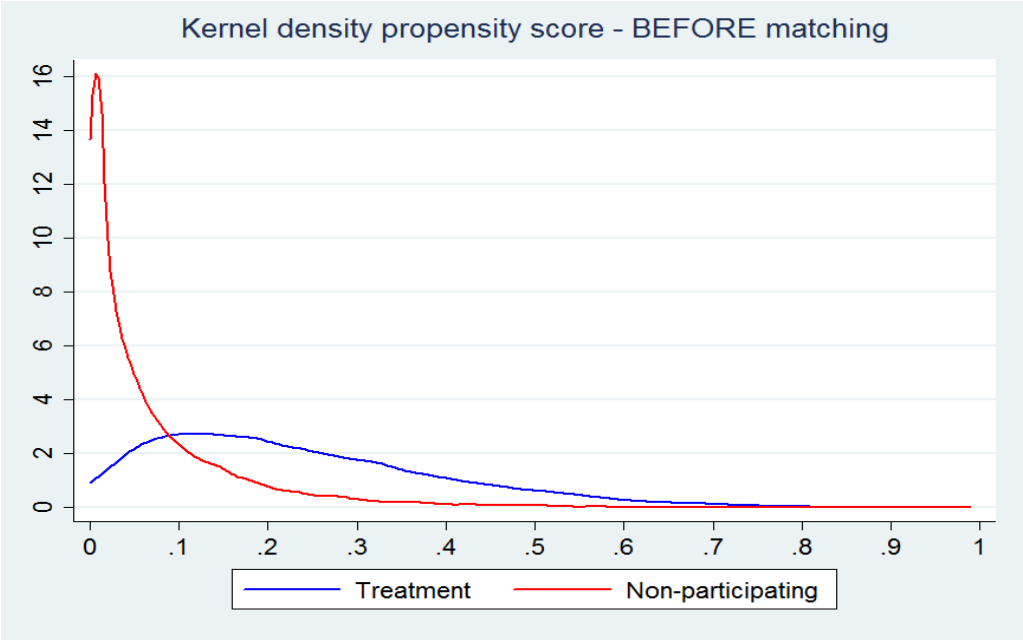
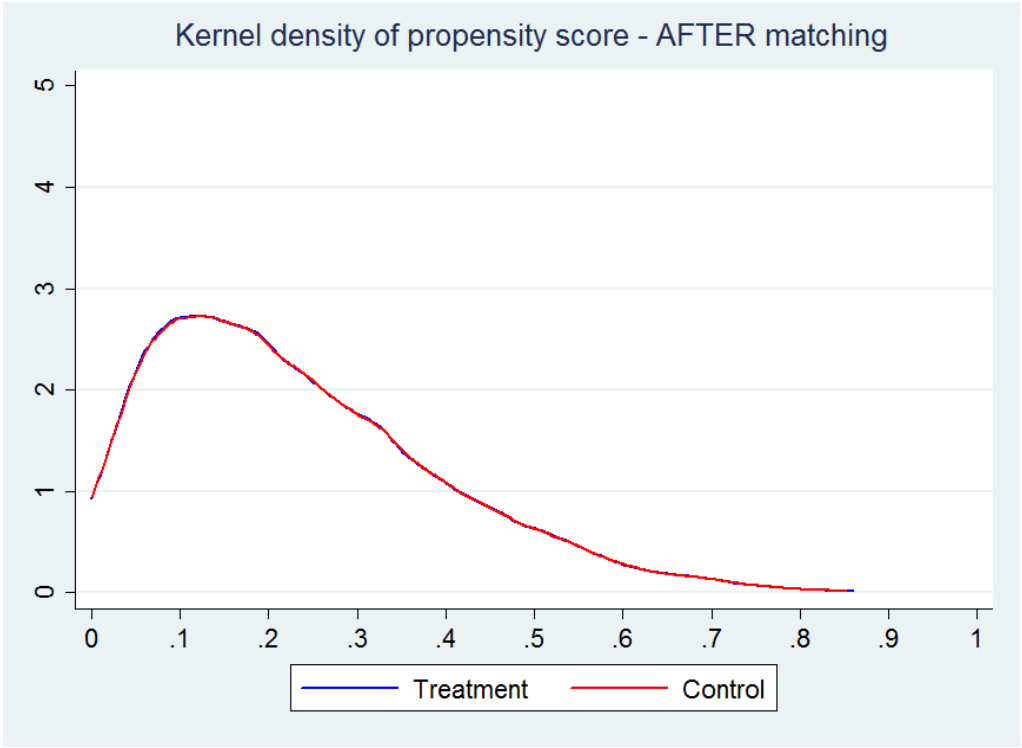


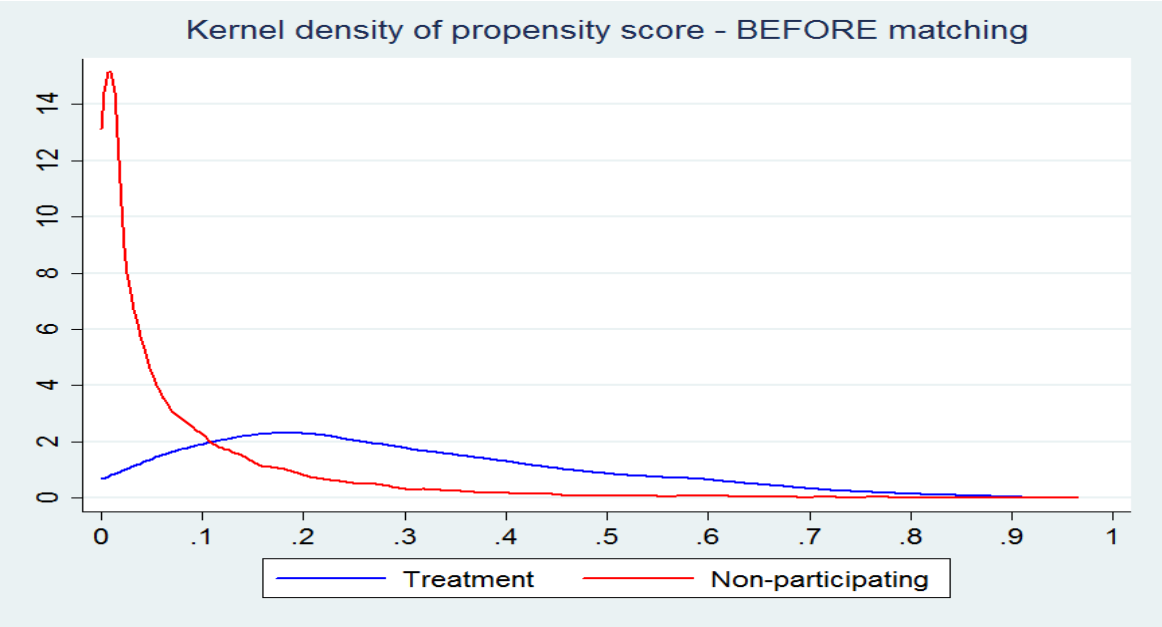
Figure A4. Kernel Density of Propensity Score, Fifth-Grade Schools

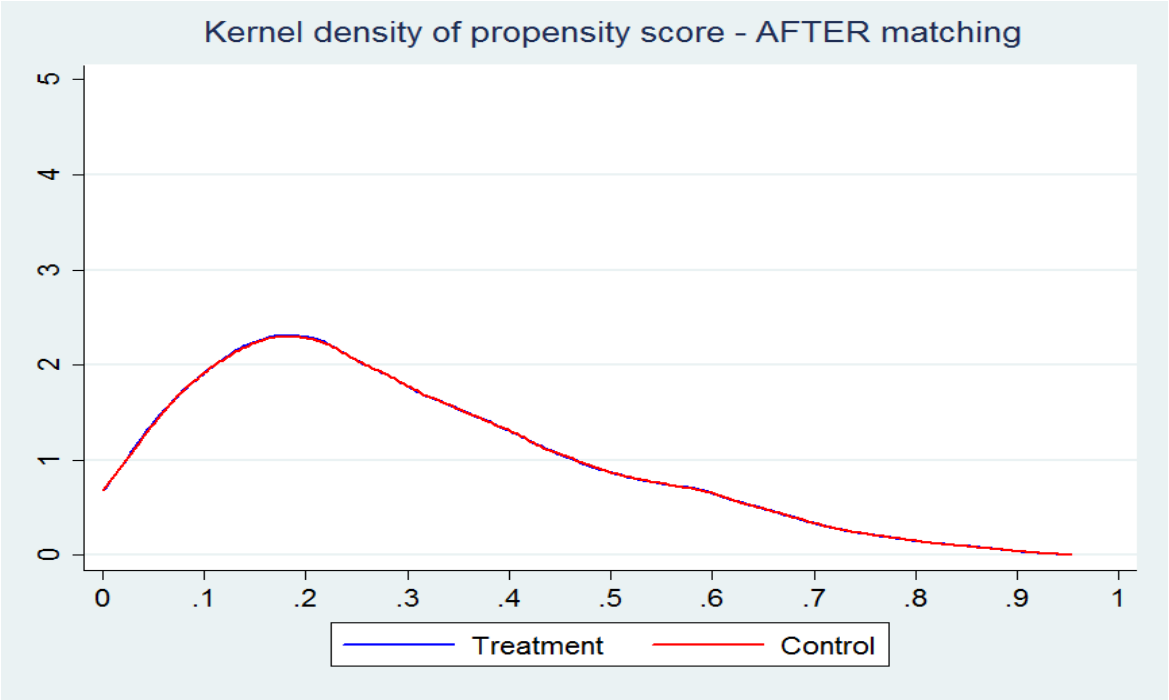




Note: This figure shows the kernel density of estimated propensity score of treatment (schools that joined Mais Educação in 2010) and nonparticipating schools, before and after propensity score matching.

Figure A5. Kernel Density of Propensity Score,Ninth-Grade Schools





Note : This figure shows the kernel density of estimated propensity score of treatment (schools that joined Mais Educação in 2010) and nonparticipating schools, before and after propensity score matching.