Longer School Days, Better Outcomes? *

Tiago Pires
Northwestern University

Sergio Urzua
Northwestern University,
NBER and IZA

February 8, 2011

Abstract

This paper presents evidence of the impact of time spent in school on different outcomes. We investigate the effects of longer school days on schooling attainment, cognitive test scores, socio-emotional variables, labor market outcomes (wages and employment), and social behavior (adolescent motherhood and participation in illegal activities), by exploiting the structure of the Chilean schooling system in which students can select between half- and full-day schools. We control for the endogenous selection into schools using propensity score matching and comprehensive sets of students' characteristics.

Our empirical analysis is carried out using new individual-level data from Chile. This data contains retrospective information on a wide range of variables for 4,497 individuals aged 25-30 years by 2008. Importantly, while the oldest cohort in the sample was enrolled in high school during the period 1992-1995, the youngest individuals were high school students between 1997-2000. This data structure allows us to investigate the impacts of the 1997 Chilean education reform, which implied a major change to the schooling system. The reform extended the length of school day in more than 30 percent. In practice, this meant that schools offering a half-day program before the reform were forced to sequentially switch to a full-time shift system. The specific analysis of this reform is a second contribution of this paper.

Although our findings suggest some heterogeneity on the magnitude of the effects, we can conclude that enrollment into a full-day school has positive effects on academic outcomes and cognitive test scores. It also reduces adolescent motherhood. However, we do not find significant overall effects on employment or wages. Only individuals switching from afternoon to full-time shift seem to experience significant increases in monthly wages. This suggests that not only the school day's length is important but also the time of the day when students attend classes.

The 1997 reform increased the benefits of full-day schools by reducing the overall likelihood of adolescent motherhood. The reform also increased the positive effects of full-day school on the likelihood of high-school dropout and on the likelihood of arrest, but in these cases the difference is not significant. Since the reform also increased the percentage of students attending full-day schools, we estimate a positive effect of the reform on these three outcomes. However, the 1997 reform did not improve, in relative terms, the labor market outcomes of those "treated".

All in all, our results indicate that longer school days improve academic and social outcomes. However, in the context of the school-to-work transition, they do not translate into better labor market outcomes.

JEL Classification Codes: I21, H43, H52

*This document is available on the web at http://

1 Introduction

This paper presents new evidence of the effects of time spent in school. We analyze the effects of longer school days on a variety of different dimensions, ranging from schooling attainment and social behavior during adolescence to cognitive, socio-emotional and labor market outcomes during adulthood. We do this by exploiting the convenient structure of the Chilean schooling system and its changes during the period 1995-2000.

For decades, the schooling system in Chile has been characterized by the coexistence of schools offering half- and full-day shifts. During the 80' and 90's primary and secondary schools could freely decide between the two systems, and Chilean students could choose not only between public and voucher schools (a popular topic in the literature) but also the type of school shift. The system operated without modification until 1997. That year the Chilean government implemented a major change to the schooling system extending the length of the school day in more than 30 percent. In practice the reform implied a universal movement toward full-time schools.

Therefore, the goal of this paper is two-fold: examine the consequences of attending full- versus half-time schools and evaluate the effects of the 1997 reform in the Chilean Education System. Another contribution of the paper is to study the effects of attending school at different time schedules.

Our empirical analysis takes into account the following important points. First, we interpret enrollment into a particular school shift as the result of an endogenous decision. Thus, we control for the potential self-selection when evaluating the effect of the school type. Moreover, since the reform increased the supply of full-day schools relative to the supply of half-day schools, we consider that the selection process is particular prevalent in our case.

Second, after the 1997 reform, the switch from a half-day to a full-day school implied not only an increase in the school-day length but also a switch in the time of the day students attend classes.

We analyze the impacts of longer school days on cognitive and socio-emotional scores, on the probability of college enrollment, on the probability of being arrested, on the probability of adolescent motherhood (before age 18), on the probability of high-school dropout and on labor market outcomes (employment and wages).

The empirical analysis is carried out using a new and rich data set from Chile obtained from a retrospective survey applied to 4497 individuals aged 25-30 in 2008. Given the timing, this information

allows to identify a cohort of individuals who did not experience the reform (29/30) and a cohort of individuals who spent most of their high school years under the reform (25/26).

The identification of the effects associated with longer school days is achieved using propensity score matching. Under the assumptions of an overlapping support and conditional mean independence of the outcomes, this method allows us to identify for full-day students the average treatment effects of attending a full-day instead of a half-day school.

We use the structure of our data to identify also the impacts of the 1997 educational reform. We do this by implementing difference-in-differences propensity score matching estimators. In this way, we not only estimate the static effect of attending full-time versus half-time schools, but also the dynamic effects associated with the reform.

Although our findings suggest some heterogeneity on the magnitude of the effects, we can conclude that attending a full-day shift during high school reduced the probability of high school dropout, reduced the probability of adolescent motherhood, and increased performance on cognitive test scores taken during adulthood. However, we do not find significant effects on labor market outcomes.

The results indicate that the 1997 Chilean reform increased the benefits of full-day schools by reducing the overall likelihood of adolescent motherhood. The 1997 reform also increased the positive effects of full-day school on the likelihood of high-school dropout and on the likelihood of arrest, but for these two outcomes the difference is not statistically significant. Since the reform also increased the percentage of students enroled in full-day schools, we expect that the reform had positive effects on these three outcomes.

The 1997 reform reduced the benefits of full-day school on the probability of college enrollment, on cognitive scores, on auto-efficiency scores, on metacognitive scores and on the likelihood of employment at age 25/26. For these outcomes, since enrolment in a full-day school kept creating benefits, the effects of the reform were ambiguous. On one hand, the reform was positive for students who would have not attended a full-day school without the reform. On the other hand, the reform was negative for students who would have attended a full-day school also without the reform.

The 1997 reform also implied a negative (but not significant) variation for the effects of full-day school on monthly wages among those "treated". For this outcome the effect of full-day school is negative and so our results suggest a negative effect of the 1997 reform on wages.

When analyzing the results in greater details, we find the presence of heterogenous benefits in

the population. Specifically, we find that full-day school was more beneficial for students in voucher schools and for students that without the reform would have attended an afternoon shift. For this latter group we estimate important improvements in the probability of enrollment in college, cognitive test scores and even monthly wages, and significant reductions in the probability of dropping from high-school.

The paper is organized as follows. Section 2 briefly places our work in the context of the related literature. In section 3 we describe the Chilean Schooling System. Section 4 proposes a theoretical framework to analyze parents' decisions and to identify the effects of the different treatments on the academic, labor and social outcomes. Section 5 discusses the empirical strategy to identify the value from switching from half-day to full-day and the dynamic effects of the reform. In section 6 we describe the data and outcomes while in section 7 we present the results obtained using our identification strategy. Section 8 extends the analysis by distinguishing between the two half-day shifts. Section 9 concludes the paper.

2 Literature Review

To the best of our knowledge, this paper is the first to provide a comprehensive evaluation of the 1997 Reform in the Chilean Schooling System and to study it in a broad perspective. Nevertheless, Valenzuela (2005), Garcia (2006), Bellei (2009), Kruger and Berthelon (2009) have analyzed the effects of the reform on specific areas. Valenzuela (2005) and Garcia (2006) found that the full day schooling program had a small but significant, positive and robust effect in test scores for fourth graders. They show that the effects on children's performance in language are higher than on math, and they are larger for voucher schools. Valenzuela also found that the program did not have effects on parents' time allocation. Bellei (2009) shows that the Chilean full school day program also had a positive effect on high school students' achievement both on math and on language. Bellei also found no evidence of heterogeneous program effects on students' achievement when student characteristics are concerned. However, he found evidence of heterogenous effects at school level. In particular, his results suggest that the program was more effective in rural and public schools than in urban and voucher schools. Kruger and Berthelon (2009), using aggregate data, found that full-day schooling program reduced

the probability of becoming an adolescent mother among poor families and in urban areas.[1]

Our paper is essentially related with the branch of economic literature that studies the effects of different school time length on academic, professional and social outcomes. Besides the aforementioned papers that analyzed this thematic for Chile, it is important to mention the seminal papers of Karweit (1983), Rossmiller (1983) and Fuller (1987). Both Karweit (1983) and Rossmiller (1983) had as primary goal to study the effect of time on task. However, in their studies they also analyzed the sources of variation of time spent in school, particularly the length of the school day. They found that despite its importance, the length of school day is not the only factor that influences student learning and its positive effects also depend on other factors such as teacher ability and the way time is used. A more positive message is given by Fuller (1987), who found that for developing countries the length of school day positively affects the school outcomes.

A paper closely related with ours is Llach, Adrogue and Gigaglia (2009). This paper assesses the enduring educational, occupational and income effects of longer school days using a "probably" natural experiment which increased in 1971 the length of the school days for around half of the primary schools in the city of Buenos Aires. Using a propensity score matching estimation they found that longer school days only have positive and significant effect on conclusion of high school, on access to and timely conclusion of a second tertiary study and on educational level of the spouse and of the household head. Longer school days seem to have a negative and significant effect on the year in which secondary tertiary study was interrupted if first one was finished, on the timely conclusion of the first tertiary study and on the conclusion of post-graduate studies. On the other hand, they have not found enduring effect of longer school days on income and employment. We think that two main novelties of our paper relatively to Llach, Adrogue and Gigaglia (2009) are the analysis of different outcomes (particularly cognitive scores and socio-emotional indicators) and the possibility of differentiate the two half-day shifts (morning and afternoon) which allow to analyze the existence of heterogeneous effects between these two shifts. Furthermore, we think that the large sample we have allows to improve the accuracy of the results.

Instead of the analysis of the effects of the length of schooling day, some other papers have studied the effects of the length of schooling year. Card and Krueger (1992) and Heckman, Layne-Farrar and

[1]For an analysis of the Chilean Schooling System see Galego and Hernando (2007) and Rau, Sanchez and Urzua (2010).

Todd (1996) found that in the United States the length of term has no impact on academic outcomes at state level. A similar result was obtained by Pischke (2007) for Germany. On the other hand, Lee and Barro (2001), using a cross country data, found that an increase in the length of schooling year has a small and positive effect on Mathematics and Sciences but a negative effect on Language.

Our paper is also related with the psychological and bio-psychological literature that examines the relationship between school-schedules and academic performance. The research on what time of day students' performance and their ability to learn is highest started as early as the beginning of the twentieth century (Gates, 1916) but it is scant and contradictory.

In two early studies, Gates (1916) and Blake (1967) found that short term memory performance is better in the morning and there is a functional decline during the early afternoon hours. Subsequently, Blake (1971) and Biggers (1980) tried to understand these diurnal changes in memory performance and cognitive ability by analyzing the interaction between biorhythms, memory alertness and cognitive performance.

Despite the findings of these studies, there is not a consensus between the researchers with respect to the most effective hours to optimize school performance. On one hand, papers as Biggers (1980) and Klein (2001) reported that the majority of older students achieve the peak of memory alertness during the morning and so their academic performance is optimized during this time of the day. On the other hand, Dunn (1985) and Monte et al (2000) indicated that for teenagers, the afternoon hours are more effective for learning. This lack of consensus makes necessary the existence of more studies that compare the learning effectiveness in schools which operate in two shifts. Therefore, we think that our paper might also provide a contribution to this literature.

3 The Chilean Schooling System[2]

The current structure of Chilean Schooling System is mainly determined by two big reforms: the 1981 reform and the 1997 reform. Despite the focus of this paper is the 1997 reform, it is important to understand the 1981 reform given its critical role in the actual design of the Chilean Schooling System.

One of the main goals of the 1981 reform was to give parents freedom to choose among public and

[2]This section is based in the program descriptions in Valenzuela (2005), Gallego and Hernando (2007) and Kruger and Berthelon (2009)

free private schools that receive a per-student subsidy (voucher).[3] This reform also transferred public schools from central to local governments, established free entry into the school market and increased the subsidy received by each school per student.[4]

The 1981 reform established the existence of three different forms of school management: public, voucher (free private) and private schools. These three forms of school management have important differences in terms of incentive structure and the amount of non-voucher resources received. The public schools are administered by municipalities and funded entirely by the government. That reduces the budget constraints, since these schools could receive, when needed, public transfers above the vouchers. On the other hand, voucher schools are privately managed but essentially financed by the fixed per-student subsidy given by the government. These schools behave in a competitive way and can be owned by profit firms or by non-profit organizations that could obtain additional funds from donations and other external sources. Finally, private schools are privately owned and managed. They do not receive funds from the government and so an important source of revenues is the tuition paid by students.

In 1997 Chilean government began the implementation of a new reform whose main objective was to improve education quality by increasing the amount of time that students spend in the school. The reform established that for all students from the third grade to the last year of high school[5] the number of schooling hours should increase by 30 percent, that is, 1.4 hours per day. Given multiple operational and infrastructure constraints the Full Day School (FDS) was implemented gradually. It was defined that all new public schools should start their activity as full-day schools and all subsidized schools had to operate as full-day schools by 2004. However, given the delays in the implementation of the program the deadline was postponed until 2007 for public schools and until 2010 for the voucher schools.

Before 1997 the majority of schools had operated in a two half-day shifts system, therefore the FDS reform implied a large investment in infrastructures and high operative costs[6]. In order to help schools with the operative costs, the government increased the value of the monthly voucher by

[3]The voucher was designed as a subsidy directed to the supply side.

[4]Before the 1981 reform there already existed free private schools that received some discretional funds from the government.

[5]The Chilean schooling system has eight years of primary education and four of secondary education.

[6]As pointed by Kruger and Berthelon (2009) one of the major operative costs associated with the FDS reform is the provision of school lunches.

40 percent for all subsidized schools offering a full-day shift. The infrastructure investments where essentially supported by the Capital Supply Fund, a grant assigned by the central government through a competitive application. To apply for the grants, schools had to submit their academic plans and request the required funds to operate under the full day regime. Public Schools could also receive resources from Regional Governments and Municipalities. The allocation of FDS funds by the Ministry of Education took in account two criteria: (i) schools with relatively low switch costs and (ii) priority schools with pre-existing deficits in infrastructure and located in areas of socioeconomic vulnerability.

During the first two years of the FDS program near 40 percent of subsidized schools, representing approximately 20 percent of students enrolled, switched to the full day regime. The first schools to implement the program were in the majority rural and small schools that only provide one half day shift before the program.[7] Thus, these schools did not have to incur in large costs of investment and, given the low enrollment, they had lower operational costs related with the switch. In 2004 approximately 60 percent of the subsidized schools were in the full day regime and in 2009 the percentage increased to almost 95 percent. In 2004 a new set of laws were approved to help schools to do the transition to the full day regime. Table 1 reports the number of schools that switch to the full-day regime until 2005.

4 Theoretical Framework

Before and after the 1997 reform (since the program has not been fully implemented yet) Chilean students have been selecting between two types of schools: schools offering a full-day system and schools offering a part-time system.[8] Let D denote the type of school and define

$$D = \begin{cases} 1 & \text{if enrolled in a Full day School (Treatment)} \\ 0 & \text{if enrolled in a Half day School (Control)} \end{cases}$$

After the 1997 reform the treatment implies not only that students attend classes at different schedules than the control group but also the school day length for the treated is longer than for students in half-day schools. Therefore, the treatment has two direct effects: increase the school day

[7] This fact explains the disparity between the number of schools that switch to full-day schools and the proportion of students affected by that switch.

[8] In section 8 we split treatment $D = 0$ in two: Morning Shift and Afternoon Shift. This division might be important if the two half-day shifts lead to different performance and there is possibility of choice between the two shifts.

length and change the time of the day students attend classes. Before the 1997 reform the treatment only implied the latter effect.

The 1997 reform represented an attempt to make the probability of $D = 1$ close to one. This suggests that legislators and police makers thought that enrolment into a full-day school with longer school days was associated with better academic and social outcomes. Tables 3 to 4 seem to suggest that this idea was in fact correct. For the majority of the indicators analyzed, students that received the treatment had better performances than those in the control group. However, it is important to be careful in the analysis of these tables, because they do not take in account the possibility of endogenous selection into the treatment. This is particularly important given that the school enrollment in Chile is not at random. Thus, tables 3 and 4, *per se*, do not allow to infer whether the assignment to a full-day school was the cause for the better performance. Our paper tries to go beyond the limitation of restrict the analysis to descriptive statistics by providing an objective and rigorous analysis of the effects of enrollment into a full-day school. In our analysis we control for possible selection mechanisms.

The selection mechanisms could come either from schools, parents/students or both. Schools might try to sort and choose students according to the predicted performance. Parents could also try to select the best treatment to their children according to their beliefs and necessities. In this paper we focus the attention in the second selection mechanism. To understand this selection mechanism we propose in subsection 4.1 a simple model of schooling choice by parents.

We will try to find the benefits (or not) of the reform at the academic, professional and social level. To do that, the paper examines its effects on cognitive scores, on social ability scores, on auto-efficiency scores, on metacognitive scores, on the probability of going to college, on the probability of being arrested, on the probability of being mother before 18, on the probability of dropping from high school and on actual labor market outcomes. In subsection 4.2 we propose a model to identify the effects of the treatments on the different outcomes.

4.1 A Simple School-Choice Model

To explain the choice of school shift by parents we consider a stylized model that adapts some of the ideas proposed by Epple and Romano (1998).

Parents must decide the type of high school for their children. High schools are characterized by two dimensions: type of school shift ($D \in \{\text{Full-Day,Half-Day}\}$) and form of school management

($Q \in \{\text{Public,Voucher,Private}\}$). Let S denote the school type, i.e. $S = \{D, Q\}$.

Assume parents' utility $U(.)$ is a function of consumption (C), child's high school achievement (A), child's performance in elementary school (b), importance given to child school performance (p) and unobserved factors (ε_U). Parents have to allocate their income (I) and their time (t) between consumption (C) and school (S). Let p_S be the school price[9], t_C the time dedicated to consumption and t_S the time dedicated to support child learning process. School achievement (A) depends on time dedicated by parents to support child learning process (t_S), on child's performance in elementary school (b), on parents education ($Pedu$), on school choice (S) and on unobserved factors (ε_A). Thus,

$$A = A(t_S, Pedu, S, \varepsilon_A)$$

Let t_S be a function of D, which implies that the choice of the school shift will determine the time dedicated to support child learning process.

Parents decide the type of school for their children (S) and consumption (C). Thus,

$$\begin{aligned} (C^*, S^*) &= \arg\max_{s,c} U(C, A, b, p, \varepsilon_U) \\ s.t &: C + p_S S \leq I \\ &: t_S + t_C \leq t \\ &: A = A(t_S, Pedu, S, \varepsilon_A) \end{aligned}$$

Assuming preferences are locally nonsatiated, the problem can be written as

$$S^* = \arg\max_S U(I - p_S D, t_S(D), Pedu, S, \varepsilon_A, b, p, \varepsilon_U) = U^*(I, Pedu, b, p, \varepsilon_U, \varepsilon_A)$$

Let the school choice be such that first parents decide the form of school management $j \in \{\text{Public,Voucher,Private}\}$ and then within each form of management they choose a particular shift $k \in \{\text{Half-time,Full-time}\}$.

[9] We normalize the price of consumption to be 1

Assume also that the utility can be written as follows

$$\begin{aligned} U_{jk}^{*} &= U^{*}\left(S=jk|I,p_S,Pedu,b,p,\varepsilon_U,\varepsilon_A\right) \\ &= \delta_{0j}+\delta_{1jk}I+\delta_{2jk}Pedu+\delta_{3jk}b+\delta_{4jk}p+\varepsilon_U+\varepsilon_A \\ &= \delta_{0j}+\Delta_{jk}+\varepsilon_U+\varepsilon_A \end{aligned}$$

where $\Delta_{jk}=\delta_{1jk}I+\delta_{2jk}Pedu+\delta_{3jk}b+\delta_{4jk}p$ and $\varepsilon_U+\varepsilon_A$ follows a generalized extreme value (GEV) distribution. [10] Thus, we can write

$$P_j = P\left(Q=j|I,Pedu,b,p\right)=\frac{\exp\left(\delta_{0j}+I_j\right)}{\sum_{m=1}^{J}\exp\left(\delta_{0m}+I_m\right)}$$

with $I_j=\log\left(\sum_{l=1}^{J}\exp\left(\Delta_{jl}\right)\right)$. The probability of choose shift k given the choice of category j is

$$P_{k|j} = P\left(D=k|I,Pedu,b,p,Q\right)=\frac{\exp\left(\Delta_{jk}\right)}{\sum_{l=0}^{K}\exp\left(\Delta_{jl}\right)}$$

Therefore, we can define the following likelihood function for our model

$$\begin{aligned} \log L &= \sum_{i=1}^{N}\sum_{j=1}^{J}1\left[Q_i=j\right]\left\{\delta_{0j}+I_j-\log\sum_{m=1}^{J}\exp\left(\delta_{0m}+I_m\right)\right\} \\ &\quad +\sum_{i=1}^{N}\sum_{j=1}^{J}\sum_{k=0}^{K}1\left[S_i=jk\right]\left\{\Delta_{jk}-\log\sum_{l=1}^{J}\exp\left(\Delta_{jl}\right)\right\} \end{aligned}$$

This is a GEV model.

[10] Formally, the joint distribution function is

$$F\left(\varepsilon\right)=\exp\left[-G\left(-\exp\left(\varepsilon_{11}\right),...,-\exp\left(\varepsilon_{33}\right)\right)\right]$$

with

$$G\left(Y\right)=\sum_{j=1}^{3}\left(\sum_{k=1}^{2}Y_{jk}\right)$$

and $Y_{jk}=\delta_{0j}+\Delta_{jk}$.

We tested more flexible specifications with $G\left(Y\right)=\sum_{j=1}^{3}\left(\sum_{k=1}^{2}Y_{jk}\right)^{\rho_j}$ and $\rho_j=\sqrt{1-corr\left(\varepsilon_{jk},\varepsilon_{jl}\right)}$. These specifications implies that ρ_j is between 0 and 1. Those specifications were rejected in our data.

4.2 Model of Student's outcomes and Treatment Parameters

The schooling choice model introduced in the previous section considers $J \times K$ alternatives (with J denoting the form of school management and K alternatives for school shift). Here, we simplify the analysis considering only the distinction between full-time and half-time schools. We go back to the more comprehensive structure later in this paper.

We use a model of potential outcomes to examine student's outcomes and treatment parameters. Let $Y_{1,i}^t$ and $Y_{0,i}^t$ denote the individual's outcome associated with full- and half-time schools, respectively. $Y_{k,i}^t$, with $k = \{0, 1\}$, is assumed to be a function of individual's characteristics, but we omit this dependency for sake of simplicity and expositional convenience. At any given period t either $Y_{1,i}^t$ or $Y_{0,i}^t$ is observed, but not both. The observed outcome depends on the schooling choice affecting the individual. Thus, we can write the observed outcome Y_i^t as

$$Y_i^t = D_i^t \times Y_{1,i}^t + Y_{0,i}^t \times (1 - D_i^t)$$

or

$$Y_i^t = Y_{0,i}^t + \Delta_i^t \times D_i^t$$

where $\Delta_i^t = Y_{1,i}^t - Y_{0,i}^t$ represents the individual level treatment effect parameter of attending a full-time versus half-time school in period t. In this paper we propose a strategy to identify and estimate the average treatment effect on treated $\Delta^t = E(\Delta_i^t | D_i = 1)$. As we discussed below, our identification of this parameter relies on the set of standard assumptions behind the matching approach. This treatment parameter indicates for students who attended full-day schools the average gain (or loss) on outcome Y of switching from half-time to full-time education at period t.

The availability of longitudinal information (as it is our case) would allow us to go beyond the analysis of the effect of D^t on Y^t. Consider the following treatment parameter:

$$\begin{aligned} \Delta_{t',t} &= \Delta^{t'} - \Delta^t \\ &= E(Y_{1,i}^{t'} - Y_{0,i}^{t'}) - E(Y_{1,i}^t - Y_{0,i}^t) \end{aligned}$$

where $t' > t$. $\Delta_{t',t}$ is the difference-in-differences treatment parameter, which measures the effect of the treatment in period t' taking into account the difference already observed between the treatment

and control group in period t. Thus, this parameter allows to evaluate how the effects of full-day school versus half-day schools changed with the 1997 reform.

5 Empirical Strategy

5.1 Propensity Score Matching

We identify Δ^t using a propensity score matching estimator. Formally, we estimate:

$$\hat{\alpha}_M = \frac{1}{n_1} \sum_{i \in I_1 \cap S_p} \left[Y_{1i} - \hat{E} \left[Y_{0i} | D_i = 1, P_i \right] \right]$$

where

$$\hat{E} \left[Y_{0i} | D_i = 1, P_i \right] = \sum_{j \in I_0} W \left(i, j \right) Y_{0j}$$

and Y_1 denotes the outcome of receive the treatment, Y_0 the outcome of not receive the treatment, I_1 the set of individual treated, I_0 the set of individuals in the control group, S_p the region of common support, $P_i = P \left(D_i = 1 | X_i \right)$ and n_1 is the number of individuals in the set $I_1 \cap S_p$. $W \left(i, j \right)$ is a weight matrix, which in the case of Kernel matching is defined as

$$W \left(i, j \right) = \frac{K \left(\frac{P_j - P_i}{\delta_n} \right)}{\sum_{k \in I_0} K \left(\frac{P_k - P_i}{\delta_n} \right)}$$

where $K \left(. \right)$ is a kernel function and δ_n is a bandwidth parameter. In this paper, the propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. As propensity score we use the probabilities derived from the school-choice model. According to our notation being treated means to receive the treatment full-day while the control group contains the individuals that were enrolled in half-day schools.

The propensity score matching estimator allows to identify the average treatment effect on treated

under the following assumptions[11]

$$\begin{aligned} P\left(D_i = 1|X_i\right) &< 1 \\ E\left(Y_0|D_i = 1, P_i\right) &= E\left(Y_0|D_i = 0, P_i\right) \end{aligned}$$

The first assumption (overlap assumption) ensures that for each value of the regressors each treated individual has an analog on the control group, and so the matching between them can be done. The second assumption (conditional mean independence assumption) can be seen as a strong assumption in our framework since it requires that the expected value of the outcome of the control group (untreated) is not affected by the treatment. There are several situations where that might not be true. Therefore, to obtain identification of the average treatment effect on treated we have to rule out all these situations.

5.2 Diff-in-Diff Propensity Score Matching

The identification strategy described in the previous subsection allows to identify the effects of full-day school on students outcomes after the reform. In order to evaluate the reform, it is also important to understand how the effects of full-day school changed as result of the reform.

In this subsection the goal is to identify the parameter $\Delta_{t',t}$. That is, this section analyzes how the reform affected the value of switching from half-day to full-day for students that were enrolled in full-day schools. These effects are estimated using a difference-in-differences propensity score matching estimator for repeated cross-section[12], defined as

$$\alpha_{DIDM} = \frac{1}{n_{1t}} \sum_{i \in I_{1t} \cap S_p} \left[Y_{1ti} - \sum_{j \in I_{0t} \cap S_p} W\left(i,j\right) Y_{0tj} \right] - \frac{1}{n_{1t'}} \sum_{i \in I_{1t'} \cap S_p} \left[Y_{1t'i} - \sum_{j \in I_{0t'} \cap S_p} W\left(i,j\right) Y_{0t'j} \right]$$

[11] These assumptions are weaker than the assumptions

$$\begin{aligned} : \quad & P\left(D_i = 1|X\right) < 1 \\ & Y_{0i} \perp D_i | P\left(D_i = 1|X\right) \end{aligned}$$

frequently mentioned in the literature. However, since we are only interested in evaluate the effect on the mean they are sufficient

[12] Notice that the estimator proposed is not the usual difference-in-differences propensity score estimator mentioned in the treatment effects literature. The estimator we propose is the difference between the propensity score matching estimators after and before the reform and so it identifies how the reform changed the effects of full-day school for the treated. On the other hand, under the suitable assumptions, the usual difference-in-differences propensity score matching estimator identifies the average treatment effect on treated.

where $I_{1t}, I_{1t'}, I_{0t}, I_{0t'}$ denote the treatment and comparison group data sets in each time period, Y_{1t} denote the outcome of treated at time t, Y_{0t} the outcome of control group in time t,$Y_{1t'}$ denote the outcome of treated at time t', $Y_{0t'}$ the outcome of control group in time t', S_p the region of common support[13], n_{1t} is the number of individuals in the set $I_{1t} \cap S_p$ and $n_{1t'}$ is the number of individuals in the set $I_{1t'} \cap S_p$. $W(i,j)$ is a weight matrix. The treatment group will be the students in full-day schools while the control group will be the students in schools with half-day shifts.

The data for students that attended high-school after the reform includes the cohort with 25-26 years old in our database (14-15 years-old in 1997), while the data for before the reform includes the cohort with 29-30 years old (18-19 year-old in 1997). It is expected that the former group started high school after 1997 and so spent must of their high-school dealing with the reform while the latter group finished the high-school before the reform started to be implemented in 1997.

The identification of how the reform changed the effects of full-day school for the treated group by the difference-in-differences propensity score matching estimator is only possible under the following assumptions. First, the use of repeated cross-section relies on the assumption that treated and control groups before and after the reform have the same distribution of unobservables. That is, despite the same individual is not observed before and after the reform, the individuals defined as treated before the reform are equal with respect to unobservables to the individuals on treated after the reform (the same is true for the individuals in the control group). Furthermore, the identification of the dynamic effects of the 1997 reform by this estimator requires the analog to the overlapping assumption and the conditional mean independence assumption for a difference-in-differences procedure. That is,

$$E\left(Y_{0t} - Y_{0t'}|P, D=1\right) = E\left(Y_{0t} - Y_{0t'}|P, D=0\right)$$

$$0 < P\left(D=1|X\right) < 1$$

6 Data and Outcomes

Our empirical analysis is carried out using a new and rich data set from Chile that allows to estimate the effects on labor market, educational and behavioral outcomes. The data was obtained from a retrospective survey to 4497 individuals aged 25-30 in 2008. Given our goals we restricted the analysis

[13]The support must be the same for both cohorts

to the subsample of individuals that have enrolled in high-school.

Since the reform was implemented in 1997, it is expected that the cohort of individuals with 29 and 30 years old in 2008 (18-19 year-old in 1997) did not experience the chances in the schooling system. On the contrary, those with 25 and 26 years old in 2008 (14-15 year-old in 1997) were always enrolled in high schools that could have been affected by the reform. Since the goal is to evaluate the effects of the reform, the main focus of the paper is in the cohort with 25-26 years. Nevertheless, the cohort 29-30 years is also used to have a repeated cross section that allows the application of a difference-in-differences matching estimator. For the subsample considered there are 1658 observations for the cohort 25-26 and 951 observations for the cohort 29-30.[14]

The survey from which the data is obtained only allows the individuals to indicate one school shift. Moreover, from the survey is not possible to identify how many years the student attended the school shift indicated. To avoid high measurement errors, we consider that the answer provided should be interpreted as saying the school shift attended for more time during the high-school. So, all the results should be interpreted according to that definition. In other words, when we refer to students in full-day schools, we mean students whose number of years in a full-day shift was higher than the number of years in a half-time shift.

Table 2 reports for both cohorts the sample distribution of students for each type of school. This table shows that the proportion of students in full-day schools for the cohort 25-26 is almost twice the equivalent proportion for the cohort 29-30. This increase in the proportion of students enrolled in full-day schools occurs for the three forms of school management. This result is expected because as shown by table 1 the reform increased the supply of full-day schools.

In our data, students in a full day school have younger and more educated parents, come from families with higher income and had a lower retention rate in the elementary school. On the other hand, students in the half-day shifts have a higher number of siblings and a lower presence of parents at home. The differences in parents occupation are not significant since in all the cases the majority of parents are working. We should notice that there is an attenuation of the differences between students in full day shift and half-day shift when we control for form of school management. This characterization is common for both cohorts as shown in table 5 and 6. Tables A4 and A5 reveal that

[14]For some outcomes the number of observations is smaller. For example, for the probability of no motherhood before eighteen we restrict the analysis to women which clearly implies a lower subsample.

these differences between the social-economic background characteristics for students in full-day and half-day schools occur for both half-day shifts (either morning or afternoon) but they are stronger relatively to the afternoon shift.

Table 3 and 4 describes the mean and standard deviation for the outcomes under analysis. These tables suggest a kind of monotonicity in the performances of the treatments, with full-day schools obtaining better results than half-day schools. Relatively to academic performance, students that attended full-day schools obtained higher high-school's grades, had more years of schooling and a lower probability from high-school dropout. Relatively to the latter indicator it is important to notice that for the cohort with 25-26 year-old the probability of high-school dropout in half-day schools is almost twice the probability in full-day schools. Furthermore, the proportion of students that enrolled in college is higher for full-day schools. Cognitive and social ability scores reveal also a better performance of students that attended full-day schools.[15]

The performance in social indicators is also positively correlated with the enrollment into full-day schools. That is particularly evident for motherhood, since the proportion of adolescent mothers is much lower for full day school's students. The results also suggest a dynamic effect of the reform on the probability of no motherhood before eighteen since the difference between full-day and half-day shifts is higher for the cohort 25-26. These results are in line with Kruger and Berthelon (2009)'s findings of a positive effect of the reform on reducing adolescent motherhood.

Relatively to the probability of being arrested there is also a positive effect of full-day school. Finally, it is important to notice that the differences in wages at age 25-26 between full-day and half-day schools are positive and relatively large. That difference is statistical significant for the cohort 25-26.

Tables A2 and A3 allow to compare, for the aforementioned indicators, the performance of students who attended a full-day shift with the performance of students who attended a morning shift and the performance of students who attended an afternoon shift. These tables show that the previously identified best performance of full-day schools, occurs either relatively to the morning shift or the afternoon shift. In any case, the worst performance is by far from students who attended an afternoon shift.

[15]The cognitive, social ability, auto-efficiency and metacognitive scores were standardized to have mean 0 over the overall sample.

7 Results

7.1 Simple School-Choice Model

Table 7 reports the estimation of the school-choice model under the assumptions described in subsection 4.1, using as base group full-day public schools.

This table shows that for public schools, mother's education increases the probability of choosing a full-day instead of a half-day school, suggesting that more educated mothers that chose a public school prefer full-day schools. Some possible explanations are the following. First, more educated mothers normally have employments that require more hours far from the family. Thus, they might prefer that their children spend more time in school because they could not be with them during the day. That is, more educated mothers prefer to enroll their children into full-day schools to reduce the number of hours they stay without adult supervision.

The underlying idea behind the reform provides another explanation for more educated mothers are more likely of choosing a full-day school. As the legislators, more educated mothers might have beliefs that attribute higher benefits to longer school days. These beliefs might be different for less educated mothers. Some anecdotal evidence also suggest that more educated mothers believe that there is a positive correlation between full-day schools and good schools, particularly for public schools. Relative to this explanation we should notice that there is not evidence that parents that give more importance to their children education have an higher probability of choosing a full-day school, and that could provide some support against our last hypothesis. Furthermore, we do not have any information that allows to infer that mothers' education has effects on their beliefs about the benefits of each type of school shift.

Finally, an alternative explanation related to the latter, but which allows all mothers to have the same beliefs about school performance, is the following. Suppose all mothers have beliefs such that full-day school is more beneficial but the enrollment in a full-day school requires that mothers exert some effort. So, an explanation for more educated mothers have an higher probability of choosing full-day might be that they are more willing to exert the effort or the effort has a lower cost for them.

In public schools the probability of choosing a half-day shift is also decreasing in the level of preparation given by the elementary school. Furthermore, at a ten percent significance level, there is a positive and significant effect of family income in the probability of choosing an half-day school.

In voucher schools the difference between the coefficients associated with the two alternatives is not statistically significant for any of the regressors. Finally, in private schools the probability of choosing half-day instead of full-day is decreasing in the preparation given by the elementary school. It is important to notice that our results suggest that the regressors' effects on the probability of choosing each shift are smaller in voucher and private schools than in public schools. This provides some evidence that parents find more differences between the shifts in the latter form of school management.

The previous results show that students that arrive with a better preparation to high-school have an higher probability of choosing a full-day school conditional on the choice of a public or private school. This might suggest that public and private full-day schools tried to choose the best students.

Relatively to the comparison across forms of school management we found that an higher family income and parents education increase the probability of choosing private and voucher schools instead of a full-day public school. An obvious explanation for the positive effect of family income in the probability of choosing a private school is that in this form of school management it is necessary to pay a tuition. In voucher schools there is not a tuition, but some of them asked for an additional fee. Furthermore, these types of form of school management have the possibility of choosing the students accepted and so it is possible that they prefer students from families with higher income and more educated parents.

The coefficients of the constant associated with form of school management reveal what was expected, that is, voucher and private schools will have a lower likelihood of choice than public schools. It is important to notice that the difference in the coefficients between public and private schools is very substantial.

The demand estimation for the cohort with 29-30 years old shows that in public schools there are no statistical differences in the coefficients of mother's education. On the other hand, for voucher and private schools, students with lower preparation from elementary school have an higher likelihood of choosing an half-day school.

The previous results allow to compute for each individual in the sample the predicted probability of enroll in a full-day school (given our goal we denote this probability by propensity score). Figures 1 and 2 report the distribution of these probabilities, distinguishing between individuals in the treated and control group. As expected, the distribution for the treated is more to the right than the distribution of the control group. The comparison between the two cohorts shows that larger values of the propensity

score have an higher density in the distributions of the cohort 25-26 than in the distributions of the cohort 29-30. This implies that for the individuals in the cohort 25-26 the probability of enrollment into a full-day school is higher. The differences in the distribution of the propensity score for the treated and control groups suggest that selection into treatment is not at random.

7.2 Student's outcomes

As explained in subsection 5.1, under some assumptions the propensity score matching estimators allow to identify the average treatment effects on treated. The overlap assumption is imposed in our estimation by restricting it to observations with common support. In what follows we assume that conditional mean independence assumption is also satisfied.

Our results using the propensity score matching method and without control for form of school management are reported in table 8. This table reveals that for the likelihood of high-school dropout and for cognitive scores, on average, the assignment to a full-day school was positive for the cohort 25-26. The positive effect of full-day school on cognitive scores seems to suggest that, as expected by legislators and police makers, the increase in school day's length leads to an higher acquisition of knowledge. Relatively to the effect on probability of dropout, it is not clear what is the mechanism that explains why full-day school reduces dropout. In fact, since enrollment into a full-day school implies that students spend more time in school, reducing the available time for other activities (e.g. part-time jobs), it was reasonable to think that full-day school would have had a negative effect, increasing dropout. We think that one possible explanation for the result found, is that full-day students spend more time in school and so it is easier to detect when they are thinking to dropout. Thus, it is easier to take measures to avoid that dropout. It is also possible that the extra time spent in school increases the links between the student and the school and so it reduces the likelihood of a dropout.

For the same cohort, a negative value of switching from half-day to full-day was found for social ability scores, probability of employment and wages. However, for all these outcomes the value is not statistically significant. For the probability of going to college, probability of being arrested, auto-efficiency scores and metacognitive scores the value from switching is positive but not statistically significant.

Relatively to wages it is important to notice that longer school days might have two effects with different directions. On one hand, if enrollment into a full-day school had increased the probability

of going to college, then worker's qualifications would also have increased and that would have had a positive effect on wage. On the other hand, if going to college had delayed the entry into the labor market, then going to college would have reduced the experience at age 25-26. This would have had a negative effect on wages. These two effects with different directions might help to explain why longer school days had small and not significant effects on wages.

The absence of enduring effects of longer school days on wages and employment was also found by Llach, Adrogue and Gigaglia (2009) for the increase of school day's length in Buenos Aires in 1971. These results suggest that longer school days have small long-term effects on labor outcomes maybe because people that are not treated tend to reduce the gap created by the treatment in the post-treatment periods.

We think that our results suggest that for students that were enrolled in full-day schools after the reform the switching from a half-day to a full-day school was positive, essentially on academic outcomes and on the probability of no adolescent motherhood. However, longer school days did not translate into better labor market outcomes.

Conventional wisdom suggests that the benefits of full-day school should be higher for students whose parents have less education. The intuition is as follows. It is expected that more educated parents are able to provide a greater and more efficient help to their children than less educated parents. Furthermore, it is expected that given the higher preparation of teachers, they could provide a greater help to students than less educated parents. On the other hand, for more educated parents (and since they could provide a personalized help) the ranking is not so evident, that is, the time spending on learning with more educated parents might be more efficient than the time spent in school. Thus, by staying at school with teachers instead of going to home and stay with parents, students whose parents have less education might have greater benefits than students whose parents have more education. Tables A7 and A8 seems to suggest that this is true except for cognitive scores[16]. This tables shows that cognitive scores is the only outcome where the benefits of full-day for the treated is higher for students with more educated parents. For all the other outcomes, full-day school translates into benefits for the treated with less educated parents and these benefits are higher than for students with more educated parents. Indeed, for some outcomes full-day school had negative

[16]In these tables more education means to have at least completed the high-school while less education means to have less than complete high-school.

but not significant effects for the treated with more educated parents.

Tables 9 to 11 report the estimated average treatment effect on treated using the propensity score matching estimator and controlling for the form of school management. In public schools, switch to full-day had positive effects on the probability of being arrested for the cohort 25-26. There is not statistical evidence that the other outcomes of the students that attended full-day schools would have been different if they had attended a half-day school. In fact for some outcomes as actual wages and cognitive scores if something happens, it is a negative effect of treatment full-day.

In voucher schools the average treatment effect on treated with full day school after the reform is positive for the social ability scores and negative for the probability of dropping from high school. This implies that for individuals that attended a full-day school after the reform the assignment to that treatment instead of a half-day school was beneficial relatively to these two outcomes. Furthermore, for all the remain coefficients, with exception of the likelihood of being employed at age 25-26, the switch from half-day to full-day had a positive effect but not significant for the students that switch. These results suggest that students in voucher schools are one of the groups that had more benefits with the reform. These higher positive effects of the full-day shift on voucher schools relatively to public schools might help to understand why there was a sharp increase in the market share of voucher schools after the reform, as described in table A1.

Relatively to private schools, the results reveal that full-day school had a negative effect on auto-efficiency and social ability scores for the treated in the cohort 25-26. On the other hand, there was positive benefits for the treated with full-day school in terms of the probability of dropping from high school.

The heterogeneity of the results for the different forms of school management provides evidence that not only the amount of time spent in school is important but also how the time is allocated. In particular our results suggest an higher efficiency of voucher schools in the utilization of the additional time. Some anecdotal evidence suggests that this higher efficiency was explained by greater and more effective monitorization of teachers in vouchers schools which have guaranteed that the extra class time was used for learning activities. On the other hand, in public schools the monitorization was weaker and so several times students stayed in school but the extra time was not used for learning activities.

Tables 8 to 11 show that for students that enroll in full-day schools after the reform the value

on the probability of no motherhood before eighteen of switching from half-day to full-day is always positive. That is, our results suggest full-day school had a positive effect in the reduction of adolescent motherhood for the treated. However, statistical significant results are only obtained for voucher schools and without controlling for the form of school management. These results are in line with the findings obtained by Kruger and Berthelon (2009), since they also found a positive effect of the reform to reduce adolescent motherhood. As pointed by Kruger and Berthelon (2009), the switch from a half-day to a full-day school increases human capital accumulation and reduces the number of hours spent without adult supervision. These two effects of full-day schools might help to explain why this school-system reduces adolescent motherhood.

7.3 DID-Propensity Score Matching

Tables 14 presents the main estimates obtained using the DID-propensity score matching approach. This table shows that whether the reform implied a positive or negative variation on the average value of switching from half-day to full-day depends on the outcome analyzed. For example, the reform had positive effects on the probability of no motherhood before eighteen by increasing the benefit of enroll in a full-day school, but it implied a negative variation on the value of switching from half-time to full-day for the probability of being employed at age 25-26.

It is also important to notice that the results also depend on the support considered. In particular, the dynamic effects of the reform on cognitive scores and on the probability of high school dropout are opposite to the dynamic effects without common support. Under common support for both outcomes the reform implied a negative variation despite the value for the probability of high school dropout is not statistical significant. Notice that by imposing a common support we eliminate from the sample the individuals in the cohort 29-30 with lower propensity scores and the individuals in the cohort 25-26 with higher propensity scores. Thus, the results seem to suggest that for these individuals the effects of the reform on cognitive scores were more beneficial than for the individuals in the common support and the opposite happens relatively to the probability of high school dropout.

Table 14 shows that the 1997 reform increased the benefits of full-day school by reducing the overall likelihood of adolescent motherhood. The reform also had positive but not significant effects on the likelihood of high-school dropout and on the likelihood of arrest. On the other hand, for all the other outcomes analyzed, the reform implied a negative variation in the effects of full-day school for

the "treated". Thus, these results might suggest that the reform implied a reduction in the benefits of attend a full-day school.

In the interpretation of these results we should remember that the cohort under analysis is the first group of students affected by the reform. Furthermore, the reform created several challenges to schools that moved from two half-day shifts to a full-day shift. So, one possible explanation for the results found is that some schools might had problems to surpass these challenges and those did not allow an higher improvement in the outcomes of the students. However, we do not have enough information that allows to conclude that.

Another possible explanation for these results is the following. The goal of the reform was to improve education's quality under the belief that full-day was better than half-day. So, under this goal, we expect that a big share of the first movers were students with lower results in the outcomes. This could have had some negative peer effects for students that would have attended a full-day shift also without the reform.

Nevertheless, when we evaluate the effects of the reform, we cannot forget that the reform implied an increase in the proportion of students that attended a full-day school. So, if full-day kept providing benefits, despite the reduction of these benefits, then the reform might have been positive, if the gains for the students who would have not attended a full-day school without the reform are higher than the losses for the students who would have attended a full-day school also without the reform. Thus, to analyze the effects of the reform we have to combine the results of this section where we analyze how the effects of full-day schools changed after the reform with the results of the previous section where we analyze the effects of full-day school after the reform.

As mentioned before, the reform increased the benefits of full-day school on the likelihood of adolescent motherhood, on the likelihood of high-school dropout and on the likelihood of arrest. Thus, for these three outcome we unambiguously estimate a positive effect of the reform, since the reform also increase the percentage of students enrolled in a full-day school. By analogy, since full-day school had a negative effect on the wages of the treated and the effect became more negative after the reform, it is expected that the reform had a negative effect on wages. On the other hand , the effect of the reform was ambiguous for the other outcomes because for these outcomes, after the reform, there is a benefit of enroll in a full-day school but that benefit was reduced by the reform. For these outcomes the reform was positive for students who would have not attended a full-day school without

the reform but it was negative for students who would have attended a full-day school also without the reform.

In order to have an idea of the overall effects of the reform consider the following back of the envelope exercise. Consider the results for the common support, assume that the proportion of students who would have attended a full-day school without the reform was 27 percent (the proportion of students in the cohort 29-30 years old who attended a full-day school) and the proportion of students in full-day schools with the reform is 47 percent (the proportion of students in the cohort 25-26 years old who attended a full-day school). Assume also that the reform has not changed the outcomes in half-day schools. Under these assumptions, we obtain a positive impact of the reform on the probability of no motherhood before eighteen, on the likelihood of not dropping from high-school, on social-ability, auto-efficiency and metacognitive test-scores, and on the likelihood of never have been arrested. On the other hand, the effects of the reform are negative on college enrollment, on cognitive scores and on labor outcomes.

In the previous analysis we gave everyone the same weight but we did not take in account equity issues. Remember that if we take in account equity issues, the treatment should be provided to everyone when it is positive.

8 Differences between the two half-day shifts

In this section we analyze how our results change when we consider that instead of two treatments for the school schedule we have three treatments

$$\begin{aligned} D_1 &= \text{Full day Schooling} \\ D_2 &= \text{Half day Schooling - Morning} \\ D_3 &= \text{Half day Schooling - Afternoon} \end{aligned}$$

The distinction between the two half-day shifts might be important if they lead to different performances (as suggested by tables A2 and A3) and the choice of the treatments is not at random.

The identification strategy used is exactly the same as before.

8.1 Simple School-Choice Model

Table A6 reports the estimation of the school-choice model. Those results show that for public schools, mother education increases the probability of choosing full-day instead of morning or afternoon. The effect is stronger for the afternoon shift. This result suggests that more educated mothers that have chosen a public school have a preference for full-day schools.

As explained in subsection 7.1 there are several explanations that might help to understand why mother's education increases the probability of choosing a full-day school instead of a half-day shift. Nevertheless, it is important to understand why the effect is stronger for the afternoon shift. In section 8.2 we show that the advantages of full-day school are higher for students that switch from afternoon to full-day. This might help to explain why the effect of mother's education on the probability of choosing full-day is stronger relatively to the afternoon shift. For example, more educated mothers might be more aware of these higher benefits or more educated mothers might be more willing to exert effort or have a lower effort to enroll their children in a full-day school instead of an afternoon shift.

In voucher schools we have that the difference between the coefficients associated with the three alternatives is not statistically significant for any of the regressors. Finally, in private schools family income at age fifteen decreases the probability of choosing morning instead of full-day while father education decreases the probability of choosing afternoon instead of full-day. As in the model with only two treatments, for voucher and private schools the regressors' effect on the probability of choosing a full-day school is smaller than for public schools. That might suggest that parents find more differences between the shifts in the latter category of school.

8.2 Student's outcomes

The propensity score matching estimators reported in tables 12 and 13 show that, on average, the choice of a full-day school instead of an afternoon shift had positive effects on the probability of going to college, on cognitive test scores and on the probability of high-school dropout. On the other hand, if the student had attended a morning shift instead of a full-day school then the differences on these outcomes would have not been statistically significant. In fact, for enrollment in college, if something happened, it is that the switch from a morning-shift to full-day school had a negative effect.

Furthermore, our results show that students who attended a full-day school had an higher wage

than the wage they would have received if they had enrolled into an afternoon shift. This result is statistical significant at a five percent significance level.

The results in tables 12 and 13 suggest that enrollment into a full-day school was positive for the individuals whose alternative was to attend an afternoon shift. Notice that for the treated whose alternative was to attend an afternoon shift, besides the positive effects of full-day school on academic outcomes, there is also a positive effect on wages. On the other hand, if the individuals enrolled in full-day schools had attended a morning shift instead, then the benefits of the full-day school were less significative and for some outcomes might have been some losses associated with the enrollment into a full-day school.

These results are in line with the findings in Biggers (1980) and Klein (2001). They show that the majority of older students achieve the maximum memory alertness during the morning and so academic performance improves by switching from afternoon to morning. Thus, if this is true, students that switched from afternoon to full-day not only spent more time in school but they also started to have classes during the hours of optimal attention. On the other hand, the latter positive effect did not occur for students that switch from morning to full-day.

The psychological and bio-psychological literature[17] also have documented that short-term memory performance is better in the morning and there is a functional decline during the early afternoon hours. This might also help to explain why the switch from afternoon to full-day was more positive than the switch from morning to full-day, particularly on the academic outcomes.

The positive effects of switch from afternoon to full-day might also be explained by some motivational effects associated with the switch. Some anecdotal evidence suggests that in Chile there is a stigma associated with the attendance of the afternoon shift (i.e. people think that only bad students attend the afternoon shift). Therefore, the switch from afternoon to full-day might have had positive effects on the students' motivation because before they thought that the probability of success on academic performance and on life was very low and so the incentive to exert effort was also low.

DID-Propensity score matching estimation

Tables 15 and 16 report the difference-in-differences propensity score matching estimators for the outcomes analyzed. Under the aforementioned assumptions these estimators allow to identify for

[17] See Gates (1916) and Blake (1967)

people enrolled in full-day schools how the 1997 reform changed the value of switching from half-day to full-day using as counterfactual either the morning shift (table 15) or the afternoon shift (table 16).

These tables show that the effect of enrollment into a full-day school on the probability of no motherhood before eighteen was positively affected by the reform either when the counterfactual is to be enrolled in a morning shift or to be enrolled in an afternoon shift.

Despite the aforementioned similarity between the two half-day shifts in the effects of the reform on the value of switching from half-day to full-day for the probability of no motherhood before eighteen, tables 15 and 16 suggest that there are important differences between the two half-day shifts. In particular, when the counterfactual is the afternoon shift the variation implied by the reform on the value of switch to a full-day school was positive for the probability of going to college, for cognitive scores, for the probability of being employed and for wages, while the variation implied by the reform on these outcomes is negative when we consider as counterfactual the morning shift. On the other hand, for the counterfactual morning the reform had a positive effect on the value of switching from half-day to full-day for the probability of dropping from high-school and social ability scores, while when the afternoon shift is the counterfactual the effect is exactly the opposite.

It is important to notice that for both half-day shifts the dynamic effects of the reform on high-school dropout change when we impose a common support.

As we explained before a complete analysis of the reform should not only take in account how the effect of attend full-day school changed with the reform but should also take in account that some students would have not attended a full-day school without the reform. Furthermore, since there is not a scientific and objective way to establish a ranking in the importance of each outcome analyzed, it is difficult to make an overall appreciation about the effects of the reform on the value of switching from half-day to full-day. Nevertheless, we consider that the reform increased the benefits of attend a full-day school for students in full-day schools that have as unique outside option to enroll into afternoon shift. On the other hand, the effects of the reform on the value of switching from morning to full-day were ambiguous and depend on the importance given to each outcome.

9 Conclusions

This paper presents new evidence of the effects of time spent in school during secondary education on a variety of different dimensions, ranging from schooling attainment and social behavior during adolescence to cognitive, socio-emotional and labor market outcomes during adulthood. We do this by exploiting the convenient structure of the Chilean schooling system and its changes during the period 1995-2000.

Our results suggest in general longer school days have positive effects on academic and social outcomes which do not necessarily translate into better labor market outcomes.

With respect to the effects of the 1997 Chilean reform, we find that the individuals who benefits the most were those who, without the reform, would have attended high schools with afternoon shifts. For them, the reform had positive effects on probability of college enrollment, likelihood of not dropping from high-school, cognitive test scores and monthly wages. This result provides some support for psychology theories which claim that students are more productive during the morning.

We also find that voucher schools were the form of school management where the reform had greater and more positive impact, particularly for outcomes such as motherhood, high-school dropout and social ability scores.

10 References

Bellei, C. (2009), Does Lengthening the School Day Increase Students' Academic Achievement? Results From a Natural Experiment in Chile, *Economics of Education Review 28, 629 - 640*

Biggers, J. (1980), Body Rhythms, the School Day and Academic Achievement, *Journal of Experimental Education 49, 45-47*

Blake, M. (1967), Relationship between Circandian Rhythm of Body Temperature and Introversion-Extraversion, *Nature 215, 896-897*

Blake, M. (1971), Temperament and Time of Day, in W.P Colquhoun (Ed.), *Biological Rhythms and Human Performance, 109-148*

Card, D. and A.Krueger (1992), Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States, *Journal of Political Economy 100, 1-40*

Dunn, R. (1985), It's Time to Handle Instructional Time Correctly, *Early Years 16, 47-49*

Epple,.D. and R.Romano (1998), Competition between Private and Public Schools, Vouchers and Peer Group Effects, *American Economic Review 88, 33-62*

Estadisticas de la Educacion(2006), Ministerio de Educacion

Fuller, B. (1987), What School Factors Raise Achievement in the Third World, *Review of Educational Research 57, 255-292*

Garcia, A. (2006), Evaluacion del Impacto de la Jornada Escolar Completa, *University of Chile Masters Thesis*

Gallego, F. and A.Hernando (2007), School Choice in Chile: Looking at the Demand Side, *mimeo*

Heckman,J., A.Layne-Farrar and P.Todd (1996), Does Measured School Quality Really Matter? An Examination of the Earnings Quality Relationship, *Does Money Matter? The Effect of School Resources on Student Achievement and Adult Sucess, Gary Burtless ed, Brooking Institution Press*

Heckman, J, H. Ichimura and P.Todd (1998), Matching as an Econometric Evaluation Estimator, *The Review of Economic Studies 65, 261-294*

Heckman, J, S.Urzua and E. Vytlacil (2006), Understanding instrumental Variables in Models with Essential Heterogeneity, *Review of Economics and Statistics 88, 389-432*

Karweit, N.(1983), Time on Task: A research review, *Center for Social Organization of Schools Report No.332*

Klein, J. (2001), Attention, Scholastic Achievement and Timing of Lessons, *Scandinavian Journal of Educational Research 45, 301-309*

Klein, J. (2004), Planning Middle School Schedules for Improved Attention and Achievement, *Scandinavian Journal of Educational Research 48, 441-450*

Kruger, D. and M.Berthelon (2009), Delaying the Bell: The Effects of Longer Schools Days on Adolescent Motherhood in Chile, *IZA discussion paper no.4553*

Llach, J., C. Adrogue and M. Gigaglia (2009), Do Longer School Days Have Enduring Educational, Occupational, or Income Effects? A Natural Experiment in Buenos Aires, Argentina, *Economia 10, 1 - 43*

Lee, J and R.Barro (2002), Schooling Quality in a Cross Section of Countries, *Economica 68, 465-488*

Marcotte, D. (2007), Schooling and test scores: A mother-natural experiment, *Economics of Education Review 26, 629-640*

Monte, A, C. DaSilva and J.Silverio (2000), Biological Rhythms in Education, *Psychologia Teoria Investigacao e Practica 5, 301-312*

Muyskens, P. and J.Ysseldyke (1998), Student Academic Responding Time as a Function of Classroom Ecology and Time of Day, *The Journal of Special Education 31, 411-424*

Pischke, J (2007), The Impact of Length of the School Year on Student Performance and Earnings: Evidence from the German Short School Year, *The Economic Journal 117, 1216 - 1242*

Rau, T., Sanchez, C., and Urzúa, S. (2011) School Choice and Unobserved Heterogeneity: Evidence from the Chilean Schooling System. *Manuscript, Northwestern University*

Rossmiller, R. (1983), Time on Task: a look at what erode time for instruction, *NASSP Bulletin 67, 45-49*

Smith,J and P.Todd (2005), Does matching overcome LaLonde's critique of nonexperimental estimators, *Journal of Econometrics 125, 305-353*

Valenzuela (2005), Partial Evaluation of a Big Reform in the Chilean Education System: From a Half Day to a Full Day Schooling, *University of Michigan Doctoral Dissertation*

Table 1: Number of Schools that switch to the full-day regime (source: Garcia, 2006)

Year	Number that switch to Full-day	Total number of FDS	Proportion of FDS
1997	3157	3157	30.6%
1998	663	3820	35.9%
1999	335	4155	38.8%
2000	527	4682	44.1%
2001	539	5221	48.3%
2002	535	5756	52.9%
2003	472	6228	55.5%
2004	368	6596	58.4%
2005	458	7054	61.0%

Data obtained from Garcia(2006) and Estadisticas de la Educacion(2006)

Table 2: School-Choice

		Public	Voucher	Private	Total
Full-Day	Cohort 25-26	282 (17.04)	271 (16.37)	183 (11.06)	736 (44.47)
	Cohort 29-30	130 (13.76)	74 (7.830)	49 (5.185)	253 (26.77)
Half-Day	Cohort 25-26	491 (29.67)	358 (21.63)	70 (4.23)	919 (55.53)
	Cohort 29-30	389 (41.16)	244 (25.82)	59 (6.243)	692 (73.23)
Total	Cohort 25-26	773 (46.71)	629 (38.01)	253 (15.29)	1655 (100)
	Cohort 29-30	519 (54.92)	318 (33.65)	108 (11.43)	945 (100)

This table reports the number of students in each type of school. The proportion of students in each type of school for each cohort is reported in parentheses

Table 3: Outcomes descriptive statistics for the cohort 25-26

	Full Day	Half Day	Difference
Cognitive Scores	0.299	0.0498	0.2494
	(1.096)	(1.023)	(.0522)
Auto Efficiency scores	0.0123	0.00573	0.0066
	(0.979)	(0.986)	(.0486)
Social Ability scores	0.0725	0.0394	0.0331
	(0.890)	(0.945)	(.0456)
MetaCognitive scores	0.00232	0.0170	-0.0146
	(0.926)	(0.976)	(.0474)
No motherhood before 18	0.957	0.933	0.0239
	(0.204)	(0.251)	(.0114)
Number of Children	0.560	0.756	-0.1956
	(0.774)	(0.851)	(.0405)
Have been arrested	0.00819	0.0197	-0.0116
	(0.0902)	(0.139)	(.0059)
Years of schooling	13.88	13.08	0.8024
	(2.492)	(2.306)	(.1358)
Grades in High School	3.835	3.577	0.2578
	(1.020)	(1.084)	(.0524)
Attend college	0.665	0.544	0.1209
	(0.472)	(0.498)	(.0241)
Drop from High School	0.0666	0.117	-0.0504
	(0.249)	(0.322)	(.0144)
Wage at age 25-26	281733.3	254405.6	27327.68
	(197576.4)	(165462.9)	(11220.54)
Employed at age 25-26	0.624	0.638	-0.0143
	(0.485)	(0.481)	(.0238)
N	737	921	

Note: Standard deviation of the mean and standard error of the difference reported in parentheses.

Table 4: Outcomes descriptive statistics for the cohort 29-30

	Full Day	Half Day	Difference
Cognitive scores	0.117	-0.0402	0.1573
	(1.018)	(0.939)	(.0703)
Auto Efficiency scores	0.238	0.166	0.0715
	(0.973)	(0.904)	(.0676)
Social Ability scores	0.223	0.122	0.1009
	(0.847)	(0.948)	(.0675)
MetaCognitive scores	0.174	0.110	0.0641
	(0.958)	(0.920)	(.0687)
No motherhood before 18	0.941	0.924	0.0173
	(0.236)	(0.265)	(.0189)
Number of Children	1.158	1.266	-0.1077
	(1.050)	(1.041)	(.0766)
Have been arrested	0.0157	0.0232	-0.0075
	(0.125)	(0.151)	(.0106)
Years of schooling	13.92	13.24	0.6746
	(2.675)	(2.534)	(.1984)
Grades in High School	3.728	3.454	0.2739
	(1.052)	(1.074)	(.0784)
Attend college	0.569	0.484	0.0844
	(0.496)	(0.500)	(.0365)
Drop from High School	0.114	0.176	-0.0621
	(0.318)	(0.381)	(.0267)
Wage at age 25-26	249644.4	235389.0	14255.4
	(193517.7)	(202765.8)	(20310.21)
Employed at age 25-26	0.533	0.500	0.0333
	(0.500)	(0.500)	(.0366)
N	255	696	

Note: Standard deviation of the mean and standard error of the difference reported in parentheses.

Table 5: Socio-economic background controls' descriptive Statistics for cohort 25-26

	Full Day	Half Day	Difference
Preparation during elementary school	2.202	2.327	-.1246
	(0.881)	(0.875)	(0.434)
Father age	59.52	60.62	-1.096
	(15.57)	(17.03)	(.8104)
Father education			
Less than complete elementary school	0.105	0.177	-0.072
Elementary School	0.087	0.146	-0.059
Incomplete High-School	0.122	0.156	-0.034
High School	0.327	0.289	0.038
Incomplete tecnica superior	0.017	0.015	0.002
tecnica superior	0.066	0.091	-0.025
Incomplete College	0.062	0.038	0.024
College	0.192	0.084	0.108
Graduate	0.022	0.004	0.018
Mother age	53.22	53.73	-.5090
	(11.10)	(11.63)	(.5632)
Mother education			
Less than complete elementary school	0.099	0.182	-0.083
Elementary School	0.117	0.138	-0.021
Incomplete High-School	0.155	0.207	-0.052
High School	0.312	0.305	0.007
Incomplete tecnica superior	0.012	0.015	-0.003
tecnica superior	0.077	0.059	0.018
Incomplete College	0.051	0.029	0.022
College	0.171	0.061	0.109
Graduate	0.007	0.004	0.003
Number of siblings	2.528	2.579	-.0509
	(1.648)	(1.625)	(.0808)
Family income at age 15	2.982	2.697	.2851
	(1.001)	(0.814)	(.0447)
Father presence	1.575	1.580	-.0058
	(0.867)	(0.879)	(.0434)
Father occupation	1.086	1.072	.0143
	(0.330)	(0.312)	(.0186)
Mother presence	1.185	1.188	-.0032
	(0.554)	(0.567)	(.0278)
Mother occupation	1.902	1.993	-.0907
	(0.920)	(0.935)	(.0483)
Importance parents give to education	1.415	1.407	.0080
	(0.725)	(0.786)	(.0375)
N	737	921	

Note: Standard deviation of the mean and standard error of the difference reported in parentheses.

Table 6: Socio-economic background controls' descriptive Statistics for cohort 29-30

	Full Day	Half Day	Difference
Preparation during elementary school	2.157	2.319	-.1621
	(0.783)	(0.869)	(.0620)
Father age	65.29	66.04	-.7500
	(17.25)	(17.26)	(1.2633)
Father education			
Less than complete elementary school	0.189	0.233	-0.044
Elementary School	0.138	0.173	-0.035
Incomplete High-School	0.105	0.122	-0.017
High School	0.255	0.270	-0.015
Incomplete tecnica superior	0.008	0.009	-0.001
tecnica superior	0.067	0.069	-0.002
Incomplete College	0.033	0.041	-0.007
College	0.197	0.077	0.120
Graduate	0.008	0.006	0.002
Mother age	57.62	58.51	-.8865
	(12.52)	(12.85)	(.9342)
Mother education			
Less than complete elementary school	0.190	0.217	-0.027
Elementary School	0.139	0.179	-0.041
Incomplete High-School	0.187	0.191	-0.005
High School	0.254	0.294	-0.040
Incomplete tecnica superior	0.008	0.004	0.004
tecnica superior	0.067	0.043	0.025
Incomplete College	0.016	0.022	-0.006
College	0.131	0.046	0.085
Graduate	0.008	0.004	0.004
Number of siblings	2.612	2.889	-.2776
	(1.760)	(4.065)	(.2632)
Family income at age 15	2.858	2.628	.2298
	(0.982)	(0.874)	(.0663)
Father presence	1.559	1.626	-.0670
	(0.868)	(0.898)	(.0653)
Father occupation	1.074	1.074	.0005
	(0.334)	(0.318)	(.0276)
Mother presence	1.190	1.212	-.0221
	(0.560)	(0.586)	(.0425)
Mother occupation	2.026	1.947	.0789
	(0.927)	(0.939)	(.0723)
Importance parents give to education	1.424	1.543	-.1196
	(0.671)	(1.003)	(.0678)
N	255	696	

Note: Standard deviation of the mean and standard error of the difference reported in parentheses.

Table 7: Demand Estimation

	25-26		29-30	
	Coeff.	t-stat.	Coeff.	t-stat
Voucher	-1.360***	(-4.46)	-1.099**	(-2.76)
Private	-7.520***	(-13.25)	-5.711***	(-7.88)
Half-Day Public				
Father education	0.0545	(1.08)	-0.0604	(-0.92)
Mother education	-0.114*	(-2.14)	0.0310	(0.40)
Family income at age 15	0.150	(1.80)	0.216	(1.96)
Preparation during elementary school	0.176*	(2.32)	0.138	(1.21)
Importance parents give to education	-0.0208	(-0.20)	0.238	(1.72)
Full-Day Voucher				
Father education	0.120*	(2.16)	-0.0369	(-0.41)
Mother education	0.0555	(0.96)	0.121	(1.16)
Family income at age 15	0.211*	(2.04)	0.389*	(2.34)
Preparation during elementary school	-0.0332	(-0.34)	-0.284	(-1.55)
Importance parents give to education	0.00247	(0.02)	-0.109	(-0.47)
Half-Day Voucher				
Father education	0.0479	(0.90)	0.0343	(0.50)
Mother education	0.0378	(0.68)	0.100	(1.21)
Family income at age 15	0.295**	(2.99)	0.191	(1.48)
Preparation during elementary school	0.112	(1.24)	0.150	(1.12)
Importance parents give to education	0.0841	(0.74)	0.222	(1.49)
Full-Day Private				
Father education	0.465***	(6.66)	0.192	(1.77)
Mother education	0.196**	(2.82)	0.352**	(3.06)
Family income at age 15	1.144***	(7.83)	0.847***	(3.92)
Preparation during elementary school	-0.257	(-1.87)	-0.442	(-1.86)
Importance parents give to education	0.0959	(0.56)	0.230	(0.98)
Half-Day Private				
Father education	0.331***	(3.69)	0.0649	(0.63)
Mother education	0.226*	(2.50)	0.313**	(2.73)
Family income at age 15	0.749***	(4.12)	0.769***	(3.66)
Preparation during elementary school	0.0822	(0.51)	0.103	(0.51)
Importance parents give to education	0.374*	(2.35)	0.387*	(2.09)
Observations	9198		5154	

t statistics in parentheses

*$p<0.05$, **$p<0.01$, ***$p<0.001$

Note: The results come from the estimation of a GEV model of type of school on socio-economic backgroud.. The base group is full-day public schools.
The values reported are the ratio between the values of the coefficient of the regressor and the coeffcient of the base group.

Table 8: Propensity Score Matching estimators - Full-Day vs Half-Day (Overall Sample)

	Cohort 25-26				Cohort 29-30			
	Treated	Control	$\Delta^{25/26}$	P-value	Treated	Control	$\Delta^{29/30}$	P-value
Academic Outcomes								
Enrollment in College	.6721	.6561	.0160	0.460	.5758	.5372	.0386	0.326
High School Dropout	.0574	.0843	-.0269	0.034	.1082	.1429	-.0347	0.172
Cognitive Test Scores	.2338	.1330	.1008	0.057	.2187	.1289	.0898	0.288
Social Outcomes								
No motherhood b/18	.9370	.9046	.0324	0.075	.9237	.9130	.0107	0.695
Social Ability Scores	.1265	.1324	-.0059	0.913	.1957	.1111	.0847	0.222
Auto Efficiency Scores	.0874	.0814	.0060	0.914	.1528	.1153	.0375	0.613
Metacognitive Scores	.0569	.0435	.0134	0.842	.1326	.0745	.0580	0.454
Ever Arrested	.0089	.0156	-.0067	0.214	.0174	.0273	-.0099	0.420
Labor Outcomes								
Employment at age 25/26	.6206	.6326	-.0120	0.697	.5455	.4954	.0501	0.212
Wage at age 25/26	279,404	279,835	-431	0.970	248,584	251,458	-2,874	0.897

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. The propensity score was defined as $P(D = Full - day)$ and it was derived from the probabilities obtained from the school-choice model with two treatments.
The common support for the cohort 25-26 is [0.1820,0.7770] and for the cohort 29-30 is [0.1126,0.6016]

Table 9: Propensity Score Matching estimators - Full-Day vs Half-Day (Students enrolled in Public High School)

	Cohort 25-26				Cohort 29-30			
	Treated	Control	$\Delta^{25/26}$	P-value	Treated	Control	$\Delta^{29/30}$	P-value
Academic Outcomes								
Enrollment in College	.5077	.5005	.0072	0.838	.4274	.4105	.0169	0.765
High School Dropout	.1077	.1327	-.0250	0.348	.1966	.2005	-.0039	0.924
Cognitive Test Scores	-.1415	-.0956	-.0459	0.560	-.0096	.0070	-.0167	0.852
Social Outcomes								
No motherhood b/18	.8987	.8875	.0112	0.708	.8689	.8851	-.0163	0.746
Social Ability Scores	.0998	.0487	.0511	0.480	.1252	.0993	.0259	0.792
Auto Efficiency Scores	.1293	.0588	.0705	0.349	.0457	.0846	-.0389	0.716
Metacognitive Scores	.0955	.0257	.0698	0.421	.0423	.0544	-.0121	0.917
Ever Arrested	.0039	.0225	-.0187	0.012	.0259	.0192	.0066	0.699
Labor Outcomes								
Employment at age 25/26	.6654	.6462	.0192	0.627	.5897	.5199	.0698	0.168
Wage at age 25/26	241,696	245,461	-3,765	0.796	204,147	236,145	-31,998	0.201

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. The propensity score was defined as $P(D = Full - day|Q = Public)$ and it was derived from the probabilities obtained from the school-choice model with two treatments.
The common support for the cohort 25-26 is [0.1674,0.5827] and for the cohort 29-30 is [0.1525,0.3802]

Table 10: Propensity Score Matching estimators - Full-Day vs Half-Day (Students enrolled in Voucher High School)

	Cohort 25-26				Cohort 29-30			
	Treated	Control	$\Delta^{25/26}$	P-value	Treated	Control	$\Delta^{29/30}$	P-value
Academic Outcomes								
Enrollment in College	.6614	.6416	.0198	0.608	.5942	.5705	.0237	0.749
High School Dropout	.0440	.0796	-.0356	0.040	.0145	.1059	-.0914	0.000
Cognitive Test Scores	.1474	.0742	.0732	0.423	.0629	.1385	-.0757	0.570
Social Outcomes								
No motherhood b/18	.9508	.8902	.0606	0.050	.9556	.9426	.0130	0.754
Social Ability Scores	.2709	.1147	.1562	0.048	.3521	.0853	.2668	0.018
Auto Efficiency Scores	.2357	.1073	.1284	0.164	.3258	.1853	.1405	0.185
Metacognitive Scores	.1917	.1006	.0911	0.173	.3762	.0461	.3301	0.005
Ever Arrested	.0159	.0182	-.0023	0.831	0	.0329	-.0329	0.017
Labor Outcomess								
Employment at age 25/26	.6255	.6301	-.0046	0.916	.5072	.5204	-.0131	0.859
Wage at age 25/26	295,526	273,569	21,957	0.264	269,571	243,721	25,850	0.396

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. The propensity score was defined as $P(D = Full - day|Q = Vou)$ and it was derived from the probabilities obtained from the school-choice model with two treatments.
The common support for the cohort 25-26 is [0.2606,0.5855] and for the cohort 29-30 is [0.0468,0.4445]

Table 11: Propensity Score Matching estimators - Full-Day vs Half-Day (Students enrolled in Private High School)

	Cohort 25-26				Cohort 29-30			
	Treated	Control	$\Delta^{25/26}$	P-value	Treated	Control	$\Delta^{29/30}$	P-value
Academic Outcomes								
Enrollment in College	.9405	.8930	.0475	0.166	.9362	.8775	.0587	0.339
High School Dropout	0	.0339	-.0339	0.070	.0213	.0262	-.0049	0.859
Cognitive Test Scores	.9369	.8470	.0899	0.607	1.072	.8450	.2269	0.317
Social Outcomes								
No motherhood b/18	.9882	.9868	.0014	0.943	1	.9767	.0233	0.496
Social Ability Scores	-.0480	.2501	-.2980	0.010	.1685	.1909	-.0224	0.910
Auto Efficiency Scores	-.1971	.1594	-.3565	0.009	.2050	.0717	.1333	0.502
Metacognitive Scores	-.2016	.0442	-.2458	0.102	.0444	.0517	-.0073	0.970
Ever Arrested	.0060	.0139	-.0079	0.594	.0213	.0070	.0143	0.551
Labor Outcomes								
Employment at age 25/26	.5476	.6649	-.1173	0.120	.4681	.4813	-.0132	0.917
Wage at age 25/26	322,797	337,185	-14,388	0.754	357,429	293,948	63,480	0.550

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. The propensity score was defined as $P(D = Full - day|Q = priv)$ and it was derived from the probabilities obtained from the school-choice model with two treatments.
The common support for the cohort 25-26 is [0.4017,0.8344] and for the cohort 29-30 is [0.1614,0.7377]

Table 12: Propensity Score Matching estimators - Full-Day vs Morning (Overall Sample)

	Cohort 25-26				Cohort 29-30			
	Treated	Control	$\Delta^{25/26}$	P-value	Treated	Control	$\Delta^{29/30}$	P-value
Academic Outcomes								
Enrollment in College	.6711	.6728	-.0017	0.938	.5758	.5553	.0205	0.589
High School Dropout	.0576	.0763	-.0187	0.136	.1082	.1301	-.0219	0.396
Cognitive Test Scores	.2333	.1692	.0641	0.370	.2187	.1457	.0730	0.347
Social Outcomes								
No motherhood b/18	.9365	.9089	.0276	0.157	.9237	.9116	.0121	0.673
Social Ability Scores	.1299	.1422	-.0123	0.812	.1958	.1276	.0682	0.381
Auto Efficiency Scores	.0900	.0904	-.0004	0.995	.1528	.1299	.0229	0.768
Metacognitive Scores	.0560	.0534	.0026	0.968	.1326	.0897	.0429	0.547
Ever Arrested	.0089	.0154	-.0065	0.244	.0174	.0275	-.0101	0.413
Labor Outcomes								
Employment at age 25/26	.6209	.6401	-.0192	0.511	.5455	.5013	.0441	0.290
Wage at age 25/26	278,523	279,632	-1,108	0.943	248,584	244,563	4,020	0.843

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. The propensity score was defined as $P(D = Full - day|D = \{Full - Day, Morning\})$ and it was derived by Bayes Rules from the probabilities obtained from the school-choice model with three treatments The common support for the cohort 25-26 is [0.2097,0.7445] and for the cohort 29-30 is [0.2471,0.6384]

Table 13: Propensity Score Matching estimators - Full-Day vs Afternoon (Overall Sample)

	Cohort 25-26				Cohort 29-30			
	Treated	Control	$\Delta^{25/26}$	P-value	Treated	Control	$\Delta^{29/30}$	P-value
Academic Outcomes								
Enrollment in College	.6749	.5692	.1057	0.067	.5664	.4946	.0717	0.162
High School Dropout	.0569	.1182	-.0613	0.037	.1106	.1688	-.0581	0.101
Cognitive Test Scores	.2458	-.2044	.4502	0.000	.2088	.0511	.1576	0.307
Social Outcomes								
No motherhood b/18	.9377	.8743	.0633	0.174	.9225	.9371	-.0146	0.717
Social Ability Scores	.1266	.0189	.1077	0.313	.1902	.0389	.1513	0.338
Auto Efficiency Scores	.0884	.0379	.0505	0.648	.1563	.0617	.0945	0.390
Metacognitive Scores	.0603	-.0172	.0775	0.621	.1337	.0341	.0996	0.332
Ever Arrested	.0088	.0101	-.0013	0.850	.0178	.0252	-.0074	0.664
Labor Outcomes								
Employment at age 25/26	.6195	.5753	.0442	0.570	.5487	.4597	.0890	0.227
Wage at age 25/26	281,643	239,494	42,149	0.047	244,902	261,075	-16,173	0.777

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. The propensity score was defined as $P(D = Full - day|D = \{Full - Day, Afternoon\})$ and it was derived by Bayes Rules from the probabilities obtained from the school-choice model with three treatments The common support for the cohort 25-26 is [0.6495,0.9854] and for the cohort 29-30 is [0.4633,0.9735]

Table 14: Difference-in-Differences Propensity Score Matching estimators - Full-Day vs Half-Day (General)

	Common Support				Without Common Support	
	$\Delta^{25/26}$	$\Delta^{29/30}$	Difference	SE	Difference	SE
Academic Outcomes						
Enrollment in College	.0215	.0420	-.0204	.0045	-.0226	.0041
High School Dropout	-.0321	-.0304	-.0017	.0033	.0078	.0030
Cognitive Test Scores	.0314	.0809	-.0495	.0108	.0110	.0096
Social Outcomes						
No motherhood b/18	.0319	.0006	.0313	.0036	.0217	.0034
Social Ability Scores	.0650	.0775	-.0125	.0081	-.0906	.0076
Auto Efficiency Scores	.0250	.0306	-.0057	.0104	-.0315	.0104
Metacognitive Scores	.0370	.0449	-.0078	.0099	-.0446	.0105
Ever Arrested	-.0121	-.0105	-.0016	.0015	.0032	.0014
Labor Outcomes						
Employment at age 25/26	.0142	.0453	-.0311	.0051	-.0621	.0049
Wage at age 25/26	-7,906	-6,405	-1,501	2716	2,443	2,546

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. As propensity score we use the probabilities derived from the school-choice model.
The region of common support is [0.1820,0.6016].

Table 15: Difference-in-Differences Propensity Score Matching estimators - Full-Day vs Morning (Overall Sample)

	Common Support				Without Common Support	
	$\Delta^{25/26}$	$\Delta^{29/30}$	Difference	SE	Difference	SE
Academic Outcomes						
Enrollment in College	-.0033	.0445	-.0480	.0051	-.0222	.0042
High School Dropout	-.0207	-.0110	-.0096	.0034	.0032	.0031
Cognitive Test Scores	.0146	.0957	-.0811	.0117	-.0090	.0099
Social Outcomes						
No motherhood b/18	.0193	.0004	.0189	.0036	.0156	.0034
Social Ability Scores	.0704	.0177	.0527	.0088	-.0804	.0081
Auto Efficiency Scores	.0247	-.0244	.0491	.0118	-.0233	.0109
Metacognitive Scores	.0239	.0299	-.0060	.0112	-.0403	.0108
Ever Arrested	-.0113	-.0146	.0033	.0017	.0036	.0015
Labor Outcomes						
Employment at age 25/26	.0096	.0235	-.0139	.0055	-.0633	.0049
Wage at age 25/26	-8,329	-1,376	-6,953	2751	-5129	2444

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. As propensity score we use the probabilities derived from the school-choice model.
The region of common support is [0.2471,0.6384].

Table 16: Difference-in-Differences Propensity Score Matching estimators - Full-Day vs Afternoon (Overall Sample)

	Common Support				Without Common Support	
	$\Delta^{25/26}$	$\Delta^{29/30}$	Difference	SE	Difference	SE
Academic Outcomes						
Enrollment in College	.1001	.0529	.0472	.0104	.0340	.0081
High School Dropout	-.1136	-.1258	.0122	.0090	-.0031	.0051
Cognitive Test Scores	.1830	.0681	.1150	.0215	.2926	.0181
Social Outcomes						
No motherhood b/18	.0897	-.0548	.1446	.0094	.0780	.0064
Social Ability Scores	.0819	.2026	-.1208	.0222	-.0435	.0192
Auto Efficiency Scores	.1229	.1682	-.0453	.0225	-.0440	.0158
Metacognitive Scores	.1799	.1232	.0567	.0206	-.0220	.0176
Ever Arrested	-.0097	-.0105	.0008	.0033	.0061	.0023
Labor Outcomes						
Employment at age 25/26	.0707	.0421	.0286	.0114	-.0448	.0099
Wage at age 25/26	-11,529	-33,915	22,386	10320	58,322	6865

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. As propensity score we use the probabilities derived from the school-choice model.
The region of common support is [0.6495,0.8888].

Figure 1: Probability of enrollment in Full-Day School (Overall): Cohort 25-26

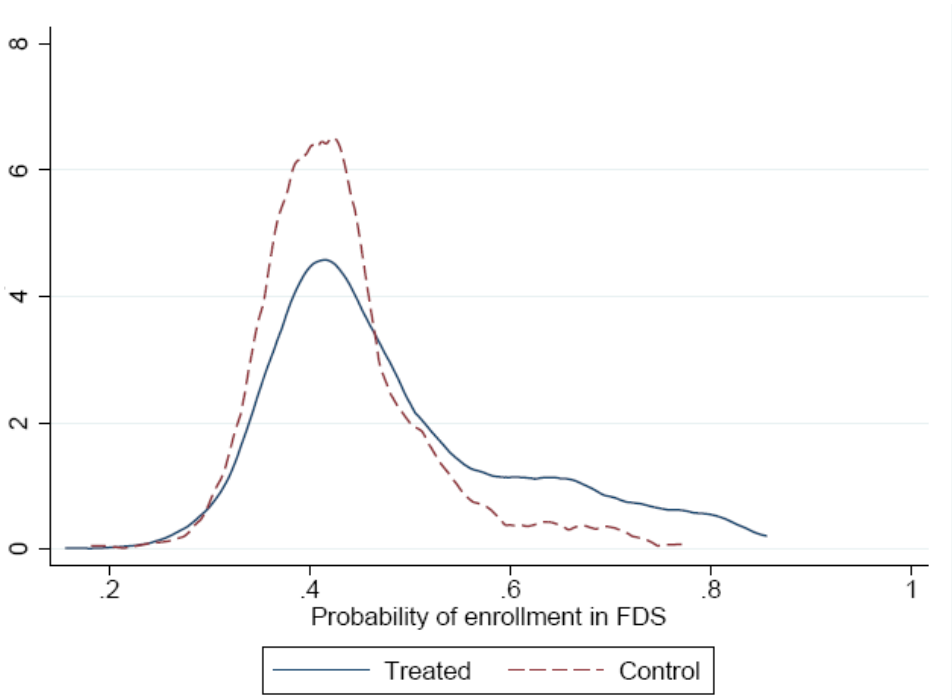

Figure 2: Probability of enrollment in Full-Day School (Overall): Cohort 29-30

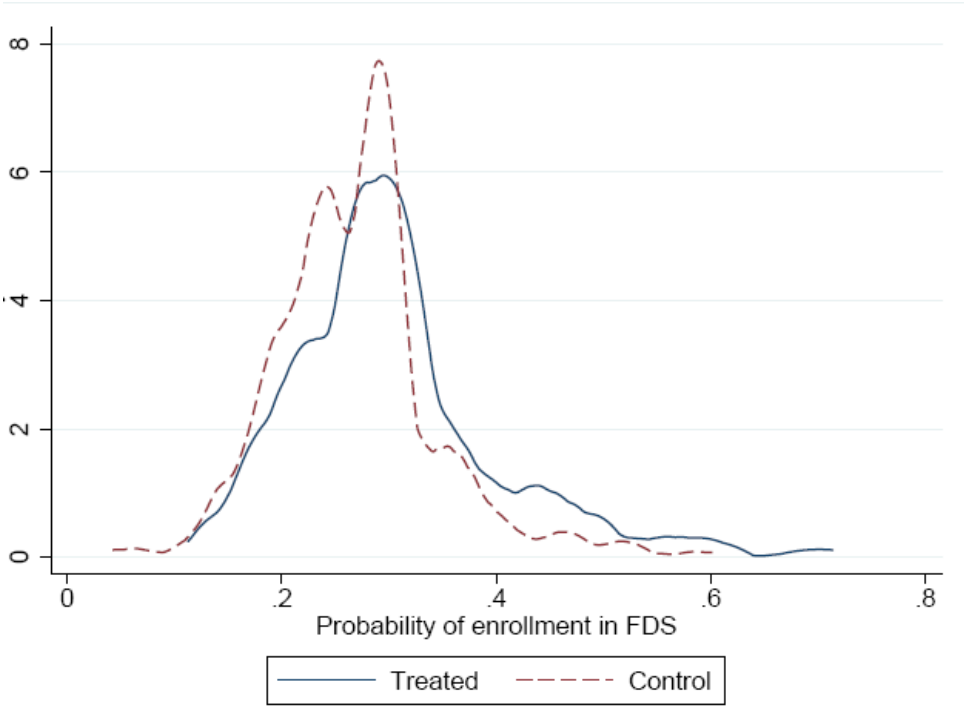

Table A1. Percentage of schools by form of school management and percentage of FDS

	Public		Voucher		Private	
	Total	FDS	Total	FDS	Total	FDS
1997	61.5	23.1	27.7	6.3	10.8	1.2
1998	59.6	26.6	28.8	7.2	11.6	2.2
1999	58.8	28.2	29.6	7.9	11.6	2.7
2000	59	31.6	30.3	9	10.7	3.5
2001	57.8	34.4	32	9.5	10.2	4.4
2002	56.7	37.3	33.5	10.1	9.8	5.4
2003	54.7	38.6	36.4	10.4	8.9	6.5
2004	54	40	37.8	10.9	8.2	7.5

Data obtained from Garcia(2006) and Estadisticas de la Educacion(2006)

Table A2. Outcomes descriptive statistics for the cohort 25-26

	Full Day	HD-Morning	Difference	HD-Afternoon	Difference
Cognitive Scores	0.299	0.096	0.2036	-0.259	0.5579
			(.054)		(.105)
Auto Efficiency scores	0.012	0.018	-0.0060	-0.079	0.0911
			(.050)		(.096)
Social Ability scores	0.073	0.050	0.0227	-0.030	0.1034
			(.047)		(.089)
MetaCognitive scores	0.002	0.025	-0.0232	-0.040	0.0425
			(.048)		(.094)
No motherhood before 18	0.935	0.910	0.0244	0.823	0.1119
			(.018)		(.034)
Number of Children	0.560	0.709	-0.1492	1.067	-0.5071
			(.040)		(.080)
Have been arrested	0.008	0.019	-0.0107	0.026	-0.0177
			(.006)		(.010)
Years of schooling	13.88	13.20	0.6784	12.37	1.5069
			(.142)		(.258)
Grades in High School	3.835	3.585	0.2496	3.521	0.3136
			(.054)		(.102)
Attend college	0.665	0.575	0.0900	0.336	0.3287
			(.025)		(.047)
High-School Dropout	0.067	0.100	-0.0334	0.235	-0.1682
			(.014)		(.028)
Wage at age 25-26	281733.3	256438.8	25294.46	240061.6	41671.65
			(11711)		(24122)
Employed at age 25-26	0.624	0.642	-0.0180	0.613	0.0107
			(.025)		(.048)
N	737	802		119	

Note: Standard error of the difference reported in parentheses.

Table A3. Outcomes descriptive statistics for the cohort 29-30

	Full Day	HD-Morning	Difference	HD-Afternoon	Difference
Cognitive Scores	0.117	-0.018	0.1347	-0.158	0.2754
			(.073)		(.109)
Auto Efficiency scores	0.238	0.184	0.0532	0.070	0.1673
			(.069)		(.110)
Social Ability scores	0.223	0.144	0.0786	0.006	0.2172
			(.068)		(.104)
MetaCognitive scores	0.174	0.138	0.0363	-0.034	0.2077
			(.070)		(.111)
No motherhood before 18	0.918	0.893	0.0247	0.870	0.0477
			(.030)		(.042)
Number of Children	1.158	1.216	-0.0577	1.527	-0.3687
			(.079)		(.118)
Have been arrested	0.0157	0.023	-0.0068	0.027	-0.0110
			(.011)		(.016)
Years of schooling	13.92	13.44	0.4819	12.30	1.6180
			(.206)		(.295)
Grades in High School	3.728	3.485	0.2438	3.294	0.4348
			(.080)		(.120)
Attend college	0.569	0.517	0.0515	0.312	0.2561
			(.037)		(.055)
High-School Dropout	0.114	0.153	-0.0392	0.295	-0.1809
			(.026)		(.042)
Wage at age 25-26	249644.4	232212.8	17431.61	253823.5	-4179.09
			(18430)		(39693)
Employed at age 25-26	0.533	0.507	0.0265	0.464	0.0690
			(.038)		(.057)
N	255	584		112	

Note: Standard error of the difference reported in parentheses.

Table A4. Socio-economic background controls for cohort 25-26

	Full Day	HD-Morn.	Difference	HD-Aftern.	Difference
Preparation by elementary school	2.202	2.324	-.1220	2.345	-.1424
			(.044)		(.089)
Father age	59.52	60.25	-.7308	63.08	-3.5546
			(.825)		(1.59)
Father education					
Less than elementary school	0.105	0.175	-.070	0.203	-.098
Elementary School	0.087	0.135	-.047	0.220	-.133
Incomplete High-School	0.122	0.149	-.027	0.202	-.080
High School	0.327	0.292	.035	0.266	.061
Incomplete tecnica superior	0.017	0.016	.001	0.009	.008
tecnica superior	0.066	0.095	-.029	0.064	.002
Incomplete College	0.062	0.041	.020	0.018	.043
College	0.192	0.093	.099	0.018	.174
Graduate	0.022	0.004	.018	0	.022
Mother age	53.22	53.62	-.4025	54.45	-1.2269
			(.568)		(1.15)
Mother education					
Less than elementary school	0.098	0.169	-.071	0.256	-.158
Elementary School	0.117	0.127	-.010	0.212	-.095
Incomplete High-School	0.155	0.206	-.050	0.220	-.065
High School	0.312	0.317	-.004	0.229	.083
Incomplete tecnica superior	0.012	0.018	-.005	0	.012
tecnica superior	0.077	0.067	.010	0.008	.069
Incomplete College	0.051	0.032	.019	0.008	.042
College	0.171	0.062	.109	0.059	.111
Graduate	0.007	0.004	.003	0.008	-.001
Number of siblings	2.528	2.567	-.0395	2.655	-.1276
			(.084)		(.162)
Family income at age 15	2.982	2.725	.2572	2.508	.4738
			(.046)		(.099)
Father presence	1.575	1.563	.0112	1.695	-.1204
			(.045)		(.087)
Father occupation	1.086	1.071	.0150	1.077	.0090
			(.019)		(.040)
Mother presence	1.185	1.173	.0126	1.294	-.1088
			(.028)		(.057)
Mother occupation	1.902	1.986	-.0842	2.040	-.1375
			(.050)		(.099)
Importance parents give to education	1.415	1.399	.0162	1.462	-.0470
			(.039)		(.070)
N	737	802		119	

Note: Standard error of the difference reported in parentheses.

Table A5. Socio-economic background controls for cohort 29-30

	Full Day	HD-Morn.	Difference	HD-Aftern.	Difference
Preparation by elementary school	2.157	2.325	-.1685	2.286	-.1289
			(.064)		(.090)
Father age	65.29	65.81	-.5249	67.21	-1.924
			(1.28)		(2.00)
Father education					
Less than elementary school	0.189	0.230	-.041	0.261	-.072
Elementary School	0.138	0.165	-.027	0.219	-.081
Incomplete High-School	0.105	0.121	-.017	0.125	-.020
High School	0.255	0.272	-.017	0.260	-.005
Incomplete tecnica superior	0.008	0.011	-.003	0	.008
tecnica superior	0.067	0.066	.001	0.083	-.016
Incomplete College	0.033	0.040	-.007	0.042	-.008
College	0.197	0.088	.108	0.010	.186
Graduate	0.008	0.007	.001	0	.008
Mother age	57.62	58.26	-.6316	59.84	-2.216
			(.936)		(1.50)
Mother education					
Less than elementary school	0.190	0.217	-.027	0.223	-.033
Elementary School	0.139	0.178	-.039	0.185	-.046
Incomplete High-School	0.187	0.185	.001	0.222	-.036
High School	0.254	0.295	-.041	0.287	-.033
Incomplete tecnica superior	0.008	0.005	.003	0	.008
tecnica superior	0.067	0.042	.025	0.046	.021
Incomplete College	0.016	0.021	-.005	0.028	-.012
College	0.131	0.052	.079	0.009	.122
Graduate	0.008	0.005	.003	0	.008
Number of siblings	2.612	2.877	-.2649	2.955	-.3436
			(.283)		(.199)
Family income at age 15	2.858	2.678	.1796	2.366	.4916
			(.068)		(.106)
Father presence	1.559	1.623	-.0638	1.643	-.0838
			(.067)		(.101)
Father occupation	1.074	1.075	-.0012	1.065	.0091
			(.028)		(.045)
Mother presence	1.190	1.218	-.0285	1.179	.0112
			(.044)		(.063)
Mother occupation	2.026	1.929	.0968	2.039	-.0130
			(.074)		(.110)
Importance parents give to education	1.424	1.541	-.1176	1.554	-.1300
			(.067)		(.097)
N	255	584		112	

Note: Standard error of the difference reported in parentheses.

Table A6. Demand Estimation

	25-26		29-30	
Voucher Constant	-1.316***	(-4.30)	-1.084**	(-2.71)
Private Constant	-7.449***	(-13.08)	-5.618***	(-7.72)
Morning Public				
Father education	0.0603	(1.16)	-0.0641	(-0.95)
Mother education	-0.113*	(-2.06)	0.0359	(0.45)
Family income at age 15	0.154	(1.78)	0.223*	(1.97)
Preparation during elementary school	0.140	(1.82)	0.0799	(0.70)
Importance parents give to education	-0.0941	(-0.86)	0.198	(1.45)
Afternoon Public				
Father education	-0.0383	(-0.40)	-0.0827	(-0.79)
Mother education	-0.216*	(-2.06)	-0.0918	(-0.72)
Family income at age 15	-0.215	(-1.45)	-0.156	(-0.93)
Preparation during elementary school	0.0409	(0.31)	0.0468	(0.28)
Importance parents give to education	0.0409	(0.25)	0.153	(0.84)
Full-Day Voucher				
Father education	0.119*	(2.14)	-0.0400	(-0.44)
Mother education	0.0538	(0.93)	0.121	(1.14)
Family income at age 15	0.207*	(1.98)	0.390*	(2.33)
Preparation during elementary school	-0.0408	(-0.42)	-0.286	(-1.59)
Importance parents give to education	-0.00512	(-0.04)	-0.110	(-0.49)
Morning Voucher				
Father education	0.0562	(1.03)	0.0664	(0.94)
Mother education	0.0443	(0.78)	0.0389	(0.46)
Family income at age 15	0.249*	(2.46)	0.199	(1.50)
Preparation during elementary school	0.0719	(0.79)	0.149	(1.12)
Importance parents give to education	0.0729	(0.64)	0.171	(1.15)
Afternoon Voucher				
Father education	-0.0719	(-0.60)	-0.230	(-1.79)
Mother education	-0.116	(-0.93)	0.393**	(2.89)
Family income at age 15	0.209	(1.09)	-0.229	(-1.05)
Preparation during elementary school	-0.00898	(-0.05)	-0.331	(-1.50)
Importance parents give to education	-0.267	(-0.96)	0.228	(1.07)
Full-Day Private				
Father education	0.467***	(6.66)	0.191	(1.73)
Mother education	0.193**	(2.77)	0.347**	(2.98)
Family income at age 15	1.133***	(7.74)	0.840***	(3.88)
Preparation during elementary school	-0.274*	(-2.00)	-0.460	(-1.95)
Importance parents give to education	0.0774	(0.45)	0.204	(0.89)
Morning Private				
Father education	0.384***	(4.14)	0.118	(1.10)
Mother education	0.194*	(2.09)	0.279*	(2.34)
Family income at age 15	0.661***	(3.52)	0.679**	(3.12)
Preparation during elementary school	0.0661	(0.40)	0.0805	(0.39)
Importance parents give to education	0.364*	(2.27)	0.362*	(1.96)
Afternoon Private				
Father education	-0.252	(-0.99)	-0.415	(-1.59)
Mother education	0.439	(1.93)	0.465	(1.86)
Family income at age 15	1.151*	(2.33)	1.014*	(2.15)
Preparation during elementary school	-0.500	(-0.89)	-0.428	(-0.83)
Importance parents give to education	-0.0274	(-0.04)	0.165	(0.32)
Observations	13797		7731	

Table A7. Propensity Score Matching segmented by father's education

	Less educated fathers				More educated fathers			
	Treated	Control	Δ	P-value	Treated	Control	Δ	P-value
Academic Outcomes								
Enrollment in College	.3879	.3739	.0140	0.719	.8026	.8049	-.0023	0.927
High School Dropout	.1408	.1785	-.0377	0.183	.0193	.0367	-.0174	0.084
Cognitive Test Scores	-.3043	-.2659	-.0384	0.556	.4809	.3413	.1395	0.068
Social Outcomes								
No motherhood b/18	.9015	.8690	.0325	0.365	.9571	.9282	.0288	0.200
Social Ability Scores	.0957	.0223	.0735	0.333	.1407	.1897	-.0491	0.447
Auto Efficiency Scores	.1644	.0194	.1450	0.124	.0519	.1084	-.0565	0.397
Metacognitive Scores	.1199	.0349	.0850	0.299	.0281	.0489	-.0207	0.767
Ever Arrested	.0094	.0307	-.0212	0.038	.0086	.0082	.0005	0.935
Labor Outcomes								
Employment at age 25/26	.6542	.6491	.0051	0.910	.6052	.6243	-.0192	0.599
Wage at age 25/26	250,538	227,826	22,712	0.090	293,734	308,837	-15,103	0.417

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. The propensity score was defined as $P(D = Full - day)$ and it was derived from the probabilities obtained from the school-choice model with two treatments. Less educated fathers are defined as fathers with less than complete high-school while more educated fathers have at least completed high-school

Table A8. Propensity Score Matching segmented by mother's education

	Less educated mothers				More educated mothers			
	Treated	Control	Δ	P-value	Treated	Control	Δ	P-value
Academic Outcomes								
Enrollment in College	.4041	.3766	.0275	0.439	.8226	.8278	-.0052	0.814
High School Dropout	.1347	.1894	-.0547	0.037	.0139	.0187	-.0049	0.595
Cognitive Test Scores	-.2211	-.2664	.0452	0.572	.4903	.3771	.1131	0.163
Social Outcomes								
No motherhood b/18	.9156	.8543	.0613	0.068	.9524	.9454	.0070	0.770
Social Ability Scores	.0350	-.0084	.0433	0.596	.1824	.2146	-.0322	0.644
Auto Efficiency Scores	.1699	.0272	.1427	0.083	.0393	.1033	-.0639	0.415
Metacognitive Scores	.1412	.0526	.0885	0.277	.0090	.0311	-.0221	0.738
Ever Arrested	.0041	.0303	-.0263	0.005	.0116	.0071	.0045	0.525
Labor Outcomes								
Employment at age 25/26	.6816	.6587	.0229	0.547	.5853	.6142	-.0289	0.465
Wage at age 25/26	250,068	234,742	15,326	0.279	299,198	308,366	-9,169	0.616

Note: The propensity score matching estimation is performed using a biweight kernel with replacement for the control group. For each estimator we present bootstrap standard errors based on 100 replications. The propensity score was defined as $P(D = Full - day)$ and it was derived from the probabilities obtained from the school-choice model with two treatments. Less educated mothers are defined as mothers with less than complete high-school while more educated mothers have at least completed high-school