Poor Little Children: The Socioeconomic Gap in Parental Responses to School Disadvantage*

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Abstract

This paper studies how parents react to a widely-used school policy that puts some children at a learning disadvantage: age at school entry. To do so, we analyze Spanish data on parental investments and find that college-educated parents increase their time investments and choose better schools for children who are younger than their classmates at school entry, while non-college-educated parents do not do any of both. Consistent with this compensating behavior, we document a lower age-at-school-entry penalty among children with college-educated parents.

Keywords: parental investments, age at school entry, education inequality, compensating behavior.

JEL Classification: I20, D10

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1 Introduction

Life (policies) can put some children at a disadvantage. In such cases, parents can react to those disadvantages by changing their investments in their children. However, parents' reactions might depend on their resources, which involves important implications in terms of inequality, social mobility, and policy impacts. Our understanding of such responses is limited, however, because a proper empirical analysis requires both exogenous variation in exposure to disadvantages and the availability of detailed data on parental investments.

In this paper, we get around these limitations by looking at a variation in exposure to school disadvantage that is both well documented as potentially exogenous and easy to observe across datasets, including those with information on parental investments. Specifically, we use time-use surveys and school-based questionnaires to study how parents from different socioeconomic statuses (SES) in Spain react to a widely-used school policy that puts some children at a learning disadvantage: age at school entry.

Most countries dictate that children born during a given one-year period should start school at the same time. This (up-to-one-year) difference in the age of students in the same classroom may be reflected in student performance. For instance, younger children might be less ready to acquire knowledge and deal overall with the experience of formal schooling. If initial outcomes shape future outcomes, the age at school entry can have long-term consequences for schooling and labor market trajectories (see Subsection 2.1).

A large body of literature shows that starting school at an earlier age is indeed related to worse student performance, labor market outcomes, and criminal behavior.[1] Furthermore, this negative effect might be greater among people from disadvantaged backgrounds, at least in some contexts (see Michael and Bernardi, 2017 on England, Fredriksson and Öckert, 2014 on Sweden, and McEwan and Shapiro, 2008 on Chile).[2]

Before looking at potential differences in parental investments, we first document that the children who were younger at school entry tend to perform worse in school than the children who were older at school entry. Using Spanish data from four waves of the Programme for International Student Assessment (PISA) survey from the Organisation for Economic Co-operation and Development (OECD), we find that students who started school at a younger age are more likely to have repeated a grade and have lower test scores in mathematics and reading at age 15 than older children. For example, students born in

[1]For student outcomes, see: Bedard and Dhuey, 2006 and Elder and Lubotsky, 2009 on the United States; Mühlenweg and Puhani, 2010 on Germany; Grenet, 2011 on France. For the effect on the probability of attention deficit hyperactivity disorder diagnoses, see Schwandt and Wuppermann, 2016; Elder, 2010. For criminal behavior, see Cook and Kang (2016) and Landersø, Nielsen, and Simonsen, 2017 on the United States and Denmark, respectively. For labour market outcomes, see Fredriksson and Öckert, 2014 on Sweden, Bedard and Dhuey, 2012 and Dhuey and Lipscomb, 2008 on the United States, and Black et al., 2011 on Norway, which finds that this age effect on earnings dilutes once people in Norway reach age 30.

[2]Elder and Lubotsky (2009), in contrast, find the opposite results in the United States.

December (the youngest age in their cohort) are 10 percentage points more likely to have repeated a grade by age 15 than those born in January (the oldest age).[3] We go further and explore how this pattern translates into long-term outcomes, using information from the population census. We find that adults who were younger at school entry have less schooling and less-educated partners.

A causal interpretation of the documented age effect requires that 1) parents do not postpone the timing at which their child's entry school, and 2) there is no connection between the characteristics of newborns and their month of birth. Some parents might be willing to enroll their children in school beyond the typical age of entry if they are sufficiently concerned about any negative effects associated with children's age at school entry. Spain enforces a strict birthday cutoff for school entry, so even if they wish to, parents cannot easily postpone the year when their child starts school (see Section 2.2). Alternatively, there could be a connection between a newborn's characteristics and birth month if parental characteristics or relevant environmental (institutional) conditions that shape fetal (newborn) health vary during the year. To study this potential seasonality in births we analyze both the population census and birth certificate data. Using census-type data of the Spanish population allows us to detect birth patterns that could go unnoticed in survey data because of a smaller sample size. Indeed, we find that there is some seasonality in births. However, we do not find systematic differences in the parental and newborn characteristics of babies born in December and January (just before and after the birthday cutoff for entry to school, which is January 1st). We confirm this pattern by looking at differences in parental characteristics between people born in December and January in the datasets used in our main analysis.

We therefore focus our analysis on people born in January (the oldest age at school entry) and December (the youngest).[4] Using data from PISA, we show that the effect of the age at school entry is significantly larger among children from disadvantaged families. For instance, young students from low-SES families are 12.7 percentage points more likely to have repeated a grade by age 15 than older students from the same socioeconomic background. This gap is only 4 percentage points among students from high-SES families.[5]

To analyze whether this difference is related to parental investments according to family background, we assemble two different datasets with detailed information about parental investments: the two waves of the Spanish Time Use Survey (STUS; 2003 and 2009) and the General Diagnostic Assessment (GDA, or *Evaluación General de Diagnóstico* in Spanish, is a 2009 national evaluation of fourth grade students with information on

[3]This pattern echoes the findings of Calsamiglia and Loviglio (2019) on Catalonia.

[4]Across datasets, we focus our basic specification on people born in January and December of the same calendar year. However, when data is available, we compare individuals born in adjacent months and find similar results.

[5]This result is robust to using both binary and continuous specifications of the SES index.

parental involvement and school characteristics). Our focus on parental time investments in child development is grounded in the child development literature, which shows that the time parents spend with children is an important input for the children's cognitive development, particularly for young children (Del Boca, Flinn, and Wiswall, 2014). We find that college-educated parents increase the amount of time they spend helping their children with school activities and that they choose schools with better inputs when their children are the youngest at school entry, whereas parents without a college education do not do any of both. Specifically, we find that college-educated parents spend an average of five more minutes per day helping their children with school activities when their children are the youngest at school entry, a result that is statistically significant at the 5 percent level. This is a large effect, considering that parents in our sample spend on average 7.5 minutes per day helping their children with school activities. This effect increases to 10 minutes per day when we focus on children who are 6 to 12 years old, the age window in which parental help with school tasks is concentrated (averaging 12.5 minutes per day), and to 15 minutes per day when we exclude the summer months (when children are out of school). Supporting the idea that these differences in parental help are related to what happens at school, we do not observe a similar pattern among parents of preschool-age children.[6]

Finally, we find suggestive evidence of different gender patterns among children from high-SES families. On one hand, younger boys from high-SES families do not seem to be able to overcome the school entry age disadvantage by the age of 15. Probably because they face a larger disadvantage, they receive more help from their parents with their homework and other academic activities, and they are more likely to attend schools with better inputs. On the other hand, younger girls from high-SES families do not have different achievement levels at age 15 relative to older girls from high-SES families. Probably because they face a smaller disadvantage, parents do not seem to invest more on them. We find no such gender-specific effect among children from low-SES families.

Our results highlight the importance of considering behavioral responses to policy in the impact evaluation literature based on reduced-form estimates. The reduced-form effects of a policy include both a direct (policy) effect and an indirect effect consisting of endogenous responses to the policy—in our case, parental responses to the school entry age (Todd and Wolpin, 2003). To disentangle policy effects and production function parameters, we need to understand behavioral responses to policies.

The main contribution of this paper is to the emerging literature on parental reactions to education policies. In seminal papers, Pop-Eleches and Urquiola (2013) show that parents in Romania are less likely to help their children with homework when they are

[6]A concern for this analysis of time investments would be that low-SES parents more quickly decrease their time investments than high-SES parents as children grow older. In Section 4.4, we present supporting evidence showing this is not the case.

admitted to more effective schools, while Das et al. (2013) find that parents in India decrease their education spending when their children are enrolled in schools that receive grants that can be spent on educational materials.[7] We contribute to this literature by highlighting how these reactions might vary according to the family's SES and the student's gender, and by providing more detailed evidence on parental responses. In the closest study to ours, Fredriksson, Öckert, and Oosterbeek (2016) show that larger class sizes in Sweden increase the likelihood that high-income parents help their children with their homework and low-income parents move their children to a different school. Relative to this paper, we make two contributions. First, we use richer measures of parental investments, which allows us to quantify the magnitude of changes in parental time investments and analyze how these responses evolve over their children's lifecycle. Second, we look at whether parental responses depend on the interaction between parental SES and children's gender.[8]

We also contribute to the ample literature on the effects of age at school entry. A strand of papers has documented that these effects are heterogeneous by SES in several contexts. Our contribution is to provide novel evidence on a plausible mechanism behind this heterogeneity—differences in parental investments in terms of time and school choice. In a contemporaneous work, Dhuey et al. (2019) use data from the state of Florida in the United States to show that high-SES parents are more likely than low-SES parents to postpone the enrollment of their children in school by one year (which is allowed in the United States). Their results support our findings that high-SES parents are more likely to help their children when they are among the youngest at school entry.

The rest of the paper is organized as follows. Section 2 elaborates on the relationship between age at school entry and student outcomes and describes the institutional framework. Section 3 presents the data, and Section 4 the identification strategy. Section 5 describes the results for age at school entry, and Section 6 presents the analyses of parental responses and the differences in these responses according to the child's age and gender. Section 7 concludes.

2 Age at School Entry

2.1 How Can Age at School Entry Affect Schooling Outcomes?

The specialized literature has devoted much attention to the issue of how age at school entry can affect student (and adult) outcomes (see, for example, Crawford et al., 2010).

[7] On the theoretical side, Albornoz et al. (2018) develop a model in which parents compensate for lower educational quality, i.e., public and private investments in a child's human capital are substitutes.

[8] A related literature analyses how parental investments responds to health endowment at birth. Many empirical studies seem to find evidence suggesting that parental investments reinforces initial differences in health endowments, although there are some indications that high-income parents might be more prone to compensating behavior (see the literature review in Almond and Mazumder, 2013).

These effects are typically categorized as 1) age at starting school, 2) age at testing, 3) relative age, and 4) length of schooling.

1. As age is a determinant of maturity, younger children at school entry might be less ready to acquire knowledge and deal overall with the experience of formal schooling (Dhuey, 2016). Moreover, because of their age, older students are more likely to have accumulated a higher stock of skills at school entry than their younger classmates, which could also help them to learn more in school.

2. If all the children in a school cohort are examined on the same day, then students are examined at different ages.

3. Younger students might perform worse because they are younger than their peers if, for example, differences in absolute performance due to maturity affect the accumulation of skills such as self-confidence.

4. The time students spend in the education system might depend on regulations about the timing of when students can enter (leave) formal schooling.

The relevance of these effects in shaping student and adult outcomes might depend on the structure of the education system. For example, the level of maturity at school entry is likely to be more important in countries that teach the same curriculum to all students independent of students' achievement levels–as is the case in Spain. The same goes for contexts where grade retention is commonly used, such as in Spain. Younger, less mature students might be more likely to repeat a grade, which might be detrimental if doing so is associated with negative stereotypes or a loss of self-esteem. The use of tracking based on early achievement levels might set younger students on different educational trajectories, including access to fewer school inputs (Mühlenweg and Puhani, 2010). Similarly, age at testing can affect educational trajectories if grades or other measures used to assess student performance are not adjusted for age. Grenet (2011) gives a more complete discussion of how the structure of education systems can amplify initial differences in performance due to age at school entry.

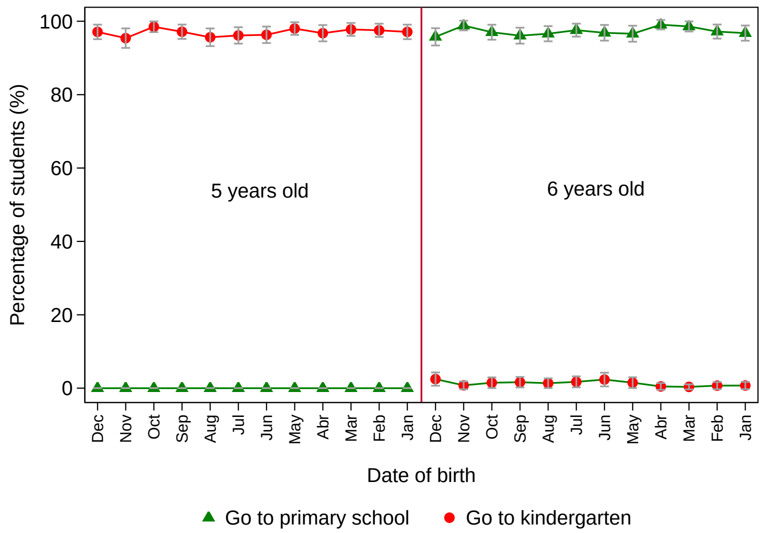
To sum up, older students' greater maturity and increased human capital at school entry, i.e., higher *school readiness*, may allow them to perform better initially. If early learning is complementary to later learning (*dynamic complementarities*), this initial difference in learning outcomes could leave early entrants at a permanent disadvantage.

2.2 Institutional Framework

2.2.1 Age at School Entry

In Spain, children must begin primary school in September of the calendar year of their sixth birthday. The birthday cutoff for school entry is January 1, and delaying entry is forbidden (IEA, 2011). Although it is not compulsory, almost every child attends kindergarten beginning in September of the year of their third birthday. To illustrate the strict enforcement of the Spanish birthday cutoff, we look at children born up to one year before and after a given school birthday cutoff to see whether they attend either kindergarten or primary school. We rely on data from the 2008 to 2015 waves of the Living Conditions Survey (*LCS, Encuesta de Condiciones de Vida* in Spanish), which is carried out annually by the Spanish National Institute of Statistics to gather data on household characteristics. Figure 1 plots the percentage of children enrolled in kindergarten and primary school by month of birth, stacking eight birth cohorts, a subset of the cohorts analyzed in our main dataset. As it is evident from the graph, compliance with the birthday cutoff rule is extremely high. Official enrollment statistics confirm that only 0.5% of children who have reached the statutory age for entry into primary education are enrolled in preprimary education (Eurydice, 2011).

Figure 1: School Enrollment by Schooling Level and Month of Birth, Children 5 and 6 Years Old



Notes: Data from the 2008 to 2015 waves of Spain's Living Conditions Survey. The figure plots the percentage of children enrolled in kindergarten and primary school by month of birth. 95% confidence intervals are reported.

2.2.2 Grade Retention

Grade repetition is allowed and common. Students can be obliged to repeat a grade once during primary education (grades 1–6), although some exceptions apply for students with special needs, who can be retained twice. Students can repeat (both) grades 7 and 8, although the total number of repeated years is limited to two in grades 1–8. Grade retention is a common practice in both primary and lower secondary school. In fact, Spain is among the three OECD countries with the highest rates of repetition at the primary level (the others are France and Portugal). Similarly, almost a third of students in lower secondary school repeat at least one grade—in contrast to only 0.5% of students in Finland (Eurydice, 2011). Thus, grade retention seems to be commonly used as a remedy for pupils in difficulty in primary and lower secondary education.

2.2.3 School Choice

School choice in primary and secondary education has been available in Spain since the 1980s. In principle, parents can choose to have their children attend any public or semipublic (*concertada*) school in their municipality of residence.[9] A national law supplemented by provincial (autonomous-community) regulations dictates the procedures to deal with excess demand for schools. Typically, parents can list a (limited) number of schools in order of preference. Then, central authorities allocate children to schools using an algorithm equivalent to the Boston mechanism, with priorities given on the basis of neighborhood of residence, sibling enrollment status, and socioeconomic characteristics (see details in Calsamiglia, 2014).

3 Data

We analyze data from six sources. To motivate our study, we use data from PISA and the Spanish population census to analyze the medium- and long-term impacts of school entry age, respectively. To analyze the potential mechanisms explaining the socioeconomic gap in these impacts, we use two surveys with information about parental investments: the STUS and the GDA. We use the STUS to study parental time spent on monitoring, teaching, and helping children with school-related tasks and the GDA to study school choice and parental help with homework.

To investigate potential threats to our identification strategy, we use the 2011 population census and microdata from Spanish birth certificates to study birth seasonality as well as the LCS survey to document compliance with the birthday cutoff for school entry.

Across datasets, we study individuals born in the 1986–2009 period—except for the analysis of long-run outcomes. We restrict the analysis of all the datasets to individuals born in Spain, because seasonality in births (an important element for our identification strategy) can vary across countries. Table 1 summarizes the role of each of these datasets in our analysis and the samples used.[10]

[9] According to figures from Eurostat for Spain, 68% of primary school students attend public schools, 28% *concertada* schools, and 4% fully private schools.

[10] The 2009 STUS and GDA surveys took place at the onset of the great Spanish recession, so the results presented in this study might not be representative of household dynamics during this economic crisis.

Table 1: Datasets

Dataset	Sample	Cohorts' birth years	Purpose	Main outcome variables
Time Use Survey (2003 and 2009)	Individuals aged 0-17 years	1986-2009	Main analysis	Parental time investments
General Diagnostic Assessment (2009)	Children enrolled in Grade 4	1999	Main analysis	Parental time investments and school choice
Population census (2011)	Individuals aged 2-17 years	1994-2009	Validity	Birth seasonality
Birth certificates (1986-2009)	Newborns	1986-2009	Validity	Birth seasonality
Living Conditions Survey (2008-2015)	Children aged 5-6 years	2002-2009	Validity	Age at school entry
PISA (2003, 2006, 2009, and 2012)	Students aged 15 years	1988, 1991, 1994, and 1997	Motivation analysis	School performance
Population census (2011)	Individuals aged 30-55 years	1956-1981	Motivation analysis	Long-term outcomes

Notes: PISA refers to the Programme for International Student Assessment.

3.1 Spanish Time Use Survey

We use data from the two waves of the STUS (2003 and 2009). Each survey includes a representative sample of the Spanish population. We use information from the diaries of activities reported by parents whose children live in their household and are between the ages of 0 and 17. As part of the survey, each household member older than age 10 fills out a diary of activities done in the previous 24 hours, at 10-minute intervals. They also report whether another member of the household was present during the activity.

Our outcomes of interest are the time parents spent with their children on the following activities: teaching, reading and playing, or other childcare activities. We construct these variables by adding up the total time that parents report spending on these categories (see details in Online Appendix B). We also have information on individuals' months of birth and mothers' education level. The sample analyzed includes only households with children (individuals younger than 18). This amounts to 6,286 households in 2003 and 2,356 in 2009. We are left with a total sample of 13,045 children (96.8%) after taking into account the missing responses in the variables of interest. Table A.1 shows the summary statistics.

3.2 General Diagnostic Assessment

The Spanish Ministry of Education ran the GDA in 2009 for the purpose of evaluating the general competencies of students in grade 4. As part of the assessment, a random sample of grade 4 students took standardized tests in four subjects (mathematics, reading, science, and civic education), while parents, pupils, and school principals answered questionnaires. The outcomes of interest to us are mainly those related to parental investments in their children's education. We use information from the surveys of students and parents on whether parents help their children with doing homework, check students' homework, and attend school meetings. To analyze changes in school choice, we use information on school characteristics (public or private school, class size, teacher profile, etc.) from the survey of school principals (who assess how motivated students and parents in the school are).

The dataset includes information on students' birthdays and their mothers' education. In total, 887 schools were selected to participate in the study, which covered all fourth-grade students in these schools. Although the GDA dataset contains 21,738 student observations, we use only the 18,583 (85.5%) responses that have answers to every question that we use in our analysis. Table A.1 shows the summary statistics.

3.3 Spanish Population Census

We use microdata from the 2011 Spanish population census. We use the dataset (10% random sample) from the IPUMS project website, which collects harmonized census data from around the world. To study birth seasonality, we focus on individuals aged 2–17 years (born between 1994 and 2009) for whom we can link child-mother observations (92% of those in this age bracket). To study long-term outcomes, we restrict the sample to individuals between 30 and 55 years old. In the first sample, we obtain a total of 539,936 observations and a sample size of 494,952 (91.7%) after removing any observations with missing values, while in the second sample, the equivalent figures are 1,437,574 and 1,373,194 (95.5%). Table A.1 reports summary statistics for the variables included in the analysis.

3.4 Spanish Birth Certificates

We use microdata from the universe of Spanish birth certificates from July 1986 to June 2009. The Spanish National Statistical Institute compiles this dataset using the standardized form that families hand in at the time of birth registration. The dataset includes detailed information about the newborn baby (birth weight, method of delivery, gender, an indication of premature birth, among others) and, starting in 2007, parents' sociodemographic characteristics.[11]

We have 6,431,087 observations in the years included in the analysis and we are left with 5,738,321 (89%) after taking into consideration missing values in the variables of interest. Table A.1 reports the summary statistics.

3.5 Living Conditions Survey

The Spanish National Institute of Statistics administers the LCS annually to gather representative data on household characteristics. We use the 2008–2015 waves to study compliance with the birthday cutoff for school entry. This is the only publicly available dataset we could find with information on both schooling attendance and month of birth for children aged 5 to 6 years old. There are 5,808 observations in our sample of interest.

[11] Our analysis does not include individuals born in the last half of 2010 and the first half of 2011, when the removal of a cash-transfer program induced temporary changes in birth seasonality around the 1st of January (Borra, Gonzalez, and Sevilla, 2019).

3.6 Programme for International Student Assessment

PISA is an international survey run by the OECD that assesses the skills and knowledge of 15-year-old students. We use Spanish data from the 2003, 2006, 2009, and 2012 waves. In addition to mathematics and reading test scores and data on grade repetition, the survey has information on student socioeconomic characteristics: indices of economic, social, and cultural status; parental education; and student's birthday, among others.[12] PISA test scores are standardized with a mean of 500 and a standard deviation of 100. We obtain a dataset with 75,082 observations after pooling the four waves of PISA, from which we keep 74,832 (99.7%) observations after dropping those with missing values.

4 Empirical Strategy

This section presents our empirical approach to analyze how the age at which children begin school affects their performance (at school and in long-term outcomes), and, more importantly, to study how parents react to this age gap.

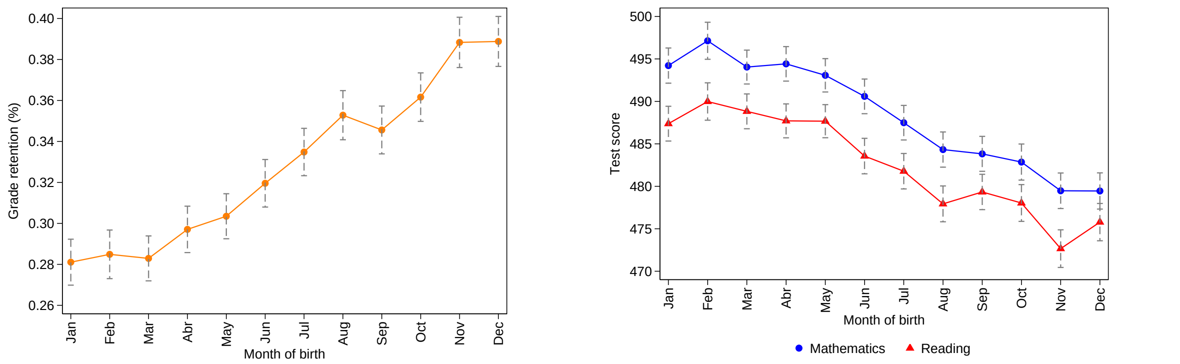
4.1 Month of Birth and Medium- and Long-Term Outcomes

To provide evidence on the relationship between the month of birth and student outcomes, we use data from PISA. Figure 2 shows local means of grade repetition and test scores at age 15 by month of birth. There is a clear monotonic relationship between these variables. People born later in the year, who are younger at school entry, tend to perform worse in school. The difference in academic performance between the youngest and the oldest children is large. Students born in December (the youngest) are around 10 percentage points more likely to have repeated a grade at age 15 than those born in January (the oldest) and have test scores around 0.1 standard deviations (SD) lower in both mathematics and reading. These differences are similar to the gender gap observed in this dataset.

[12] PISA 2006, 2009, and 2012 included an optional questionnaire for parents. However, the questionnaire was not administered in Spain.

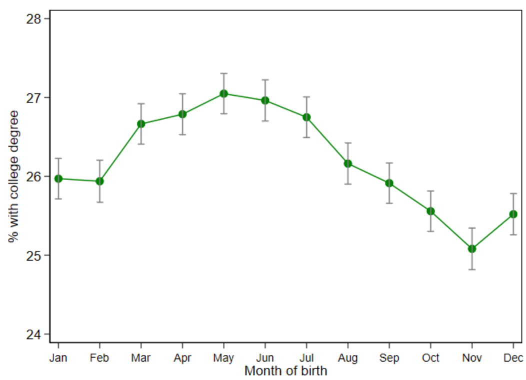
Figure 2: **School Performance, by Month of Birth**

A. Students who have repeated at least one grade by age 15 (%) **B. Test scores in mathematics and reading (SD = 100)**



Notes: Data on Spanish students aged 15 assessed in PISA 2003, 2006, 2009, and 2012. The figures plot the share of students who have repeated at least one grade by age 15 and the means of test scores in mathematics and reading in PISA by month of birth. Test scores are standardized with a mean of 500 and a standard deviation of 100 at the participating OECD countries. 95% confidence intervals are reported.

Figure 3: **Long-Term Outcomes: Individuals with a College Degree by Month of Birth**



Notes: Data from the 2011 Spanish population census. The sample includes Spanish individuals from 30 to 55 years old. The figure plots the share of individuals with a college degree (including three- and four-year programs). 95% confidence intervals are reported.

We then use the census data to look at the relationship between month of birth and long-term outcomes. Figure 3 shows local means of the probability of having a college degree by month of birth. In contrast to the PISA data, the relationship between these variables is not monotonic. People born around the middle of the year are more likely to have a college education than others, although the magnitude of the differences between months is small (up to 1 percentage point). This pattern is difficult to reconcile with a pure age effect, since people born in May are younger than people born in January, and suggests the potential existence of seasonality in births, which we will examine in Section 4.3.

4.2 Econometric Specification

Our identification strategy exploits the variation in age at school entry generated by the combination of using a single birthday cutoff to regulate school entry and the fact that children are born throughout the calendar year. With this relationship in mind, we write the following econometric model:

$$T_i = \alpha_0 + \beta_1 Young_i + \beta_2 High\,SES_i + \beta_3 Young_i * High\,SES + \beta_k X_i' + c_i + \epsilon_i \quad (1)$$

where T_i is a measure of student/adult outcomes or time/educational investments made by parents of child i, $Young_i$ is a normalized scalar that indicates individual i's month of birth, $High\,SES_i$ indicates whether individual i's comes from a family with a high SES, X_i*'* is a vector of covariates, and c_i is a vector of birth cohort dummies. Children born later in the calendar year are younger at the moment they start school than children born earlier. In most regressions, we proxy $High\,SES_i$ by an indicator that denotes whether i's mother has a college education. The vector X_i*'* includes an indicator for whether i is a female and a set of family and survey characteristics that varies across datasets (see the specific controls in the notes below the tables). The vector c is included when more than one birth cohort is available in the data.[13] The coefficients β_1 and β_3 are the parameters of interest and indicate the effect of school entry age on the outcomes analyzed for individuals with parents from low- (β_1) and high-SES (β_1+β_3) families, proxied by the mother's education. β_3 indicates whether the effect of school entry age differs by SES.[14]

Interpreting differences in the month of birth as differences in the age at school entry depends on parents not manipulating the effective age at which their children start school. In principle, some parents could do this if they are sufficiently concerned about the negative effects associated with their child's age at school entry. However, as discussed in Subsection 2.2, this strategy is not a concern in the Spanish context. The school system enforces a strict birthday cutoff for school entry. Hence, children's predicted age

[13]Note that birth cohorts might refer to individuals born in the same calendar year, as is the case in the majority of our estimations, or to individuals born from July of one year to June of the following year, as in the specifications in which we compare individuals born in adjacent December and January months. We clarify when the latter is the case.

[14]One alternative strategy is to implement a regression discontinuity design. This option would ideally require the exact date of birth, which we do not have in our main dataset. We could still use the month of birth as a discrete running variable and include in the sample individuals born in months other than December and January. Such a choice would have the advantage of increasing sample size and potentially the precision of our estimates. However, misspecification in the control function could lead to bias in the estimated effect. This is an important concern in our case because the documented seasonality suggests that the relationship between cofounders and month of birth is not monotonic. Also, we cannot implement this design in datasets which record mainly students in the same grade, such as PISA and the GDA. Hence, we opt for the more conservative design. Nonetheless, using the STUS data, we also compare individuals born in adjacent January and December months and find similar results, available in the Online Appendix, Table A.3.

in months at school entry effectively equals their actual age at school entry.[15]

Interpretation of β_1 and $(\beta_1+\beta_3)$ as the age at school entry effects for low- and high-SES individuals depends on independence between the month of birth conditional on SES and the error term. Broadly, the main threat to identification is that within SES, there might be a connection between the month of birth and parental or newborn characteristics. This could happen either because some (concerned) parents may try to time pregnancy to give birth after the birthday cutoff, or mothers with certain characteristics are more likely to give birth in specific months of the year. In this case, the estimated effects of the child's age at school entry would be confounded by birth seasonality. For instance, Buckles and Hungerman (2013) show that in the United States, winter births are disproportionately common among teenagers and unmarried women.

Importantly, the interpretation of β_3 as a causal parameter is not compromised by differences by month of birth (i.e., seasonality) that are common across SESs (which are captured by β_1) nor by differences by SES that are common across month of birth (which are captured by β_2). The threat to the identification of β_3 comes from differences by month of birth that vary across SESs.

Along this line, to interpret differences in parental investments by month of birth and SES as differences in parental responses by SES to school disadvantage requires that the relationship between parental inputs and age in months varies only by SES because of the age-at-school-entry penalty. A concern here would be that low-SES parents decrease more rapidly their time investment than the high-SES parents as the children age. We show in Section 4.4 evidence supporting that this is not a problem in our context —and it should not be a problem either for studying responses related to school choice.

Finally, it is worth noting that we do not include school fixed effects in our specification, unlike other studies on the effects of school entry age on school performance. As we show in Subsection 6.2, school choice is one possible channel through which parents can respond if their children are among the youngest students entering school. Therefore, we do not control for school characteristics.

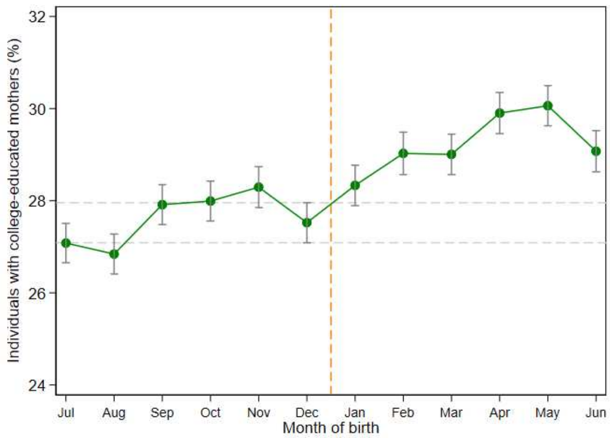
4.3 Birth Seasonality: Maternal and Birth Characteristics

As outlined in the previous subsection, we are concerned with the existence of seasonality in births and whether, if any exists, it interacts with SES. Such a pattern could arise either because parents with different characteristics have children at different times of the year or because some parents plan childbirth to follow the school birthday cutoff. We first look at the relationship between the month of birth and SES (proxied by a mother's college education). To do so, we use information from the 2011 population census on individuals

[15]In an instrumental variables framework, our econometric model is akin to a reduced form model in which the instrument (predicted age in months at school entry) almost perfectly predicts the endogenous variable (age in months at school entry).

aged 2 to 17.

Figure 4: Share of Individuals with College-Educated Mothers, by Month of Birth



Notes: This graph plots local means of having a college-educated mother by month of birth. The graph is centered around the school entry cutoff (January 1st). Data from the 2011 population census. The sample includes all individuals born from 1994 to 2009. Local means are represented by dots, and 95% confidence intervals are in gray.

Figure 4 plots the proportion of mothers with a college education by their children's month of birth. As we expected from Figure 3, we find suggestive evidence of birth seasonality by SES. Children born in the first half of the year tend to have better-educated mothers than those born in the second half of the year. However, children born in January and December, close to the birthday cutoff, seem on average to have mothers with similar levels of education (the 95% confidence intervals of these months overlap). Furthermore, the regression estimate of the difference in the proportion of mothers with a college education between the children born in adjacent December and January months is close to zero (-.008 compared to a mean of .275), although it is statistically significant at the five percent level. See rows 3–4 in column (3) in Panel C in Table A.1 in the Appendix. Figure A.2 in the Online Appendix shows a similar pattern for several parental characteristics: mother (father) is of foreign nationality, maternal (paternal) age and mother is married, while column (3) in Panel C in Table A.1 reports the corresponding regression estimates. Only in mother's age we find a small difference between individuals born in December and January.

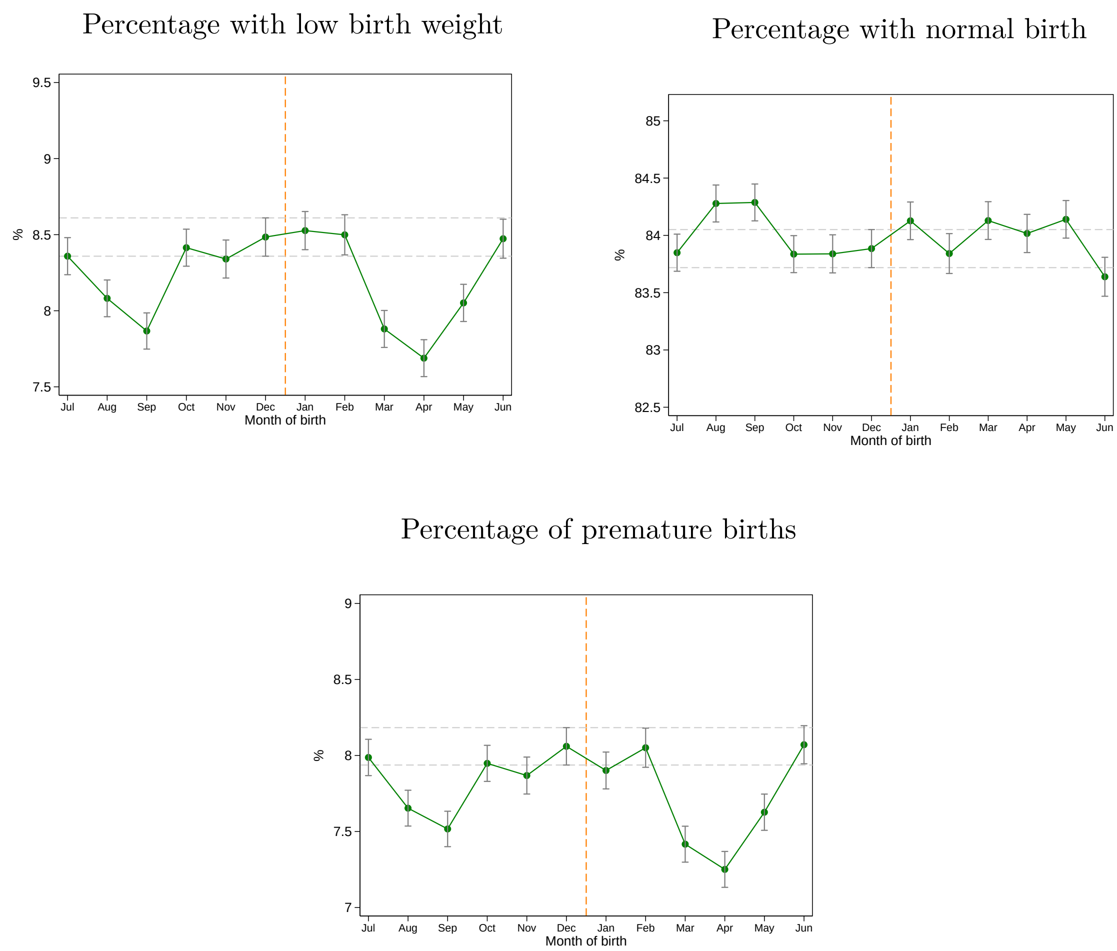
Even if close to the birthday cutoff there is no connection between parental characteristics and the month of birth, it is possible that there is a relationship between newborn characteristics and the month of birth if unobserved parental characteristics or environmental (institutional) conditions vary by month. To study this possibility, Figure 5 displays the means of several birth characteristics (low weight, normal birth, and premature birth) of children born in each month of the year, using microdata from the universe of children born in Spain from 1986 to 2006. As in Figures 3 and 4, being born in the first months of the year is associated with more positive outcomes. Importantly, the birth characteristics of children born around the birthday cutoff for school entry seem to be similar. To confirm this, column (3) in Panel D in Table A.1 in the Appendix shows regression estimates of the average difference in these characteristics between children born in adjacent December and January months. Children born in December are 0.2 percentage points more likely to be born prematurely than those born in January, with a high statistical significance, but this is a small difference (compared to a baseline of 5 percentage points), and there are no similar gaps between these two months in terms of gender and prevalence of normal births and low birth weight. Therefore, from now on we focus our analysis on children born in December and January.

The analysis of the population census and birth certificates shows that individuals born in December and January are on average observationally similar in terms of several parental and birth characteristics. However, these individuals were born in adjacent months, while in our preferred specification we mainly compare individuals born in the same calendar year. As this amounts to comparing people born almost one year apart, it is important for us to investigate whether they are indeed similar. Hence, we repeat the analysis but compare individuals born in the same calendar year. In Panels C and D in Table A.1 and in the Appendix, column (4) shows regression estimates of the average difference in parental and birth characteristics between children born in December and January of the same calendar year. Three of the seven parental characteristics in the census data are statistically significant at conventional levels, but the magnitude of these point estimates is small. In the birth certificates data, we observe statistically significant differences in three of the four variables analyzed, but the magnitude of these differences is, again, small.

Furthermore, we compare maternal education for individuals born in December and January in the datasets used in our main analyses. Importantly, the GDA dataset records information on people in the same grade. Results confirm the reported patterns. We do not find statistically significant differences between individuals born in January and December in the same calendar year in the STUS or GDA datasets. Results are available in column (4) in Panels A and B in Table A.1

Summing up, we do not find systematic differences between individuals born in December and January when we look at several family and birth characteristics across datasets. Importantly, the small differences that we observe would indicate that, if any, individuals born in December have parents with slightly worse parental characteristics than those born in January, as marginally the first group have on average mothers with less education and are more likely to be born prematurely and with a low birth weight. Given a negative selection on parental characteristics among December born individuals,

Figure 5: Birth Characteristics of Newborns, by Month of Birth



Notes: Data from Spanish birth certificates. The sample includes the universe of Spanish babies born in the period 1986–2006. The figures plot, by month of birth, the percentage of newborns with a low birth weight, with a normal birth, and with a premature birth. The means are represented by dots, and 95% confidence intervals are in gray.

one would expect to observe that they receive lower parental investments than January born individuals. Such pattern would produce a downward bias in the estimation of the average compensating effect to the age-at-school-entry penalty, as this effect means higher parental investments for the December born children.[16]

Finally, we look at the density of newborns by month of birth using the same birth

[16]We further pursue this analysis and compare within-SES differences in birth characteristics of children born in December and January, using birth certificates data from 2007 to 2009. We use these years because the information about maternal education is available only from 2007 onward. Figure A.3 and Table A.1 in the Online Appendix report results. Looking within SES (β_1 and $\beta_1 + \beta_3$ in equation 1) , we do not find any statistically significant difference between children born in December and January (see row 1 and row 6). Importantly, β_3 has a small magnitude (-.001–.003) and is not statistically significant at conventional levels in any of the four cases, which indicates that there is no difference in birth outcomes by month of birth that vary across SESs.

certificate data. If some parents try hard to have their children born after the birthday cutoff for school entry (in January), one should expect to observe a higher number of births in January than December. However, we do not find empirical support for this scenario. There is no bunching in the number of births by maternal education when we compare those born in December and January (see Figure A.4 in the Online Appendix).

4.4 Parental Time Investment by Socioeconomic Status and Age

As mentioned before, our identification strategy would be compromised if the secular rate of change in parental investments by age is different by SES. To be more precise, note that a larger increase in time invested by high-SES parents in reaction to the age at school entry penalty is observationally equivalent to a secular pattern in which parents decrease the time invested as their children grow older, and such a decrease is steeper among low-SES families. Hence, we investigate potential differences in parental investment profiles by age and SES using data from the STUS.

Figure A.5 in the Online Appendix shows the average time (in minutes per day) that parents spend helping their children with academic activities by SES and child's age. We find that high-SES parents spend more time on average teaching their school-age children no matter the child's age. However, and this is the most important feature for us, the evolution of the parental time investment by age is similar for parents from high- and low-SESs: in both cases, it tends to increase during the early years of primary school until peaking when the child is about 9 years old, and then go down. This piece of evidence supports our identification assumption that differences in parental investments by SES and month of birth for individuals from the same birth cohort do not explain differences by SES in parental investments along the life cycle.

5 The Effect of Being the Youngest

In this section, we estimate age-at-school-entry effects on student and adult outcomes. We start by examining average effects, and then, move to analyze whether these effects vary by SES. Our main specification includes only individuals born in January or December, and hence our results capture the maximum effect of age at school entry, as we compare the youngest to the oldest individuals at school entry.

5.1 Poor Little Children: Short- and Long-Term Effects of Being the Youngest

Columns 1–3 in Table 2 present the results of regressing three measures of school performance (grade retention, mathematics and reading test scores) on an indicator of whether the student was born in December or in January, an indicator for being a female, and an indicator for coming from a family with a high SES (in the top 25% of the distribution of the SES index).[17] All the regressions include vectors of dummies for the PISA survey year. Remember that the oldest children at school entry are born in January ($Young = 0$) and the youngest in December ($Young = 1$).

Table 2: **Medium- and Long-Term Outcomes**

	Medium-term outcomes			Long-term outcomes		
	Grade retention	Mathematics score	Reading score	College graduate	Employed	Partner has college degree
	(1)	(2)	(3)	(4)	(5)	(6)
Young	0.105***	-13.861***	-11.164***	-0.00599***	0.00152	-0.00729***
	(0.014)	(2.476)	(2.370)	(0.00198)	(0.00247)	(0.00216)
Female	-0.086***	-11.568***	34.421***	0.0281***	-0.125***	-0.00791***
	(0.014)	(2.464)	(2.496)	(0.00195)	(0.00243)	(0.00211)
Top 25% SES	-0.259***	59.506***	53.436***			
	(0.015)	(2.797)	(2.763)			
Mean	0.28	499.25	491.24	0.143	0.680	0.119
Observations	12,311	12,311	12,311	226,454	226,454	162,920

Notes: The data analysed in columns 1 to 3 come from Spanish students aged 15 assessed in PISA 2003, 2006, 2009 and 2012. In these first three columns the outcome variables are indicators of school performance. Grade retention (Column 1) indicates whether the student repeated a grade at least once, and mathematics and reading scores (columns 2 and 3) represent the student's performance in the PISA tests. Test scores are standardised with a mean of 500 and a standard deviation of 100 at the participating OECD countries. The data analysed in columns 4 to 6 come from the 2011 Spanish population census. In Column 4, the outcome variable is an indicator of whether the individual is a college graduate, in Column 5 it is an indicator of whether s/he is employed, and in Column 6 an indicator of whether her/his spouse is a college graduate. The sample consists of Spanish individuals born in December and January. The indicator variable "Young" equals one if the student was born in December and zero if in January. The regressions in columns 1 to 3 include survey year dummies and those in columns 4 to 6 include cohort dummies, where the cohorts are defined as being born from July of one year to June of the following year. Robust standard errors are in parentheses (clustered at school level in the case of columns 1 to 3). * p<0.10, ** p<0.05, *** p<0.01.

Along the same line as the visual evidence shown in Graph 2, younger students do worse in school than their older peers. The youngest children at school entry are 10 percentage points more likely to have repeated a grade at age 15 than the oldest children (column 1). This gap is similar to the gender gap in grade retention (see row 2, also in

[17] We define high SES as being in the top 25% of the distribution of the SES index to roughly approximate the proportion of children with college educated mothers in our main datasets; around 36% (30%) of children have a college educated mother in the STUS (GDA) dataset. As a robustness check, we run an alternative specification using the SES index as a continuous variable and find similar results to those presented in this subsection. See Figure A.1 in the Online Appendix.

column 1), and around 2/5 of the estimated gap for SES (see row 3). In the same fashion, there is a clear age gap in student achievement. On average, the youngest students have lower test scores in mathematics (-0.14 SD) and in reading (-0.11 SD). All the results discussed are statistically significant at the 1 percent level.

Columns 4–6 in Table 2 present the results for the long-term effects of being an early entrant to school. In this specification, we are not able to include information on parental SES because we do not observe this information in the population census data. Regressions reported in columns 4–6 include cohort dummies, where cohorts are defined as being born from July of one year to June of the following year. Note that in these birth cohorts we compare individuals born in adjacent months (we cannot make the same comparison using PISA data because we would be comparing students in different grades). We find that people born in January (the oldest at school entry) are more likely to have a college degree (by 0.6 percentage points) and a more-educated partner (one with a college degree, by 0.7 percentage points) than people born in December. Both results are statistically significant at the 1 percent level. We do not find statistically significant differences in the probability of being employed. Summing up, Table 2 documents that, in line with the international literature, people who are younger at school entry than their classmates tend to have worse student outcomes, which seems to carry into the long term.

5.2 Socioeconomic Status and the Disadvantages of Being Younger: Poor (Poor) Little Children

Table 3 shows the results of regressing measures of student performance on an indicator of whether the student was born in December or January, an indicator for being a female, an indicator for coming from a family in the top 25% of the distribution of the SES index, and an interaction term between these two indicators ($Young * top\,25\%$).

We find clear differences in the effect of age at school entry by socioeconomic background. Being young at school entry has a significantly worse effect on poor students. Young students from a low socioeconomic background are 12.7 percentage points more likely to have repeated a grade at age 15 than older classmates from the same socioeconomic background (see row 1 in column 1). Importantly, this age effect is significantly smaller for children with a high socioeconomic background, by 8.7 percentage points (see row 4). A qualitatively similar argument can be made about achievement at age 15, as measured by test scores in mathematics and reading. Younger students from a low socioeconomic background have -0.16 SD (-0.14 SD) lower mathematics (reading) test scores than their older counterparts (see row 1, columns 2–3), while this age effect is significantly smaller for privileged children: 0.1 SD in both subjects. These results are statistically significant at the 1 percent level. Still, younger children with high SES are more likely to have repeated a grade (by 4 percentage points) and have lower mathematics test scores (by 0.06 SD) at age 15 than older classmates from the same socioeconomic background (see row 6–7, columns 1–2), though they have statistically similar reading test scores (row 7, column 3). Overall, we find similar results when using the SES index as a continuous variable. See Figure A.1 in the Online Appendix.

Therefore, families with a high SES seem to be able to buffer the negative effect of their child being relatively young on the child's outcomes, while families with a lower socioeconomic background do not.

Table 3: School Performance, Entry Age and Socioeconomic Status

	Grade retention (1)	Mathematics score (2)	Reading score (3)
Young	0.127***	-16.439***	-13.754***
	(0.018)	(2.983)	(2.842)
Female	-0.086***	-11.553***	34.435***
	(0.014)	(2.460)	(2.493)
Top 25% SES	-0.215***	54.408***	48.317***
	(0.019)	(3.789)	(3.778)
Young * top 25% SES	-0.087***	10.153***	10.195***
	(0.028)	(5.378)	(5.187)
Mean	0.28	499.25	491.24
$\beta_1 + \beta_3$	0.04	-6.29	-3.56
p-value: $\beta_1 + \beta_3 = 0$	0.014	0.028	0.21
Observations	12,311	12,311	12,311

Notes: Data from Spanish students aged 15 assessed in PISA 2003, 2006, 2009 and 2012. The outcome variables are indicators of school performance. Grade retention (Column 1) indicates whether the student repeated a grade at least once, and mathematics and reading scores (columns 2 and 3) represent the student's performance in the PISA tests. Test scores are standardised with a mean of 500 and a standard deviation of 100 at the participating OECD countries. The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. Young * top 25 SES (β_3) is an indicator of the interaction between the variable "Young" and an indicator for coming from a family in the top 25% of the SES index. All regressions include survey year dummies as controls. Standard errors clustered at the school level are in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

6 Parental Responses

Two channels could explain why entry age effects are greater among children from low-SES families. First, high-SES children might actually be ready to start school irrespective of their age, or more likely to be ready, because of the well-established correlation between family SES and preschool investment. This explanation implies that what puts young children at a learning disadvantage is being below a minimum level of learning achievement (maturity) on the first day of school, and growing up in a more educationally nurturing environment makes it more likely that even the youngest children are above this minimum level.

Second, high-SES parents might increase their investment when their children are among the youngest at school entry to compensate for the children's learning disadvantage. Parents with higher SES are likely to be more prepared in terms of financial resources, human capital, and information to invest in their children in reaction to negative shocks. A dominance of channel one implies that among high-SES families, one should not observe differences in parental investments according to the child's age at school entry. A dominance of channel two implies the opposite. In this section, we analyze data on parental involvement in their children's education to study whether parents respond differently to age at school entry depending on their SES.

6.1 Parental Time Investment

Our main estimates on parental time investments come from data from the two waves of the STUS, which reports in detail how parents use their time on activities directly related to their children's human capital development.

Table 4: Parental Time Investments

	(1) Teaching	(2) Read and Play	(3) Other childcare
Young	-0.0443	2.617	9.021**
	(1.193)	(2.401)	(4.579)
College mother	0.0975	4.460	11.17*
	(1.450)	(3.421)	(6.652)
Young X College mother	5.590**	-0.750	-5.501
	(2.502)	(4.410)	(8.854)
Girl	0.446	-1.620	-7.370**
	(1.041)	(2.006)	(3.757)
Mean	7.55	22.64	85.74
$\beta_1 + \beta_3$	5.6343	1.867	3.52
p-value $\beta_1 + \beta_3$=0	0.01	0.61	0.64
Observations	2,196	2,196	2,196

Notes: Data from the Spanish Time Use Survey 2003 and 2009. The sample consists of children aged 0 to 17 born in December or January in Spain. The outcome variables indicate the minutes parents spent daily with their children doing different activities: ones related to teaching (column 1), reading and playing (column 2), and other childcare activities (column 3). The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has more than secondary education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All the reported models include as controls the number of siblings, vectors of dummies for birth order, year of birth, weekday and quarter of interview, and survey year. Standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1

Table 4 reports the estimated coefficients from Equation 1, using as outcomes measures of the time (in minutes) that parents spend teaching their children, reading and playing with them, and on other childcare activities. These coefficients represent the effects of age at school entrance on parental time investments and how such effects interact with family SES (i.e., whether the mother has a college education or not).

In households with non-college-educated mothers, the school entry age does not seem to affect parental time investments in activities related to children's human capital development. The coefficient for being among the youngest at school entry has a small magnitude and is not statistically significant at conventional levels in the three regressions presented. In contrast, households with university-educated mothers spend significantly more time with their children on activities related to teaching (more than 5 minutes per day, significant at the 5 percent level) when they are among the youngest at school entry. This is a large effect. Parents in our sample spend an average of 7.5 minutes per day helping their children with school activities. There are no statistically significant differences according to child's month of birth on the time that highly educated parents spend on the other childcare activities. Thus, more educated parents invest more time in teaching activities when their children are among the youngest at school entry. Interestingly, this effect seems to be larger during the school months (estimated at 7 minutes daily, see Table A.4 in the Online Appendix).[18]

Table 5: Parental Involvement

	(1) Help with homework	(2) Parents check homework	(3) Parents go to school meetings
Young	0.00321	0.00231	-0.0229
	(0.0154)	(0.0189)	(0.0201)
College mother	0.0369*	-0.106***	-0.0265
	(0.0192)	(0.0271)	(0.0275)
Young X College mother	0.0758***	0.0732**	0.0425
	(0.0247)	(0.0364)	(0.0377)
Girl	-0.0152	0.0328**	-0.00887
	(0.0123)	(0.0166)	(0.0169)
Mean	0.85	0.69	0.59
$\beta_1 + \beta_3$	0.079	0.076	0.02
p-value: $\beta_1 + \beta_3 = 0$	0.00	0.02	0.54
Observations	3461	3350	3345

Notes: The data comes from the General Diagnostic Assessment survey of 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or in January. The outcome variables are different measures of parental involvement in children's education: a variable indicating whether parents help their children with homework (column 1), an indicator variable of parents checking children's homework (column 2), and a variable indicating whether parents frequently go to school meetings (column 3). The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has a college education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All models include as control an indicator variable that equals 1 if the student lives with at least one sibling. Standard errors are clustered at the school level. * p<0.10, ** p<0.05, *** p<0.01

We complement these results with data from the GDA. Here, using self-reported

[18]Results are robust to also include as controls maternal age, and indicators for whether the mother is a Spanish national and whether she is married (see Online Appendix, Table A.2). Furthermore, we also compare individuals born in adjacent January and December months and find similar results, which are available in Online Appendix, Table A.3.

statements, we analyze whether parents respond to school entry age by changing their behaviors regarding helping children do their homework or check their homework, or by attending school meetings more frequently (as reported by the students). As before, we examine whether the parental responses depend on maternal education.

Table 5 presents the estimated coefficients from Equation 1 in which the outcome variables are indicators of different dimensions of parental involvement. As in the time use data, we do not find that households with non-college-educated mothers invest time differently if their children enter school at a younger age (first row of column 1), and we do find differences in households with college-educated mothers. Children with university-educated mothers are significantly more likely to receive help doing their homework (an increase of 8 percentage points, significant at the 1 percent level) and have their parents check their homework (up 7.6 percentage points, significant at the 5 percent level) when they are among the youngest at school entry (see rows 6–7 in columns 1–2). However, we do not find that parents increase attendance at school meetings (column 3). Summing up, this evidence shows that more-educated parents compensate for school disadvantage by putting more effort into helping their children with their with academic tasks.[19,20]

6.2 School Inputs

We now analyze whether parents respond to school entry age by enrolling their children in schools (classrooms) with different levels of inputs and whether these reactions vary according to the level of maternal education.[21]

Using the GDA, we look at differences in several school inputs between the schools (classrooms) that students born in December and January attend. To do this, we rely on surveys of principals and teachers. Table 6 presents the coefficient estimates from Equation 1. In the first column, the outcome is an indicator variable of whether the student attends a *concertada* school, which is a privately-managed school that may offer a more customized educational environment than regular schools. We do not find that entry age significantly affects school choice on this specific feature, and the result is independent of the mother's education. However, younger children with college-educated

[19]Results are robust to also include as controls indicators for whether the mother is a Spanish national and whether the child resides with both parents (see Online Appendix, Table A.6).

[20]Parents "checking" homework could be a complement or a substitute for "helping with" it. In our data, 60% of parents do both activities, which suggests a high degree of complementarity. However, among those parents who only do one of these activities (around 35%), high-SES parents are more likely than low-SES parents to "help" rather than "check," which indicates some degree of substitutability.

[21]Parents may learn about the age at school entry penalty while their children grow up (e.g. during preschool) and, in consequence, decide to choose better primary schools for their younger children. This is a distinct possibility because at 3 years old already 96% of children in Spain attends preschool (Ministerio de Educación, Cultura y Deporte, 2019). Alternatively, some parents may know about the age at school entry penalty before they decide the timing of conception, and decide to respond to this penalty by increasing time and school investments during childhood instead of timing their child's birth after the entry to school birthday cutoff.

mothers are more likely to attend schools with better teachers (up 0.09 SD in a teacher quality index significant at the 1 percent level) and with parents who are more involved in the school (up 0.088 SD in a parental involvement index, significant at the 5 percent level) than older children from similar types of families (row 6, columns 4–5). In contrast, we do not observe significant differences in the characteristics of the schools attended by children from mothers without a college education (see the first row in columns 1–5). In the Online Appendix, we provide the disaggregated effects of the variables that constitute the Teacher Quality and the Parental Involvement indexes, plus a School Quality Index, which aggregates the nine variables analyzed (and produces results consistent with those presented in Table 6). It is also worth noting that we find effects in both variables reported by teachers (Parental Involvement Index) and principals (Teacher Quality). The principals' assessments refer to overall teacher quality at the school level, not the teacher in the specific classroom that the child attends. This is relevant because it supports the argument that high-SES parents choose schools with better inputs when their children are among the youngest at school entry—in contrast to an alternative explanation in which younger high-SES children are sorted into better classrooms either because high-SES children generally attend more responsive schools or because parents lobby for better classrooms rather than choosing better schools. Therefore, we find evidence that more-educated parents are more likely to send their children to schools with better inputs when the children enter school at an earlier age.[22]

[22]Also in the GDA, both parents and students declare (in separate surveys) whether the student is currently enrolled in a school because of living in the school's catchment area. We use this information as an indicator that parents choose (or not) to send their young children to different schools from the default option. We find that children of mothers without a college education seem to go to their neighborhood school regardless of the month they were born, while young children of college-educated mothers seem to be more likely to attend a different school than the default option for older classmates from similarly educated mothers. Table A.7 in the Online Appendix reports the results.

Table 6: School Inputs

	(1) *Concertada* school	(2) Class size	(3) Peers motivated to learn	(4) Teacher quality index	(5) Parental involvement index
Young	0.00268	0.220	-0.0259	-0.00775	-0.00804
	(0.0204)	(0.179)	(0.0213)	(0.0243)	(0.0304)
College mother	0.232***	1.316***	0.138***	0.00704	-0.00582
	(0.0298)	(0.287)	(0.0271)	(0.0319)	(0.0417)
Young X College mother	0.0362	-0.579*	0.0676**	0.0995**	0.0964**
	(0.0370)	(0.338)	(0.0334)	(0.0430)	(0.0486)
Girl	0.0164	0.136	-0.00941	0.00843	0.00917
	(0.0170)	(0.141)	(0.0161)	(0.0202)	(0.0221)
Mean	0.40	23.89	0.69	0.01	0.02
$\beta_1 + \beta_3$	0.039	-0.36	0.042	0.091	0.088
p-value: $\beta_1 + \beta_3 = 0$	0.23	0.19	0.13	0.01	0.04
Observations	3171	3171	3171	3171	3171

Notes: The data come from the General Diagnostic Assessment survey 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or January. The outcome variables are different school characteristics: a *concertada* school indicator (column 1), class size (column 2), an indicator of whether the teacher reports that the students in her class are very motivated (column 3), a Teacher Quality Index (column 4) and a Parental Involvement Index (column 5) The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has a college education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All models include as control an indicator variable that equals 1 if the student lives with at least one sibling. Standard errors are clustered at the school level. * p<0.10, ** p<0.05, *** p<0.01

Overall, these results are consistent with the idea that more-educated parents compensate when their children start school at an earlier age by spending more time helping their children with school and sending their children to schools with better inputs. Along the same lines, we do not find that less-educated parents change their patterns of investment in their children to compensate for or reinforce the effects of entry age. This socioeconomic difference in compensating behavior helps to explain why the detrimental effect of being young at school entry is greater for low-SES children.[23]

6.3 Heterogeneity Analysis

6.3.1 Parental Time Investment According to Age

Using data from the STUS, Table 7 reports the estimated coefficients from Equation 1 for three age groups: children younger than 6 (who are below school age at the time of the survey), children aged 6 to 12 (who are of primary school age), and children aged 13

[23] As a supplementary analysis, we replicate our main tables using paternal education instead of maternal education as a proxy for SES. We do so motivated to understand if our results are related to other variables that capture SES or have a more specific relationship with maternal education. Tables A.10, A.11, and A.12 in the Online Appendix report results. In terms of parental time investment (STUS) and involvement (GDA), the results convey the same message as those presented in Tables 4 and 5. We do not find significant differences in terms of school inputs. The coefficients of interest have the same sign as those presented in Table 6, but are imprecisely estimated. It is hard to conclude something from these last results, but they potentially suggest that households with college-educated fathers and non-college-educated mothers might be less reactive to the age-at-school-entry penalty in terms of school choice.

to 17 (who are of secondary school age). Table 4 shows that young children with highly educated mothers spend more time with their parents on activities related to teaching than their older peers. If these results are driven by a mere age effect and not by what is going on in school (i.e., not by a negative early-entry-age effect), we might expect a similar pattern if we analyze the sample of children who are outside of compulsory school age. However, as shown in Table 7 (row 6 in columns 1–3), the sum of the coefficients for *Young* and the interaction *Young*College Mother* is not significantly different from zero when estimated using the sample of children aged 0 to 5. This includes both parental time related to teaching and all other childcare. In contrast, the coefficient for this interaction in the teaching time regression is positive and statistically significant when we analyze the sample of children who are above school entry age, i.e., aged 6 to 12 (column 4) and 13 to 17 (column 7).

Interestingly, the magnitude of the point estimate in the sample of children aged 6 to 12 seems to be larger than that in the sample of children aged 13 to 17. While in the former sample, the youngest children from households with university-educated mothers spend 10 minutes more a day with their parents on activities related to teaching than their older peers, in the latter sample, the corresponding figure amounts to only 7 minutes (and is insignificant). This pattern is consistent with the ideas that 1) parents react to the realization that their child has a school disadvantage, and 2) that the returns on investments at earlier ages are larger. This is only suggestive evidence, as we do not have enough statistical precision to rule out that both parameters are of the same magnitude. As Table A.5 in the Online Appendix shows, the compensating effect becomes larger when we exclude the summer months (point estimate is 15 minutes), which reinforces the idea that parental reactions are driven by what is going on in school. Once more, across the three age groups, we observe that in households with less-educated mothers, entry age does not seem to affect parental time investments in activities related to the children's human capital development.

Table 7: Parental Time Investment, by Age Groups

	(1) Teaching	(2) Reading and playing	(3) Other childcare	(4) Teaching	(5) Reading and playing	(6) Other childcare	(7) Teaching	(8) Reading and playing	(9) Other childcare
	0–5 years old			6–12 years old			13–17 years old		
Young	-0.199	1.771	19.41	-0.214	1.672	18.75***	-0.333	3.390**	-4.303
	(1.746)	(6.705)	(12.13)	(2.360)	(3.068)	(6.540)	(1.890)	(1.683)	(3.705)
College mother	2.040	7.577	19.57	-2.400	5.116	9.264	0.179	-0.692	-5.990
	(1.924)	(7.441)	(13.52)	(3.065)	(4.103)	(8.849)	(2.142)	(1.684)	(4.137)
Young X College Mother	-1.346	-7.889	-9.844	13.24**	3.677	-5.418	7.013	-0.352	9.921*
	(2.776)	(10.15)	(19.68)	(5.352)	(5.878)	(11.22)	(5.142)	(3.242)	(5.839)
Girl	0.375	-3.089	-15.89*	-0.700	0.304	-5.590	1.397	-3.084*	-3.305
	(1.380)	(5.051)	(8.887)	(2.006)	(2.721)	(5.426)	(1.724)	(1.633)	(3.369)
Mean	4.77	45.56	171.24	12.54	16.42	63.99	4.44	3.89	13.95
$\beta_1 + \beta_3$	-1.56	-5.19	-25.07	10.13	0.12	-3.20	5.02	2.14	5.34
t-test $\beta_1 + \beta_3 = 0$	0.50	0.42	0.54	0.01	0.29	0.16	0.18	0.27	0.22
Observations	744	744	744	812	812	812	640	640	640

Notes: Data from the Spanish Time Use Survey 2003 and 2009. The sample is of children aged 0 to 17 born in December or January in Spain. The first 3 columns include only children younger than 6, columns 4 to 6 include children aged 6 to 12 and the last 3 columns include children aged 13 to 17. The outcome variables indicate the minutes a day parents spent with their children doing different activities: ones related to teaching, to reading and playing, and other childcare activities. The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has more than secondary education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All the reported models include as controls the number of siblings, and vectors of dummies for birth order, year of birth, weekday and quarter the interview was conducted, and year of survey. Standard errors are clustered at the household level.
*** p<0.01, ** p<0.05, * p<0.1

6.3.2 Gender Differences

Finally, we analyze whether the responses from highly and less-educated parents vary according to the student's gender. We look at gender gaps motivated by the literature showing that girls mature faster than boys (see a discussion in Bertrand and Pan, 2013) and that boys struggle more when they face disadvantaged environments (see, for example, in the literature on family structure: Autor et al., 2019; Fan et al., 2015). To do this, we first analyze whether the age effect on student outcomes, as measured by PISA, differs by gender. We find some evidence, which is reported in Table 8, that this is the case. As before, we observe that being among the youngest at school entry has a significant negative effect among children from low-SES families, both for boys and girls (see row 1, columns 1-6). However, the story seems to be different for children from high-SES families. Boys from high-SES families do not seem to manage to overcome the age disadvantage (see rows 5 and 6, columns 1–3). Compared to their older peers, young boys from high-SESs are more likely to have repeated a grade (by 7.4 percentage points, with statistical significance at the 1 percent level) and have lower test scores in mathematics (by 0.11 SD, with statistical significance at the 1 percent level) and reading (by 0.08 SD, with statistical significance at the 10 percent level) at age 15. In contrast, we do not observe a gap in student outcomes among high-SES girls (columns 4–6). The magnitude of the coefficients reported in row 5 is small, and none are statistically significant at conventional levels (see row 6). Therefore, at age 15, there are no differences in academic performance between girls born in December and January who come from advantaged families.

Table 8: School Performance, by Student Gender

	Boys			Girls		
	(1) Grade retention	(2) Math score	(3) Reading score	(4) Grade retention	(5) Math score	(6) Reading score
Young	0.135***	-17.197***	-16.526***	0.118***	-15.686***	-11.031***
	(0.014)	(2.448)	(2.492)	(0.026)	(4.209)	(4.052)
Top 25% SES	-0.231***	55.298***	50.989***	-0.198***	53.294***	45.409***
	(0.019)	(3.395)	(3.456)	(0.026)	(4.952)	(4.579)
Young * top 25% SES	-0.061**	6.599	8.930*	-0.115***	14.187*	11.777*
	(0.027)	(4.790)	(4.877)	(0.035)	(7.330)	(6.630)
Mean	0.33	505.08	473.92	0.23	493.58	508.09
$\beta_1 + \beta_3$	0.07	-10.60	-7.60	0.003	-1.50	0.75
p-value: $\beta_1 + \beta_3 = 0$	0.002	0.01	0.07	0.90	0.81	0.89
Observations	6070	6070	6070	6241	6241	6241

Notes: Data from Spanish students aged 15 assessed in PISA 2003, 2006, 2009, and 2012. The outcome variables are indicators of school performance. Grade retention (column 1) indicates whether the student repeated a grade at least once, and mathematics and reading scores (column 2 and 3) represent the performance of the student in the PISA tests. Test scores are standardised with a mean of 500 and a standard deviation of 100 at the participating OECD countries. The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. Young * top 25 SES (β_3) is an indicator of the interaction between the variable "Young" and an indicator for coming from a family in the top 25% of the distribution of the SES index. All regressions include survey year dummies as controls. Standard errors clustered at school level are in parentheses. * p<0.10, ** p<0.05, *** p<0.01

We use data from the GDA to study differences in parental investments by SES and gender because this data has a larger sample size than the STUSs. Table 9 shows that young boys from households with college-educated mothers are more likely to receive help from their parents with homework (by 6 percentage points) and their parents are more likely to check their homework (by 10 percentage points), as shown in rows 5 and 6 in columns 1 and 2. Both younger girls from low- and high-SESs are more likely to receive help with homework from their parents with respect to older girls from the same SES (by 4 percentage points, at the 10 percent level, in the first case, and by 10 percentage points, at the 1 percent level, in the second case). That said, we do not observe these differences in the probability that parents check their homework and go to school meetings (columns 5–6).We obtain results along the same lines using data from the STUS. Although the results are more imprecisely estimated, we observe again that the differential compensating effect on time investments found among high-SES parents is mainly present in male students (see the results in Table A.9 in the Online Appendix).

We also look at gender differences in school choice (see Table 10). Again, it is clear that younger boys with high-SES are more likely to be enrolled in schools with better inputs than older classmates from families of similar background (panel A, rows 5–6). There are no observed differences between the schools attended by younger and older boys from low-SES (panel A, row 1) or girls from high- and low-SESs (panel B).

In summary, we do not find that the student outcomes or the parental responses for boys and girls from low-SES families differ according to the student's age at school entry. In contrast, we observe different gender patterns among children from high-SES families. Younger boys from high-SES families do not seem to be able to overcome the age at school entry disadvantage by age 15, and probably because they face a larger disadvantage they receive more parental help with homework and other academic activities. Younger girls, though, do not have different achievement levels at age 15 from their older classmates, and, probably because they face a smaller disadvantage, we observe that they receive more parental time than older girls from families with the same SES, but attend similar schools. Maybe girls mature faster than boys, or receive more investments than boys, and do not face a learning disadvantage at school entry, or maybe they are able to overcome this disadvantage faster. We cannot say which of these explanations is true, but these results indicate, like those presented before, that high-SES parents invest more in their children who are at a disadvantage in school.

Table 9: Parental Involvement, by Student Gender

	Boys			Girls		
	(1) Help with homework	(2) Parents check homework	(3) Parents go to school meetings	(4) Help with homework	(5) Parents check homework	(6) Parents go to school meetings
Young	-0.0330	-0.00474	-0.0435	0.0407*	0.00981	-0.00318
	(0.0228)	(0.0279)	(0.0267)	(0.0224)	(0.0260)	(0.0296)
College mother	0.0280	-0.0894**	-0.0435	0.0419	-0.127***	-0.00478
	(0.0239)	(0.0376)	(0.0378)	(0.0297)	(0.0383)	(0.0391)
Young X College mother	0.0936***	0.105**	0.0950*	0.0587	0.0444	-0.0115
	(0.0329)	(0.0509)	(0.0538)	(0.0367)	(0.0515)	(0.0522)
Mean	0.86	0.67	0.59	0.85	0.70	0.58
$\beta_1 + \beta_3$	0.06	0.10	0.05	0.10	0.05	-0.01
p-value $\beta_1 + \beta_3 = 0$	0.02	0.02	0.26	0.00	0.23	0.74
Observations	1743	1687	1687	1718	1663	1658

Notes: The data comes from the General Diagnostic Assessment survey 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or in January. Columns 1 to 3 analyse the sample of boys and columns 4 to 6 the sample of girls. The outcome variables are different measures of parental involvement in children's education: a variable indicating whether parents help their children with their homework (column 1), an indicator variable of parents checking children's homework (column 2), and a variable indicating whether parents frequently go to school meetings (column 3). The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has a college education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All models include as control an indicator variable that equals 1 if the student lives with at least one sibling Standard errors are clustered at the school level. *** p<0.01, ** p<0.05, * p<0.1

Table 10: School Choice, by Student Gender

	(1) Concertada school	(2) Class size	(3) Peers motivated to learn	(4) Teacher quality index	(5) Parental involvement index
Panel A: Boys					
Young	0.00409	0.316	-0.0329	0.0220	0.00654
	(0.0279)	(0.255)	(0.0307)	(0.0361)	(0.0439)
College mother	0.189***	1.098***	0.110***	0.00111	-0.0351
	(0.0390)	(0.410)	(0.0366)	(0.0467)	(0.0593)
Young X College mother	0.0969*	-0.667	0.0944*	0.0838	0.118
	(0.0510)	(0.479)	(0.0483)	(0.0630)	(0.0718)
Mean	0.40	23.85	0.69	0.00	0.01
$\beta_1 + \beta_3$	0.10	-0.36	0.06	0.11	0.12
p-value: $\beta_1 + \beta_3 = 0$	0.02	0.40	0.11	0.04	0.04
Observations	1596	1596	1596	1596	1596
Panel B: Girls					
	(1) Concertada school	(2) Class size	(3) Peers motivated to learn	(4) Teacher quality index	(5) Parental involvement index
Young	-0.000418	0.120	-0.0212	-0.0387	-0.0251
	(0.0285)	(0.273)	(0.0303)	(0.0345)	(0.0399)
College mother	0.281***	1.561***	0.168***	0.0140	0.0262
	(0.0411)	(0.289)	(0.0364)	(0.0460)	(0.0520)
Young X College mother	-0.0276	-0.530	0.0401	0.113*	0.0731
	(0.0534)	(0.424)	(0.0478)	(0.0630)	(0.0659)
Mean	0.41	23.94	0.68	0.01	0.02
$\beta_1 + \beta_3$	-0.03	-0.41	0.02	0.08	0.05
p-value: $\beta_1 + \beta_3 = 0$	0.55	0.15	0.61	0.14	0.42
Observations	1575	1575	1575	1575	1575

Notes: The data come from the General Diagnostic Assessment survey 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or January. The outcome variables are different school characteristics: a *concertada* school indicator (Column 1), class size (Column 2), an indicator of whether the teacher reports that the students in her class are very motivated (Column 3), a Teacher Quality Index (Column 4) and a Parental Involvement Index (Column 5). The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has a college education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All models include as control an indicator variable that equals 1 if the student lives with at least one sibling. Standard errors are clustered at the school level. *** p<0.01, ** p<0.05, * p<0.1

7 Conclusions

To understand inequality in human capital, it is necessary to understand how parental investments vary according to SES. Our results contribute to this goal by providing evidence on how parents react to a widely used school policy that puts younger children at a learning disadvantage. The results are consistent with the idea that parental responses vary by SES.

Highly educated parents compensate when their children have to enter school at an earlier age by spending more time helping their children with learning activities and choosing schools with better inputs for them. We do not find a similar pattern among less-educated parents. This socioeconomic difference in behavior can potentially explain why the disadvantage of being young at school entry is greater for low-SES children. Interestingly, highly educated parents give boys in this situation particular attention.

There is a well-established empirical relationship between parental SES and student (and longer-term) outcomes. Differences in planned investment paths are likely to play a key role in this. Our results highlight an additional channel: differences in investments due to different responses to policies that put children at a learning disadvantage. In other words, we find evidence that more-educated parents are more prepared to handle disadvantages and can then protect their children from them by increasing the resources they allocate to their children. Our findings call for the design of public policies targeting those who need support the most: young children from low-SES families. The policies would presumably focus not only on the children but also on parents and schools.

The results presented in this paper are also informative on the effects of teaching the same curriculum to children with different achievement levels, which is a common practice around the world. Our findings suggest that the task of dealing with a unique curriculum from the position of a learning disadvantage can be particularly daunting for children from low-SES families. Policies aiming to allow schools to teach at the right level (using some degree of tracking or supplementary activities according to achievement level) are worth exploring.

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Appendix

Tables: Summary Statistics

Table A.1: Summary Statistics of the Main Datasets

		All	January	December - January	
				Adjacent Months	Same calendar year
		(1)	(2)	(3)	(4)
Panel A: Spanish Time Use Survey (Cohorts' birth years: 1986-2009)					
	Female	0.484	0.503	-0.005	-0.006
		[0.500]	[0.500]	(0.022)	(0.022)
	College mother	0.364	0.382	-0.040*	-0.021
		[0.481]	[0.486]	(0.021)	(0.021)
	Birth order	1.464	1.484	-0.034	0.006
		[0.690]	[0.720]	(0.030)	(0.030)
	Number of children	1.906	1.899	0.008	0.030
		[0.854]	[0.836]	(0.036)	(0.036)
Outcomes					
	Time spent teaching	7.690	6.777	1.661	2.399**
		[25.509]	[22.779]	(1.110)	(1.169)
	Time spent reading and playing	22.705	22.747	-0.059	1.715
		[53.277]	[52.844]	(2.004)	(2.067)
	Childcare time	86.215	88.097	-6.678	2.940
		[118.936]	[124.428]	(4.409)	(4.462)
Observations		13045	1114	2196	2196
Panel B: General Diagnostic Assessment (Cohorts' birth years: 1999)					
	Female	0.500	0.479		0.034*
		[0.500]	[0.500]		(0.018)
	College mother	0.296	0.296		0.012
		[0.457]	[0.457]		(0.016)
	Student lives with at least one sibling	0.836	0.821		-0.021
		[0.37]	[0.38]		(0.0142)
Outcomes					
	Help with homework	0.857	0.836		0.031
		[0.350]	[0.371]		(0.014)
	Parents check homework	0.694	0.680		0.020
		[0.461]	[0.467]		(0.018)
	Parents go to school meetings	0.579	0.591		-0.010
		[0.494]	[0.492]		(0.018)
	Concertada school	0.394	0.388		0.019
		[0.489]	[0.487]		(0.019)
	Class size	23.918	23.825		0.126
		[3.945]	[4.286]		(0.152)
	Peers' motivation for learning	0.701	0.687		-0.003
		[0.458]	[0.464]		(0.019)
	Teacher quality index	-0.002	-0.009		0.026
		[0.583]	[0.576]		(0.021)
	Parental involvement index	0.003	-0.005		0.015
		[0.647]	[0.650]		(0.027)
Observations		18583	1551		3085
Panel C: Population Census 2011 (Cohorts' birth years: 1994-2009)					
	Female	0.486	0.483	0.006	0.004
		[0.500]	[0.500]	(0.004)	(0.004)
	College mother	0.278	0.275	-0.008**	0.003
		[0.448]	[0.447]	(0.004)	(0.004)
	Mother is not Spanish	0.058	0.057	0.002	0.006**
		[0.235]	[0.233]	(0.003)	(0.003)
	Mother's age	40.878	41.196	0.118***	-0.671***
		[5.950]	[5.984]	(0.044)	(0.043)
	Married mother	0.839	0.839	-0.001	-0.005
		[0.368]	[0.367]	(0.004)	(0.004)
	Mother's spouse has a college degree	0.216	0.215	-0.002	0.003
		[0.411]	[0.411]	(0.004)	(0.004)
	Mother's spouse is not Spanish	0.050	0.049	-0.002	0.002
		[0.219]	[0.216]	(0.003)	(0.003)
	Mother's spouse's age	43.266	43.662	0.035	-0.781***
		[6.367]	[6.393]	(0.051)	(0.049)
Observations		503227	35709	67240	71659
Panel D: Birth Certificates (Cohorts' birth years: 1986-2006)					
	Female	0.484	0.484	0.000	0.000
		[0.500]	[0.500]	(0.001)	(0.001)
	Born prematurely	0.046	0.046	0.002***	0.001*
		[0.209]	[0.210]	(0.000)	(0.000)
	Normal birth	0.882	0.884	-0.001	-0.003***
		[0.323]	[0.320]	(0.001)	(0.001)
	Low birth weight	0.051	0.051	0.000	0.001*
		[0.220]	[0.221]	(0.000)	(0.000)
Observations		5738321	474559	908214	954135

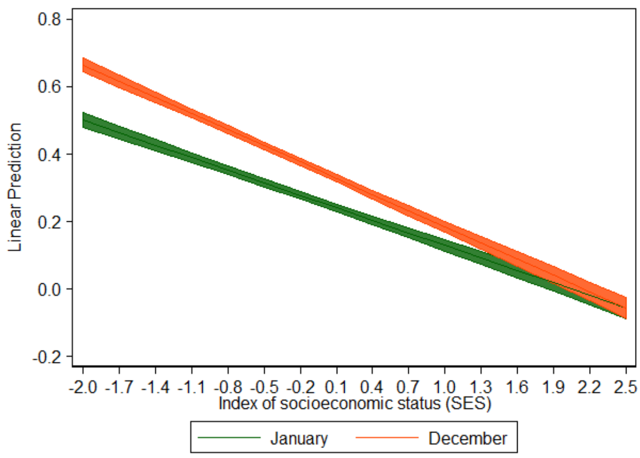
Notes: Columns 1 and 2 report means -and standard deviations in brackets- for all the individuals and only for those born in January, respectively. Columns 3 and 4 report mean differences -and robust standard error in parentheses- for individulas born in December vs. those born in January (Dec - Jan). Column 3 reports differences for individuals born in adjacent months and column 4 for individuals born in the same calendar year. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Online Appendix

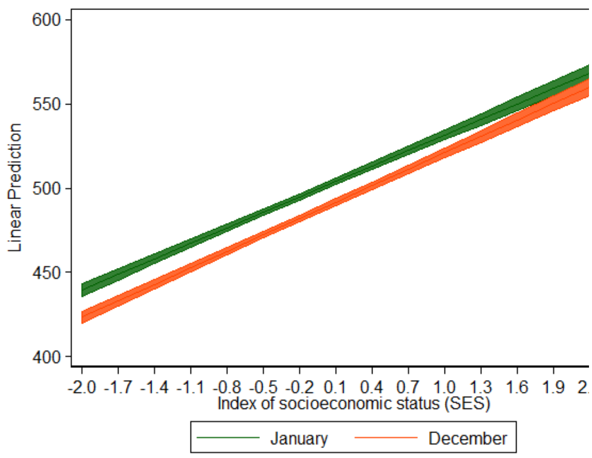
A. Supplementary Figures and Tables

Figure A.1: **School Performance at Age 15, Young versus Old by Socioeconomic Status**

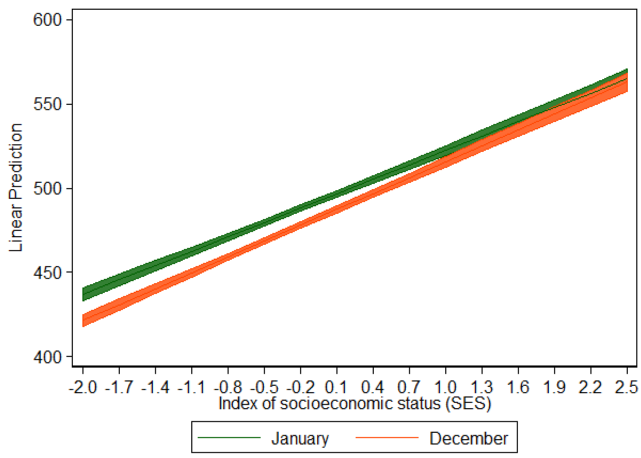
Repeated a grade



Mathematics score

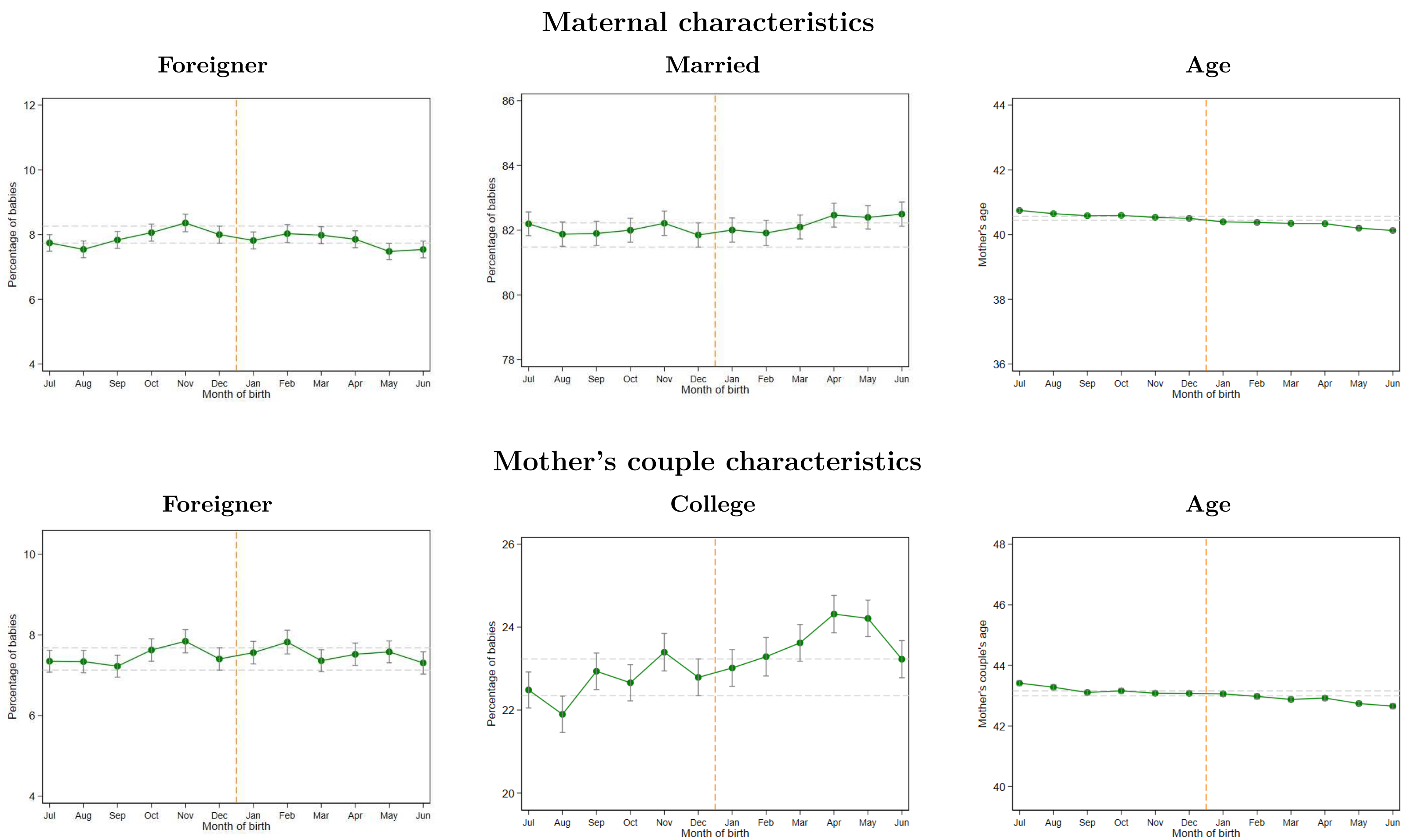


Reading score



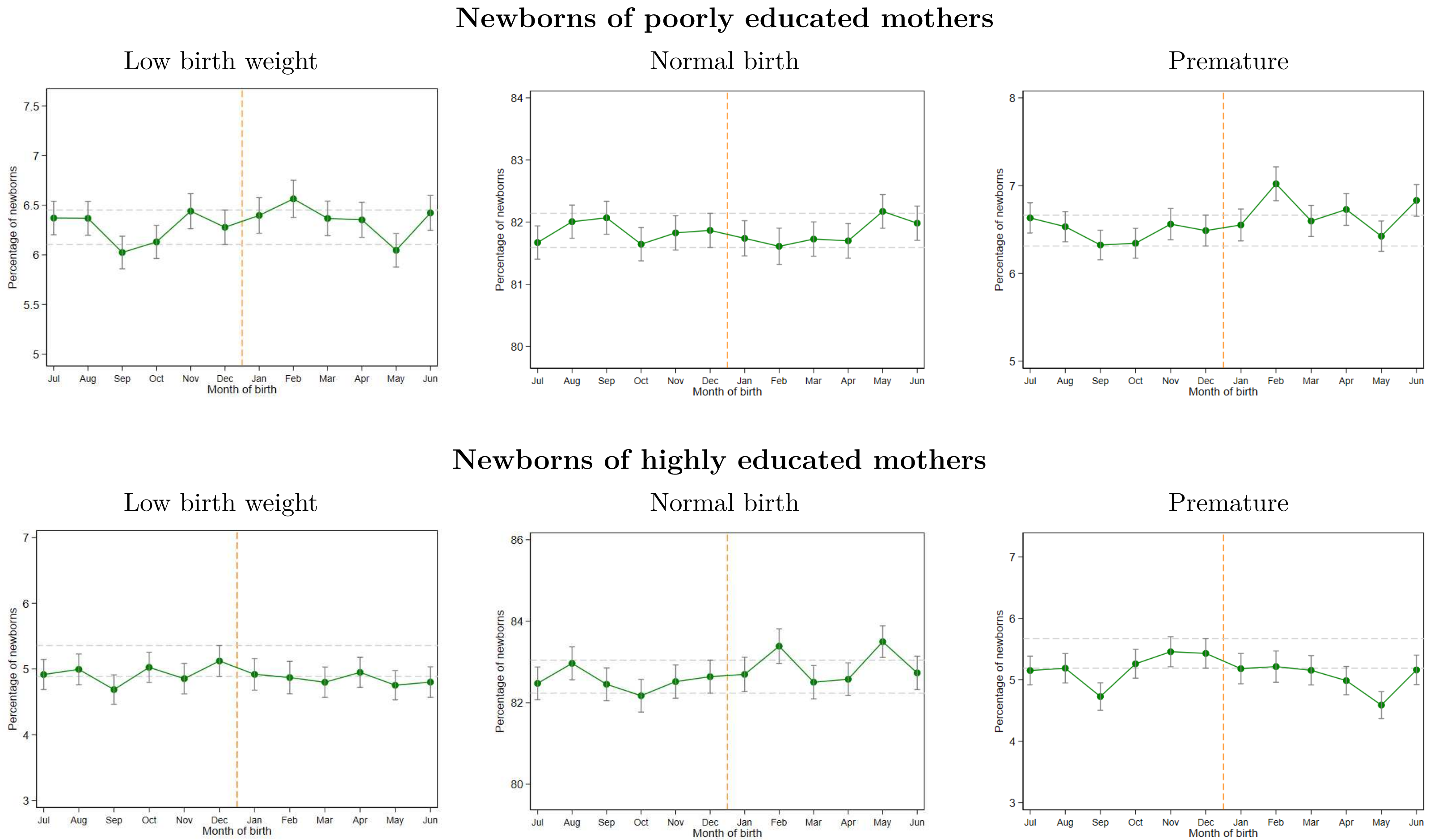
Notes: Data on Spanish students aged 15 assessed in PISA 2003, 2006, 2009 and 2012. For young (born in December) and old (born in January) students the figures plot the predicted marginal effect of socio-economic status on: the probability of having repeated at least one grade (top), and the mean test score in mathematics and reading at PISA (bottom). PISA test scores are standardised with a mean of 500 and a standard deviation of 100 at the participating OECD countries. Point estimates and 95% confidence intervals.

Figure A.2: Parental Characteristics and Month of Birth



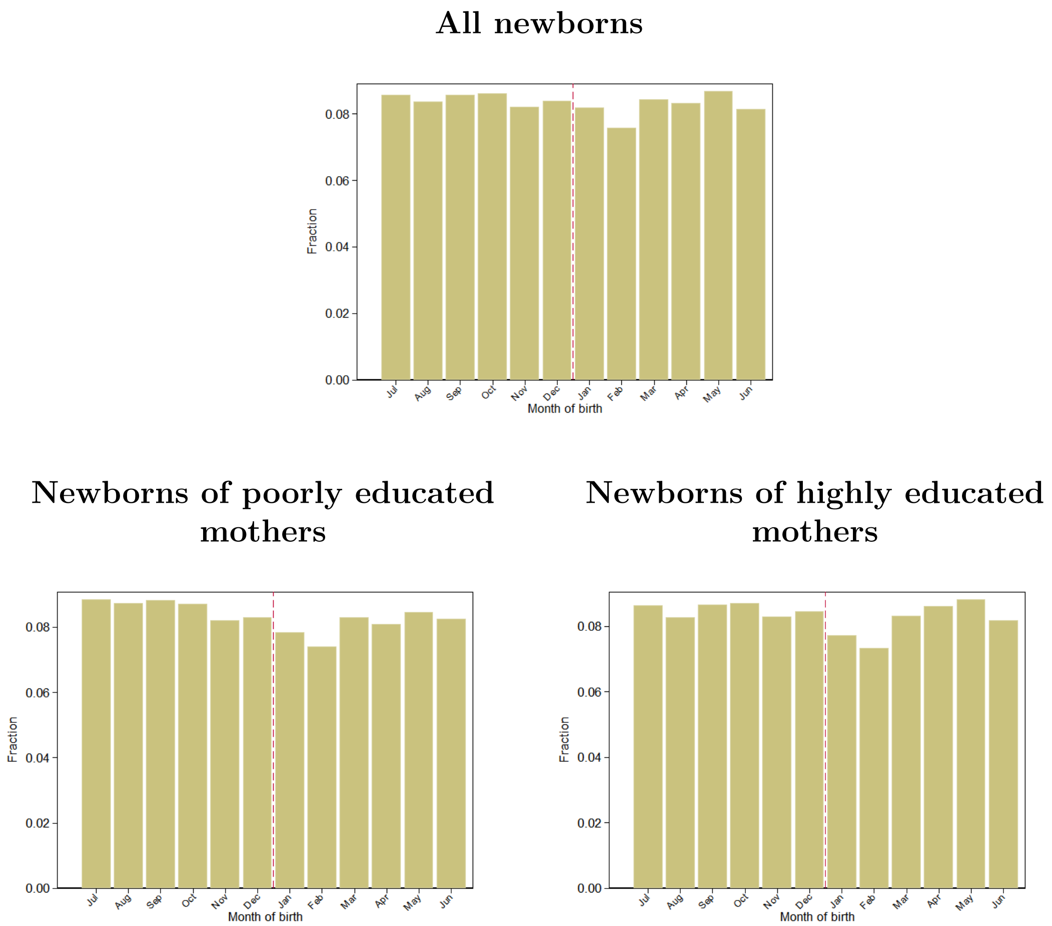
Notes: The data come from Spanish population census 2011. The first three figures plot, by month of birth, the percentage of babies born from non-Spanish mothers, from mothers living in a couple, and the average age of the mothers.. The last three figures plot the same variables but for the mother's couple. Means are represented by dots and 95% confidence intervals are in gray.

Figure A.3: Newborn Characteristics and Month of Birth



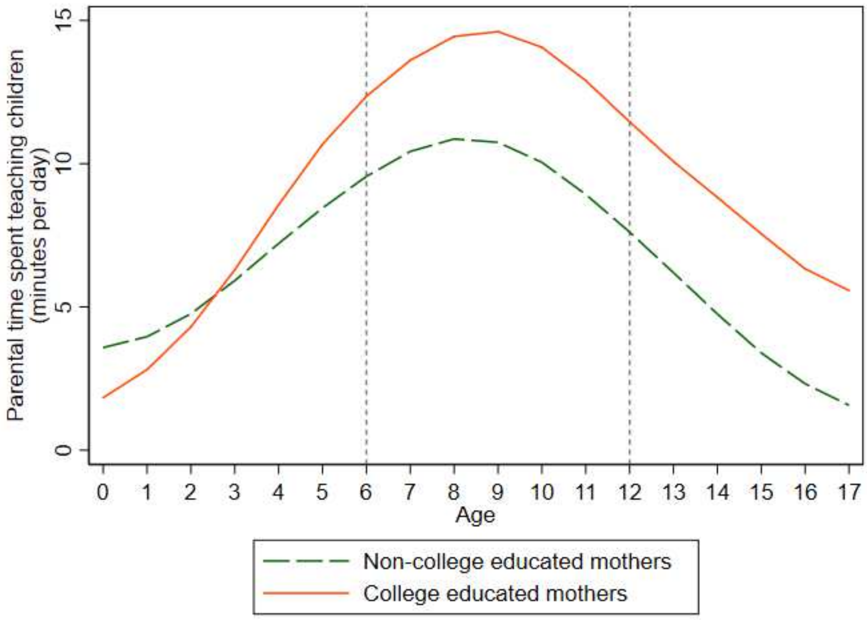
Notes: Data from Spanish birth certificates. The sample includes the universe of Spanish babies born in the period 2007–2009. The figures plot, by month of birth, the percentage of newborns with a low birth weight, the percentage of babies born in normal conditions, and the percentage of premature babies. The means are represented by dots and 95% confidence intervals are in gray.

Figure A.4: Births, by Month of Birth



Notes: The data come from Spanish birth certificates. The sample includes the universe of Spanish newborns (first figure) in the period 1986–2006, Spanish babies born from college educated mothers (second figure) in 2007–2009 or from mothers without college education (last figure) in the period 2007–2009. The figures plot, by month of birth, the percentage of births.

Figure A.5: Parental Time Investment Teaching Children, by Socioeconomic Status and Age



Notes: Data from the the Spanish Time Use Survey 2003 and 2009. The sample consists of children aged 0 to 17 born in Spain. The figure plots, by age of the children and socioeconomic status, the minutes parents spent daily with their children doing activities related to teaching.

Table A.1: Birth Characteristics of Children Born in January versus December, by Socioeconomic Status

	(1) Low weight (<2500 grams)	(2) Premature	(3) Normal birth	(4) C-section
Young	-0.001	-0.001	-0.003	0.001
	(0.001)	(0.001)	(0.002)	(0.002)
College mother	-0.015***	-0.014***	0.010***	0.004*
	(0.002)	(0.002)	(0.003)	(0.003)
Young*College mother	0.003	0.003	-0.001	0.002
	(0.002)	(0.002)	(0.004)	(0.004)
Girl	0.010***	-0.007***	0.015***	-0.013***
	(0.001)	(0.001)	(0.002)	(0.002)
Mean	0.06	0.06	0.82	0.20
$\beta_1 + \beta_3$	0.002	0.002	-0.004	0.003
p-value $\beta_1 + \beta_3 = 0$	0.23	0.18	0.17	0.40
Observations	211,207	211,207	211,207	211,207

Notes: Data from Spanish birth certificates. The sample includes the universe of Spanish babies born in December and January in the period 2007–2009. The outcome variables indicate whether the baby was born with a low birth weight (Column 1), premature (Column 2), in normal conditions (Column 3) or by a c-section (Column 4). “Young" (β_1) is an indicator variable that equals one if the baby was born in December and zero if in January. The variable “College mother" takes the value one if the mother of the newborn has more than secondary education and zero otherwise. Young*College mother (β_3) is an indicator variable of the interaction between “Young" and “College mother". Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.2: Parental Time Investments: Controlling for Additional Maternal Characteristics

	(1) Teaching	(2) Read and Play	(3) Other childcare
Youngest	-0.0954	2.789	9.697**
	(1.253)	(2.521)	(4.627)
College mother	0.0542	5.031	7.587
	(1.490)	(3.507)	(6.817)
Youngest X College mother	5.644**	-0.963	-3.632
	(2.589)	(4.554)	(9.071)
Girl	0.488	-1.400	-6.493*
	(1.085)	(2.054)	(3.836)
Mean	7.77	22.95	87.05
$\beta_1 + \beta_3$	5.55	1.83	6.06
p-value: $\beta_1 + \beta_3 = 0$	0.01	0.63	0.43
Observations	2,117	2,117	2,117

Notes: Data from the Spanish Time Use Survey 2003 and 2009. The sample consists of children aged 0 to 17 born in December or January in Spain. The outcome variables indicate the minutes parents spent daily with their children doing different activities: ones related to teaching (column 1), reading and playing (column 2), and other childcare activities (column 3). The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has more than secondary education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All the reported models include as controls the number of siblings, vectors of dummies for birth order, year of birth, weekday and quarter of interview, survey year, maternal age, and indicators for whether the mother is a Spanish national and whether she is married . Standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1

Table A.3: Parental Time Investments in Children Born in Adjacent Months

	(1) Teaching	(2) Read and Play	(3) Other childcare
Young	-0.382	-0.169	-5.882
	(1.147)	(2.378)	(4.554)
College mother	0.235	4.672	11.04*
	(1.442)	(3.399)	(6.664)
Young X College mother	5.804**	-0.705	-5.753
	(2.456)	(4.361)	(8.844)
Girl	0.500	-1.846	-7.361**
	(1.006)	(1.978)	(3.729)
Mean	7.55	22.64	85.74
$\beta_1 + \beta_3$	5.422	-0.874	-11.635
	0.105	0.194	0.440
p-value $\beta_1 + \beta_3 = 0$	0.01	0.81	0.13
Observations	2,196	2,196	2,196

Notes: Data from the Spanish Time Use Survey 2003 and 2009. The sample consists of children aged 0 to 17 born in December or January in Spain. The outcome variables indicate the minutes parents spent daily with their children doing different activities: ones related to teaching (Column 1), reading and playing (Column 2), and other childcare activities (Column 3). "Young" (β_1) is an indicator variable that equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has more than secondary education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All the reported models include as controls the number of sibilings, a vector of dummies for birth order, birth cohort, day of week and quarter of interview. A birth cohort comprises individuals born from July of one year to June of the following year. Standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1

Table A.4: Parental Time Investments, Summer Months Excluded

	(1) Teaching	(2) Reading and playing	(3) Other childcare
Young	0.700	0.0706	2.690
	(1.460)	(2.813)	(5.624)
College mother	-0.0786	3.302	10.59
	(1.732)	(3.764)	(8.129)
Young X College mother	7.392**	3.798	-3.360
	(3.171)	(4.984)	(10.39)
Girl	0.110	-0.536	-6.753
	(1.339)	(2.331)	(4.547)
Mean	9.00	22.43	86.91
$\beta_1 + \beta_3$	7.05	1.98	-10.99
p-value: $\beta_1 + \beta_3 = 0$	0.00	0.35	0.94
Observations	1,688	1,688	1,688

Notes: Data from the Spanish Time Use Survey 2003 and 2009. The sample is of children aged 0 to 17 born in December or January in Spain. Survey questionnaires that were filled in during the months of July, August, and September are excluded. The outcome variables indicate the minutes a day parents spent with their children doing different activities: ones related to teaching (Column 1), reading and playing (Column 2), and other childcare activities (Column 3). "Young" (β_1) is an indicator variable that equals one if the student was born in December and zero if in January. The variable "College mother" takes value 1 if the mother of the student has more than secondary education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All the reported models include as controls the number of sibilings, a vector of dummies for birth order, year of birth, day of week and quarter of interview, and year of survey. Standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1

Table A.5: Parental Time Investments, by Age Group with Summer Months Excluded

	(1) Teaching	(2) Reading and playing	(3) Other childcare	(4) Teaching	(5) Reading and playing	(6) Other childcare	(7) Teaching	(8) Reading and playing	(9) Other childcare
	0–5			6–12			13–17		
Young	0.573	-5.381	18.50	-0.762	2.627	19.18***	0.552	4.958**	-2.408
	(2.130)	(7.842)	(13.85)	(2.864)	(3.355)	(6.932)	(2.163)	(2.219)	(4.271)
College mother	2.504	3.873	18.04	-5.346	4.859	12.91	1.223	0.853	-7.391
	(2.376)	(8.306)	(14.95)	(3.639)	(4.319)	(9.973)	(2.733)	(1.603)	(4.978)
Young X College mother	-2.428	7.534	-10.45	19.16***	4.608	-4.712	7.453	-4.701	13.57**
	(3.468)	(11.30)	(21.97)	(6.780)	(6.553)	(12.20)	(6.583)	(3.185)	(6.802)
Girl	0.0852	-0.949	-11.25	-0.514	-0.420	-13.21**	1.680	-2.004	-3.257
	(1.693)	(6.039)	(9.863)	(2.428)	(2.974)	(5.807)	(2.232)	(1.614)	(4.135)
Mean	5.50	45.31	171.88	14.73	15.93	65.01	5.54	3.98	15.33
$\beta_1 + \beta_3$	-2.10	2.45	-27.53	14.81	1.04	-2.37	5.86	-0.27	8.37
p-value: $\beta_1 + \beta_3 = 0$	0.51	0.79	0.64	0.00	0.20	0.16	0.20	0.90	0.04
Observations	569	569	569	639	639	639	480	480	480

Notes: Data from the Spanish Time Use Survey 2003 and 2009. The sample is of children aged 0 to 17 born in December or January in Spain. Survey questionnaires that took place during the months of July, August, and September are excluded. The first 3 columns include only children younger than 6, columns 4 to 6 include children aged 6 to 12 and the last 3 columns include children aged 13 to 17. The outcome variables indicate the minutes a day parents spent with their children doing different activities: ones related to teaching, to reading and playing, and other childcare activities. "Young" (β_1) is an indicator variable that equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has more than secondary education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All the reported models include as controls the number of sibilings, a vector of dummies for birth order, year of birth, day of week and quarter of interview, and year of survey. Standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1

Table A.6: Parental Involvement: Controlling for Additional Maternal Characteristics

	(1) Help with homework	(2) Parents check homework	(3) Parents go to school meetings
Youngest	-0.00210	0.0116	-0.0226
	(0.0159)	(0.0196)	(0.0209)
College mother	0.0337*	-0.112***	-0.0422
	(0.0195)	(0.0277)	(0.0281)
Youngest X College mother	0.0790***	0.0644*	0.0518
	(0.0254)	(0.0377)	(0.0387)
Girl	-0.0197	0.0316*	-0.000440
	(0.0127)	(0.0173)	(0.0172)
Mean	0.86	0.69	0.60
$\beta_1 + \beta_3$	0.077	0.076	0.029
p-value: $\beta_1 + \beta_3 = 0$	0.00	0.02	0.38
Observations	3,233	3,133	3,129

Notes: The data comes from the General Diagnostic Assessment survey of 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or in January. The outcome variables are different measures of parental involvement in children's education: a variable indicating whether parents help their children with homework (column 1), an indicator variable of parents checking children's homework (column 2), and a variable indicating whether parents frequently go to school meetings (column 3). The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has a college education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". All models include as control an indicator variable that equals 1 if the student lives with at least one sibling, and indicators for whether the mother is a Spanish national and whether the child resides with both parents. Standard errors are clustered at the school level. * p<0.10, ** p<0.05, *** p<0.01

Table A.7: School Choice: Attendance Determined by Catchment Area

	(1) Parental survey	(2) Student survey
Young	0.02	0.006
	(0.022)	(0.019)
College mother	-0.092***	-0.018
	(0.03)	(0.022)
Young X College mother	-0.046	-0.064**
	(0.039)	(0.032)
Girl	0.0040	-0.020
	(0.018)	(0.015)
Mean	0.47	0.24
$\beta_1 + \beta_3$	-0.026	-0.058
p-value: $\beta_1 + \beta_3 = 0$	0.42	0.02
Observations	3292	3292

Notes: The data come from the General Diagnostic Assessment survey 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or January. The outcome variables is an indicator of whether the parent (column 1) or the student (column 2) declare (in separate surveys) if the student is enrolled in because of living in the school's catchment area. "Young" (β_1) is an indicator variable that equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has a college education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". Standard errors are clustered at the school level. * p<0.10, ** p<0.05, *** p<0.01

Table A.8: School Quality Index

	School quality index	Private school	Class size	Peers motivated to learn	Teacher quality index			Family peers motivation index		
	(1)	(2)	(3)	(4)	(5) Teachers continual training	(6) Teachers target students with learning disadvantages	(7) Teachers follow students' progress daily	(8) Parents attend meetings	(9) Parental interest in learning problems	(10) Parental interest in grades
Young	-0.0163	0.00571	-0.0507	-0.0545	-0.0581	-0.0179	0.0527	-0.00143	-0.0102	-0.0125
	(0.0180)	(0.0437)	(0.0414)	(0.0448)	(0.0440)	(0.0435)	(0.0439)	(0.0425)	(0.0444)	(0.0437)
College mother	0.00463	0.0279	0.00386	0.00629	0.0178	-0.0230	0.0264	-0.0178	-0.0106	0.0109
	(0.0238)	(0.0606)	(0.0722)	(0.0628)	(0.0562)	(0.0629)	(0.0608)	(0.0632)	(0.0647)	(0.0654)
Young X College mother	0.107***	0.0722	0.143*	0.156**	0.167**	0.159**	-0.0275	0.154**	0.0178	0.117
	(0.0300)	(0.0756)	(0.0844)	(0.0777)	(0.0728)	(0.0803)	(0.0761)	(0.0747)	(0.0780)	(0.0786)
Girl	0.00360	0.0338	-0.0353	-0.0188	0.00213	0.00432	0.0189	0.00293	-0.00133	0.0259
	(0.0133)	(0.0357)	(0.0335)	(0.0351)	(0.0342)	(0.0350)	(0.0355)	(0.0353)	(0.0343)	(0.0343)
Mean	0.01	0.03	-0.01	-0.02	0.00	0.00	0.02	0.02	0.01	0.02
$\beta_1 + \beta_3$	0.09	0.08	0.09	0.10	0.11	0.14	0.03	0.15	0.01	0.10
p-value: $\beta_1 + \beta_3 = 0$	0.00	0.23	0.19	0.13	0.10	0.03	0.68	0.02	0.92	0.12
Observations	3171	3171	3171	3171	3171	3171	3171	3171	3171	3171

Notes: The data come from the General Diagnostic Assessment survey 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or January. The outcome variables are an Index of School Quality (column 1) and the different school characteristics that are included in such index: a *concertada* school indicator (column 2), class size (column 3), an indicator of whether the teacher reports that the students in her class are very motivated (column 4), variables related to teacher quality (columns 5 to 7) and to parental involvement (columns 8 to 10). "Young" (β_1) is an indicator variable that equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has a college education and zero otherwise. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". Standard errors are clustered at the school level. * p<0.10, ** p<0.05, *** p<0.01

Table A.9: Parental Time Investments, by Student's Gender

	Boys			Girls		
	(1) Teaching	(2) Read and Play	(3) Other childcare	(4) Teaching	(5) Read and Play	(6) Other childcare
Youngest	-0.131	0.469	0.821	-0.174	3.523	12.22**
	(2.283)	(2.834)	(6.249)	(2.056)	(2.734)	(5.009)
College mother	-4.052	4.164	-1.281	2.739	0.919	5.401
	(2.626)	(3.814)	(7.106)	(2.874)	(3.132)	(7.667)
Youngest X College mother	15.37***	3.193	9.874	5.557	1.347	-7.951
	(5.117)	(5.409)	(10.11)	(4.790)	(5.138)	(10.74)
Observations	723	723	723	729	729	729

Notes: Data from the Spanish Time Use Survey 2003 and 2009. The sample is of children aged 6 to 17 born in December or January in Spain. The first 3 columns correspond to the analysis of the sample of boys and the last 3 to the sample of girls. The outcome variables indicate the minutes a day parents spent with their children doing different activities: ones related to teaching, to reading and playing, and other childcare activities. "Young" (β_1) is an indicator variable that equals one if the student was born in December and zero if in January. The variable "College mother" takes the value one if the mother of the student has more than secondary education and zero otherwise. All the reported models include as controls the number of sibilings, a vector of dummies for birth order, year of birth, and day of week and quarter of interview, and year of survey. Young X College mother (β_3) is an indicator variable of the interaction between "Young" and "College mother". Standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1

Table A.10: Parental Time Investments: Paternal Education

	(1) Teaching	(2) Read and Play	(3) Other childcare
Young	0.0901	-0.109	8.925
	(1.362)	(2.673)	(5.826)
College father	-0.329	0.983	3.887
	(1.684)	(3.500)	(7.574)
Young X College father	6.092**	8.909*	-3.771
	(2.697)	(4.757)	(9.617)
Girl	-0.165	-1.225	-8.966**
	(1.197)	(2.256)	(4.287)
Mean	8.01	24.59	91.12
$\beta_1 + \beta_3$	6.18	8.8	5.15
p-value $\beta_1 + \beta_3 = 0$	0.01	0.03	0.50
Observations	1,805	1,805	1,805

Notes: Data from the Spanish Time Use Survey 2003 and 2009. The sample consists of children aged 0 to 17 born in December or January in Spain. The outcome variables indicate the minutes parents spent daily with their children doing different activities: ones related to teaching (Column 1), reading and playing (Column 2), and other childcare activities (Column 3). The indicator variable "Young" (β_1) equals one if the student was born in December and zero if in January. The variable "College father" takes the value one if the father of the student has more than secondary education and zero otherwise. Young X College father (β_3) is an indicator variable of the interaction between "Young" and "College father." All the reported models include as controls the number of sibilings, a vector of dummies for birth order, year of birth, and weekday and quarter of interview, and year of survey. Standard errors are clustered at the household level. *** p<0.01, ** p<0.05, * p<0.1

Table A.11: Parental Involvement: Paternal Education

	(1) Help with homework	(2) Parents check homework	(3) Parents go to school meetings
Young	0.006	0.037**	-0.0245
	(0.015)	(0.019)	(0.020)
College father	0.016	-0.057**	-0.031
	(0.020)	(0.029)	(0.031)
Young x College father	0.072***	-0.022	0.061
	(0.025)	(0.038)	(0.041)
Girl	-0.011	0.031*	-0.008
	(0.012)	(0.017)	(0.017)
Mean	0.86	0.69	0.59
$\beta_1 + \beta_3$	0.078	0.015	0.037
p-value $\beta_1 + \beta_3 = 0$	0.00	0.65	0.29
Observations	3,368	3,261	3,257

Notes: The data come from the General Diagnostic Assessment survey of 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or in January. The outcome variables are different measures of parental involvement in children's education: a variable indicating whether parents help their children with the homework (Column 1), an indicator variable of parents checking children's homework (column 2), and a variable indicating whether parents frequently go to school meetings (column 3). "Young" (β_1) is an indicator variable that equals one if the student was born in December and zero if in January. The variable "College father" takes the value one if the father of the student has a college education and zero otherwise. Young X College father (β_3) is an indicator variable of the interaction between "Young" and "College father." Standard errors are clustered at the school level. * p<0.10, ** p<0.05, *** p<0.01

Table A.12: School Inputs

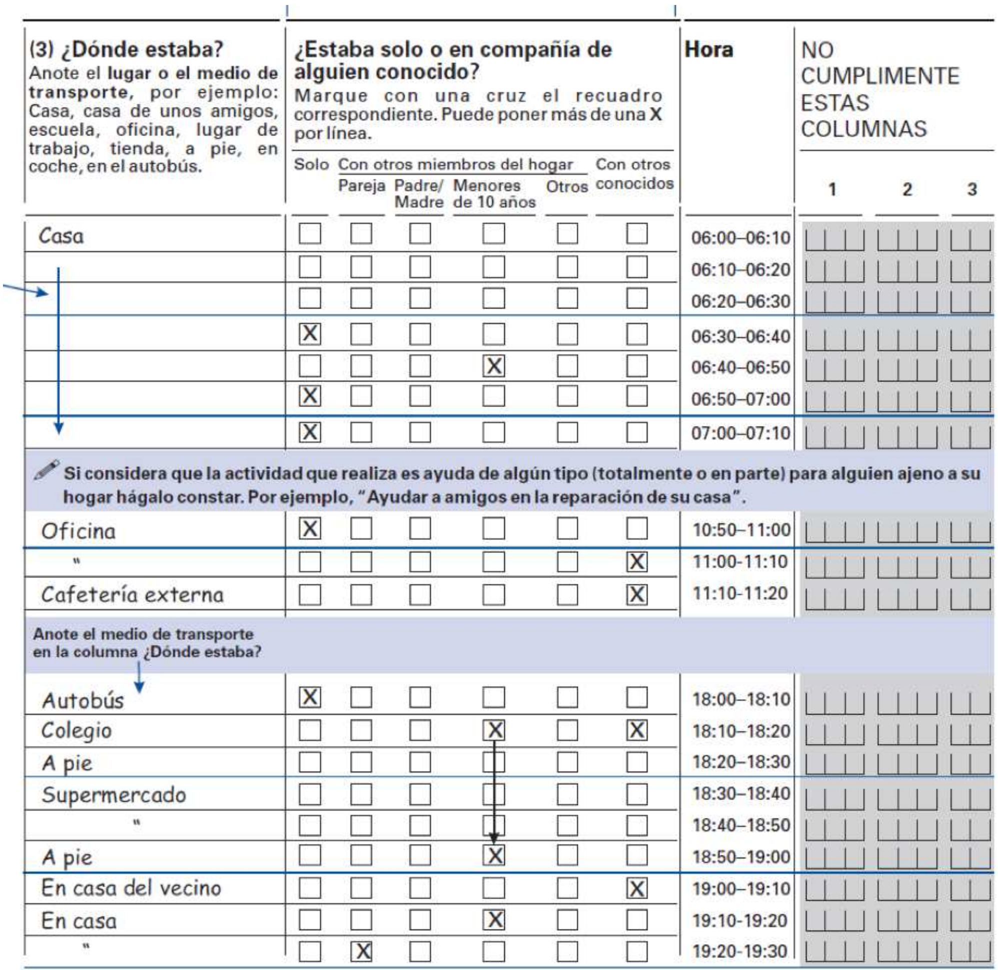
	(1) *Concertada* school	(2) Class size	(3) Peers motivated to learn	(4) Teacher quality index	(5) Parental involvement index
Young	0.002	-0.003	-0.010	0.015	0.011
	0.021	0.171	0.022	0.023	0.703
College father	0.280***	1.258***	0.135***	0.033	0.093**
	0.035	0.346	0.032	0.038	0.046
Young X College father	0.026	-0.082	0.004	0.004	0.031
	0.041	0.38	0.040	0.046	0.053
Girl	0.024	0.156	-0.003	0.012	0.015
	0.017	0.141	0.016	0.021	0.022
Mean	0.41	23.91	0.69	0.01	0.02
$\beta_1 + \beta_3$	0.028	-0.085	-0.006	0.02	0.042
p-value: $\beta_1 + \beta_3 = 0$	0.45	0.80	0.87	0.62	0.37
Observations	3079	3079	3079	3079	3079

Notes: The data come from the General Diagnostic Assessment survey 2009. The sample includes Spanish students enrolled in grade 4 who were born in December or January. The outcome variables are different school characteristics: a *concertada* school indicator (column 1), class size (column 2), an indicator of whether the teacher reports that the students in her class are very motivated (Column 3), a Teacher Quality Index (column 4) and a Parental Involvement Index (column 5) "Young" (β_1) is an indicator variable that equals one if the student was born in December and zero if in January. The variable "College father" takes the value one if the father of the student has a college education and zero otherwise. Young X College father (β_3) is an indicator variable of the interaction between "Young" and "College father." Standard errors are clustered at the school level. * p<0.10, ** p<0.05, *** p<0.01

B. Definition of Time Use Variables

We use data from the STUS to construct measures of the time parents spend on childcare activities. We do so using information from the activity diaries from each household member over the age of 10 years who used the survey form below. In this diary, individuals report their activities across the previous 24 hours, in 10-minute intervals. They also indicate whether another member of the household was present during the activity.

Figure B.1: Spanish Time Use Survey's Diary of Activities



(3) ¿Dónde estaba? Anote el **lugar o el medio de transporte**, por ejemplo: Casa, casa de unos amigos, escuela, oficina, lugar de trabajo, tienda, a pie, en coche, en el autobús.

¿Estaba solo o en compañía de alguien conocido? Marque con una cruz el recuadro correspondiente. Puede poner más de una **X** por línea.

Hora

NO CUMPLIMENTE ESTAS COLUMNAS

¿Dónde estaba?	Solo	Con otros miembros del hogar: Pareja	Padre/ Madre	Menores de 10 años	Otros	Con otros conocidos	Hora	1	2	3
Casa							06:00–06:10			
							06:10–06:20			
							06:20–06:30			
	X						06:30–06:40			
				X			06:40–06:50			
	X						06:50–07:00			
	X						07:00–07:10			

Si considera que la actividad que realiza es ayuda de algún tipo (totalmente o en parte) para alguien ajeno a su hogar hágalo constar. Por ejemplo, "Ayudar a amigos en la reparación de su casa".

¿Dónde estaba?	Solo	Pareja	Padre/ Madre	Menores de 10 años	Otros	Con otros conocidos	Hora	1	2	3
Oficina	X						10:50–11:00			
"						X	11:00–11:10			
Cafetería externa						X	11:10–11:20			

Anote el medio de transporte en la columna ¿Dónde estaba?

¿Dónde estaba?	Solo	Pareja	Padre/ Madre	Menores de 10 años	Otros	Con otros conocidos	Hora	1	2	3
Autobús	X						18:00–18:10			
Colegio				X		X	18:10–18:20			
A pie							18:20–18:30			
Supermercado							18:30–18:40			
"							18:40–18:50			
A pie				X			18:50–19:00			
En casa del vecino						X	19:00–19:10			
En casa				X			19:10-19:20			
"		X					19:20-19:30			

We focus on parents who live with children between the ages of 0 and 17. Childcare activities are codified into five categories: (1) "teaching children," (2) "reading to or playing and talking with children," (3) "physical childcare and monitoring," (4) "spending time with children," and (5) "other childcare activities." We study (1) and (2) separately and aggregate (3) to (5) as other childcare. Because of the structure of the diary, parents separately report the time they spend with children below and above ten years old. If there is more than one child in the same age category in a household, we assign each one the total parental time in their category.