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What Matters for Education? Evidence for Catalonia

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Abstract

This paper studies the association between socioeconomic factors, school characteristics and children's cognitive and non-cognitive development in Catalonia. We find that children born later in the year, close to the December 31st cutoff date, persistently tend to have lower academic results than those born in the first two quarters. However, we do not observe any difference in non-cognitive development by quarter of birth. The analysis also shows that children who ever attended nursery school do generally better than those who first started at pre-school (P3) or later. Furthermore, we find that family structure matters since children raised in non-nuclear and low educated families tend to underperform others at school. Estimates also indicate that first generation immigrants, especially Africans, have worse academic performance than those born in Spain. There seem to be strong benefits associated to time spent reading and studying languages, computer science and music. Finally, there is inconclusive evidence that students who arrive late in the academic year and those with special needs generate negative peer effects in the classroom.

JEL Classification: I20, J24
Keywords: education, school, family, use of time

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1 Introduction

This paper analyses the association between socioeconomic factors and children's cognitive and non-cognitive development in Catalonia. More precisely, we study what matters for educational performance by empirically evaluating the following questions: Does the age of enrolment at school and the quarter of birth matter for future children development? Are there differences in scholastic results depending on the country of birth? How language spoken at home is related to academic and social skills? Do household characteristics such as the level of income, the educational attainment, the composition of the family, their values and political attitudes play a role in children development? How do students who arrive in the middle of the academic year or students with special needs influence the academic achievement and social abilities of their peers? Does the allocation of time in after-school activities matter for scholastic performance? The answer to all these questions will be useful for designing best practices to improve the education levels of the population.

Education has become increasingly important in today's economy as evidenced by the growing skill premium. The emergence of new technologies that drive economic growth demands, in addition to ideas and invention, a qualified workforce who is able to use modern resources. In fact, the relationship between human capital and growth is well established (Nelson and Phelps (1966), Romer (1990) and Rebelo (1991)). Most recently, research has focused on the association between labour-force quality and growth. Hanushek and Kimko (2000), for instance, show that direct measures of labour-force quality from cross-country comparative mathematics and science tests are strongly related to growth. Consequently, improving the cognitive and non-cognitive skills becomes one of the main goals of governments.

This paper uses the data collected in 2005 from the project "Família i Educació a Catalunya" by the Fundació Jaume Bofill. Cognitive development is measured with two quantitative indicators reported by the teacher: *Global knowledge* and *Catalan Knowledge*(the main language of instruction in elementary schools in Catalonia). Non-cognitive knowledge is measured with two indicators: *School Abilities* (reported by the teacher) and *Social Behaviour*(a combination of several qualitative measures given by both the teachers and the parents). Children are analyzed at three different stages of elementary school (second, fourth and sixth grade).

The main results of the paper are the following. First, the quarter of birth is significatively related to cognitive development and this maturity gap does not dissipate as children advance into latter grades. Even though our results cannot be inter-

preted in a causal manner, they indicate that cutoff rates deserve a close look, as previous literature has already made apparent. Remedial tutoring for the youngest students in the class could compensate this initial disadvantage.

Second, our study finds that the age of enrolment is related to children development, with children having ever attended nursery school doing generally better than those who only start at first year of pre-school (*P3*)(three-year olds in Catalonia) or later. This relationship relaxes once origin and family education variables are included in the analysis, which suggests that those who start school late are disproportionately represented among disadvantaged groups. Among those attending nursery school, there are no differences in scholastic results between those who start very early on, before the age of one, and the rest.

Third, we find a strong association between the structure of the family and educational outcomes. Children raised in non-nuclear families tend to underperform others at school. Hence, the increasing trend in divorce rates in Catalonia is likely to have adverse consequences on overall children's development. By contrast, family size is not important for cognitive knowledge, although elder and only children have the best language skills.

Fourth, first generation immigrants, that is, children born out of Spain, tend to have worse academic performance than those born locally. Remarkably, there are no differences in *Social Behaviour* between foreigners and natives, except for African born children who also do much worse in non-cognitive scores. Hence, amongst all foreign groups, Africans seem by far the most disadvantaged. Interestingly there are no performance differences between students born in Catalonia and those born in the rest of Spain, and that the language spoken at home, once origin is controlled for, is not crucial for children development. In general most of the instruction in elementary schools takes place in Catalan. This suggests that the ability to understand and use the local language is perhaps more important than speaking it at home. We do not observe any differences in cognitive and non-cognitive knowledge between second generation immigrants, that is, children born in Catalonia but whose parents are both foreigners, and other natives. This result indicates that there is certain assimilation of the immigrant children.

Fifth, results show that children born in families with higher educational attainment have better scholastic results. This factor is more relevant than family income. Hence, investing now in education to achieve a highly educated society is likely to have long-lasting effects. Results also show that parental employment status does

not play a role once other socioeconomic factors are accounted for.

Sixth, regarding school characteristics, we find that, other things equal, children in public schools receive higher scores in cognitive knowledge than children in private schools with public funding (*'concertada'*). Different grading practices among public and private school teachers could account for this finding. Given that school grades partly determine university access, this finding confirms the need to use more objective evaluations (i.e. standardised tests). The analysis does not provide strong evidence for negative peer effects generated by students entering the class in the middle of the academic year or by those with special needs. The simple negative association between these factors and performance measures disappears once other explanatory variables are included.

Finally, results suggest that studying languages, computing and music, as well as reading enhance children's development. Sports activities improve educational achievement to a lesser extent. Once socioeconomic factors are accounted for, there is no evidence that the amount of time children watch TV matter for educational performance.

The paper is organised as follows. Section 2 summarises recent demographic trends in Catalonia and their relevance for education. Section 3 describes the data sources, the construction of the indicators of cognitive and non-cognitive knowledge, and the explanatory variables employed. Section 4 contains the characteristics of the sample. Section 5 looks at the association between socioeconomic variables and development indicators using a multivariate analysis and discusses the results. Finally, the paper concludes with a summary of the findings in Section 6.

2 Education and Recent Demographic Trends in Catalonia

The best practices to enhance the quality of human capital of a population may heavily depend on the social structure of the country in which the policy is to be implemented. In this regard, understanding the demographic trends that shape that social context informs the research questions and it is a pre-condition to any policy recommendation.

In the last decade, Catalonia experienced a large demographic transformation with more women entering the labour market and a massive inflow of immigrants. Female

participation rates (16–64) rose from 55% in 1996 to 68% in 2007, above the average of the EU (Amarelo and Bové (2008)). During this period, the number of foreigners registered in the census multiplied by ten, from 98,035 in 1996 to 972,507 in 2007. This way migration contributed to 80% of the population growth in Catalonia over these years (Domingo and Bayona (2008)). The increase in foreigners was especially large in the last five years with more than half a million foreigners relocating to Catalonia. In fact, during this period Spain received the largest net migration in absolute numbers among EU countries.

These demographic transformations have had a large impact on the structure of the society, with more children attending nursery school earlier in life, and a large inflow of immigrant children arriving to the country with heterogeneous skills and educational histories. In this context, it is even more crucial than ever to identify the groups of children with poor cognitive and non-cognitive development and provide guidelines for enhancing the quality of their human capital.

One of the implications of higher maternal labour force participation is a shift to earlier ages of school enrolment and more prevalence of nursery school attendance. This demographic phenomenon has brought up multiple discussions and research on whether rising female employment rates may negatively impact the educational performance of children (Dronkers (1994)). There is a large literature that analyzes the effects of age at school entrance over different measures of school performance (or even later outcomes on labour markets and health) (see Stipek (2002) for a survey). This subject has made it into the mainstream press (see Weil (2007)). Still most of the emphasis has been on estimating the impact of entry age into formal education (i.e. kindergartern for the US). To address endogeneity problems of entry age and be able to make causal inferences many of these studies have employed the quarter of birth or the legal entry age at school (cutoff date) as an instrument for entry age (Angrist and Krueger (1991), Elder and Lubotsky (forthcoming 2009)). Results have been mixed, though in general, point to some evidence of better performance among the older members of a class, even though some of these works find that differences fade over time (Elder and Lubotsky (forthcoming 2009)).

On these grounds, we are interested in studying whether the age of first enrollment in any form of school matters for a child's development on elementary school and whether deviations from the optimal age of starting school adversely affect children's development. Compulsory school in Catalonia starts at first grade of elementary school, at the age of six. Primary (or elementary school) includes six grades and runs from age six to age twelve. However, pre-primary school from age three to age

six (*P3, P4, P5*) is recommended and provided at no cost by the public sector or at reduced fees by the private sector that receives a public subsidy ('concertada'). As a result, the great majority of families choose to enroll their children at age three in *P3*. In addition, many families, particularly those with working mothers, send their children to nursery school. The availability of public or subsidized nursery schools or childcare centers is somewhat limited.[1]In the paper we look at the age when the child enters in any form of school whether nursery, pre-primary or elementary.

The second major trend in recent Catalan demography, the arrival of large flows of immigrants, may have had the opposite effect in age of entry at school by shifting it to later ages. Some immigrant children have never attended school in their country of origin or arrive to Catalonia without proper (or very heterogeneous) educational experience. Some of them require remedial education at different stages of elementary and secondary school.

Such competing demands pose problems to the policy maker as the allocation of resources across the different stages of the educational trajectory is not trivial. For instance, Heckman and Masterov (2007) make a strong case for early intervention and propose that in order to enhance education more resources need to be allocated in preschool age. They argue that investing in young children, especially those in disadvantaged environments, pays off since these individuals tend to become more productive and less dependent on future aid. However, even if this may be a best use of resources, countries with large migrant populations need to also devote resources to facilitating a smooth assimilation of the new populations and potentially to remedial education to overcome some initial handicaps.

The general increase in the flows of migration in the last years has also increased the number of studies that aim at establishing the best practices for assimilating them into the school system (OECD (2003)). If a large proportion of students arrives once the academic year has started, they may disrupt the regular pace of the class and slowdown the progress of the rest of the class. (Calero and Waisgrais (forthcoming) and Sánchez (2008)). Following this concern, the models in this paper estimate whether children in classes with a high proportion of students of late enrolment (mostly immigrants) or students with special needs tend to do worse because of a negative peer effect.

[1]The fees for nursery schools, before pre-school, are much higher, even state ones, than schools. For example, in Barcelona, without including lunch, parents pay around 150 euros a month per child in a public nursery (0 to 3 years old) while the cost is around 15 euros a month for 3 to 12 years old (just needed to cover the cost of materials).

In another sphere, data shows that the number of children raised in adverse environments has recently increased in modern economies. Heckman and Masterov (2007) give examples of rising trends in different measures of adversity for the US (e.g. the absence of a father, scarce financial resources and low parental education and ability). Catalonia, as the rest of Spain, follows similar trends. For example, Flaquer (2008) explains that there has been a very sharp rise in divorce rates in Catalonia, which has lead to a higher number of monoparental families and more children at risk of poverty. Nowadays, the divorce rate in this region is 3.5 divorces per thousand inhabitants, well above the average in the EU, which stands at around 2 per thousand. Empirical evidence shows that children born into disadvantaged families are likely to have worse future outcomes (e.g. in areas such as education or employment) (Jaffee et al. (2001)). To address this, we control for the type of household in which children live and estimate its relationship to their educational performance and social behavior.

Finally, society has evolved as well as the type of activities that people tend to do in their leisure time: reading, watching TV, internet surfing and so on. Our study also looks at the relationship between the time devoted to extra-curricular activities and children's development.

3 Data

We use data from the project "Família i Educació a Catalunya" funded by the Fundació Jaume Bofill. The dataset contains socioeconomic information on 942 children aged 6 to 12. The random sample was constructed as follows: first, the schools were randomly selected by stratum. Second, amongst these schools, one of the three groups (2nd, 4rth and 6th of Primary) was randomly selected. Finally, children from these grades were selected. More details about sample construction can be found at Bonillo et al. (2007).

The information available for each child was collected in 2005 through four questionnaires: two of them completed by the parents (one with general household information and another about the children's social attitudes); a third questionnaire completed by the teacher about the children's cognitive and non-cognitive abilities at school as well as other social behaviour characteristics; and the fourth filled in by children aged 12 years old about their social attitudes.

In the survey on household information, parents respond to questions related to

the structure of the family (e.g. origin, education, labour force status, and age of the parents); language used between members; household income; school factors (e.g. age of enrolment, reasons for the selection of a particular school and degree of participation of the parents in meetings); out-of-school activities; resources and expenditure in education; norms; values; religious and political attitudes.

The second questionnaire that parents complete includes three main sections. The first one inquires about the social behaviour of the child and follows the Strengths and Difficulties Questionnaire (SDQ) in Goodman (1997).[2] These questions are also answered by the teachers in one of the sections of their questionnaire. Another set of questions discusses the relationship between the child and his/her family (e.g. whether parents and children have nice conversations) and follows the structure of the Alabama Parenting Questionnaire (APQ) in Frick (1991).[3] In the final section, parents respond about their perception on different aspects of their family life such as whether there are lively discussions or whether the members have a good time together. This part follows the Self-report Family Inventory (SFI) in Beavers et al. (1990).

Teachers complete a survey that contains three sections. In the first section they assess the cognitive knowledge of the student on seven subjects and on Catalan language. Second, the teachers respond to questions related to qualitative school abilities of the child such as whether the child undertakes school tasks in an adequate manner (delivered on time, asking for help when needed, etc), whether he/she follows the general rules and pays attention to the teacher, and whether he/she is well integrated in the group and collaborates with other pupils. This second section of the questionnaire follows the School Social Behaviour Scales (SSBS–2) in Merrell (2002). The last section includes the same questions about social behaviour, posed to parents and based on the SDQ in Goodman (1997).

Twelve year old children complete a three section questionnaire.[4] However, we do not use this last questionnaire in our study because we want to focus not only on the twelve-years old but on all age groups.

[2]http://www.sdqinfo.com.

[3]http://fs.uno.edu/pfrick/APQ.html.

[4]The first one asks questions regarding the relationship between the child and the family, based on the APQ, and it contains similar questions to the parents' survey on this topic. In the second section, children respond five questions on social behaviour taken from the SDQ. Finally, children report on antisocial behaviour (questions formulated following Pérez and Torrubia (1985) and Pérez and Torrubia (1998)), on alcohol, smoke and drug habits, and on the level of discussions with their parents.

3.1 Cognitive and Non-cognitive Indicators

A complete picture of a child's educational performance requires a multi-facet view of the child's development. Both academic performance and emotional and social maturity are important elements to evaluate a child's achievements. Substantial research shows that, for example, employment success is strongly affected by both cognitive and non-cognitive abilities (Heckman et al. (2006)). In that regard, the paper uses four indicators to measure children' development, the dependent variable, two for cognitive learning (*Global knowledge* and *Catalan Knowledge*) and two for non-cognitive behaviour (*School Abilities* and *Social Behaviour*).

The two variables for cognitive learning are constructed as follows. *Global knowledge* assesses the general academic knowledge of the child and it is calculated by taking an arithmetic average of the valuations given by the teacher on seven subjects (Science, Catalan, Spanish, Foreign language, Maths, Art and Physical education). The teacher selects for each subject either low (1), average (2) or high (3). Hence, the average will be a number between 1 and 3. *Catalan Knowledge* assesses the knowledge of the language and it is an arithmetic average of the skills in writing, reading, oral expression and comprehension. The teacher assesses the knowledge from none (0) to very high (10) and therefore the average will be a number between 0 and 10.[5]

The first indicator for non-cognitive knowledge, *School Abilities,* is constructed taking the average of twenty qualitative responses (from 1 to 5) given by the teachers on school competence of the children. The indicator *School Abilities* summarises information on academic performance of the pupil, his/her self-control and ability and willingness to follow directions in the classroom as well as his/her personal relationship with other students in school.

The second indicator, *Social Behaviour*, is the average of two indices, one calculated from the parents' answers and another from the teachers', and takes values from 1 to 3. Taking the mean of two different sources should provide a more objective (or balanced) measure of a child's social behaviour.[6] These two indices, in turn, have

[5]More details on the construction of the two cognitive dependent variables can be found in Appendix A.

[6]Simple sample descriptives of the two indicators show that parents' responses tend to be, in general, more positive than those of teachers. To see whether this biases our inferences in any way, we calculate an alternative indicator that only uses the least favourable of the two values, either the parents' or the teachers' scores, for each student as their evaluation. This is a strategy often recommended when indicators are constructed from responses given by respondents who may overstate their answers (see, for example, Piancentini et al. (1992)). Our results, however, are robust to the use of either of the indicators and in the text we only present estimates with the indicator calculated as an average of teacher's and parent's evaluations. Estimates that use the least favorable evaluation are available from the authors.

been calculated from the responses to several questions in SDQ on social behaviour such as, the kindness or temperament of the child, among others.[7]

3.2 Independent Variables

The dataset contains a rich set of socioeconomic variables and information on the school that the child attends. The complete definition and the labels of the covariates can be found in Appendix B.

Personal Characteristics

The analysis includes variables on the child's personal information such as age (and its square), gender, quarter of birth, grade (either second, fourth or sixth grade of primary school) and at what age the child first attended any form of school.

Family Structure

The analysis contains information on the composition of the family: the number of siblings, the ranking of birth (eldest, middle or youngest), whether the child has always lived with both his/her parents and the typology of the family (nuclear, monoparental, extensive and reconstructed). In nuclear families both parents and children live together in the same household. In monoparental families, only one of the two parents, either the father or the mother, lives with the child. In extensive families, in addition to their parents, children cohabit with other members of the family such as the grandparents. In rebuilt households children also cohabit with individuals that are not members of their biological (or adoptive) family such as, for instance, a partner of a remarried mother.

Socioeconomic Characteristics of the Family

The regressions control for the socioeconomic characteristics of the family such as the place of birth of the child and his/her parents, the number of years that a non-Catalan child has spent in Catalonia since his/her arrival, the language spoken at home, the level of education and the labour force status of the parents, the level of income of the household. There is also a variable for the socioeconomic status of the family that combines information on education, labour force status and income. Finally, the analysis controls for the religious involvement of the child.

Relationship between the Family and the School and School Characteristics

[7] More details on the construction of the two non-cognitive dependent variables can be found in Appendix A.

The study includes information on the relationship between the family and the school such as the frequency of attendance to parent-teacher conferences (school meetings with the student mentor), the total monthly amount (in euros) that parents spend in school fees and in after-school activities and whether parents were able to choose the school of their liking for their child.

There is information on school characteristics such as its geographical location and the size of their municipality, whether the school is public or not, the number of students per class, the proportion of students in the class who enroll once the academic year has started the proportion of students who require special attention, and the total size of the school.

Time Use by the Student

Estimates also control for the way children spend their time. In particular, the estimates include information on the number of hours per week that each child devotes to activities that are likely to affect his/her school and social performance: watching TV, doing homework, reading and participating in after-school activities (sports, dancing, psychomotor activity, language, music and computer instruction).

4 Description of the Sample

Table 2 in Appendix C shows the means and standard deviations of the variables. Students in our sample are evenly divided across gender, between grades (second, fourth and sixth) and across quarter of birth. Roughly a third of the students had entered some type of school by their first birthday. Almost half of them had enrolled by eighteen months and 75% of the children was already at school by the time they were two and a half years old. Only 5% of the sample enrolled in a school for the first time after age three. In a broader classification, we observe than almost three fourths of the children went to nursery, around 17% started school around 3 years at *P3* and the remainder 10% enrolled after. As we noted before, even though compulsory education does not start until age six, school is publicly provided (or heavily subsidized in the private sector)from age three (*P3*). As a result a great majority of children are enrolled in *P3*. The cutoff date for children in Catalonia is December 31^{st}. As a result children who are entering school for the first time before turning three and who were born between September and December are attending formal pre-school (*P3*) and not nursery school.

With regard to the structure of the family, 20% of the children in sample are only

children, 60% have one sibling, 16% have two and only 3% of the children have three or more siblings. Around 80% of families are nuclear and 10% monoparental. The 10% remaining is roughly equally divided between extensive and rebuilt families. The proportion of children who never cohabited with both the father and the mother at the same time is low (3%).

Among children, 89% is born in Catalonia, 2% is from the rest of Spain, 7% from Latin America, 1% from Maghreb and 1% from other countries. Both parents were born outside Catalonia in 10% of the families. Amongst the children not born in Catalonia, the average number of years since arrival is 3.7.[8] In addition, the survey provides information on language knowledge and on the language regularly spoken at home. Around 52% of the sample speaks only Catalan at home, 36% speaks only Spanish, around 10% mixes Spanish and Catalan at home and the remaining 2% does speak neither Catalan nor Spanish.

The proportion of fathers who did not complete primary school is low (5%). Around 20% of fathers finished compulsory secondary school (16 years old), around 40% completed upper secondary (18 years old), and around a third of the fathers obtained a university degree. The educational achievement of mothers is slightly superior to that of fathers, although the difference is very small.

At least one of the parents is employed in the majority of the non-monoparental families. Both parents are employed in 68% of the families in the sample. One fifth of the children have both parents working with a special timetable (shifts, nights, etc.) whereas one third of the sample has either the mother or the father working under a special timetable. Most of the families (42%) have monthly net earnings between 1800 and 3000 euros, 32% live with less than 1800 euros a month and 26% have earnings above 3000 euros a month. Immigrants are disproportionately represented in the lowest socioeconomic and educational status.

As noted the survey collects information about the links between family and school. The parents of only four children out of a sample of 942 never attend parent teacher conferences, whereas either the parents or the tutors of 92% of the children always attend those meetings. In the sample, families on average spend around 114 euros a month per child in school bills and 60 euros a month in extra-curricular activities. Around 10% of families claim that the school the child attends was not freely chosen by them.

In addition the survey provides information on school characteristics. Around two

[8]Notice, however, that one fifth of the non-Catalan do not fill in this information.

thirds of the schools in the sample are located in Barcelona or its metropolitan area and, not surprisingly, half of them are in towns of more than fifty thousand inhabitants. Moreover, almost two thirds of the schools are public and the rest are private with some public funding (*'concertada'*). In our sample, around 60% of the children born in Catalonia is enrolled in a public school while the percentage rises to 80% for children born outside Catalonia.

The proportion of students who enroll in the class in the middle of the academic year (2.5%) or who have special needs (5%) is low. On average, there are 23.2 students per class and one third of the schools are large with more than 600 students.[9]

On average, children spend more time watching TV (9.3 hours a week) than doing homework (5.1) and reading (2.6) altogether. The mean number of hours per week spent in activities out of school is 5.2. The majority of those hours are devoted to sport related activities including dance and psychomotor activity (2.9), followed by music, language and computer instruction (1.2).

Regarding cognitive abilities, the average score for *Global Knowledge* in the sample is 2.3. The index ranges from 1 to 3 and a higher score means better academic performance. The average score for *Catalan Knowledge* is 7.1 (scores range from 0 to 10). On non-cognitive abilities, the average result for *School Abilities* is 3.9 (scores range from 1 to 5) and for *Social Behaviour* is 2.8 (scores range from 1 to 3).

Table 3 in Appendix C shows the correlations between a subset of the explanatory variables and the four development indicators, the dependent variables. It is important to point out that a bivariate analysis does not take into account correlations across personal characteristics. A simplistic analysis of basic correlations is unwarranted since it is conducive to naïve conclusions that attribute the wrong weight of some of these variables to educational attainment. Regression analysis in Section 5 allows us to account to control for basic underlying characteristic and provides a more accurate picture of the association of each of the potential factors with children's development.

[9]The number of students in the class of certain schools is surprisingly large (around 65 individuals report a class size of 30 or more students). To calculate the average size of the class, the proportion of students of late enrolment and those with special needs we treat these cases as misreported.

5 Socioeconomic factors and education attainment

This section analyses the association between socioeconomic characteristics and the level of cognitive and non-cognitive knowledge, which is measured with the four indicators described in Appendix B. For this purpose, we estimate a multivariate model with ordinary least squares (OLS) including a large set of explanatory variables.

All four dependent variables (*Global knowledge, Catalan Knowledge, School Abilities and Social Behaviour*) are derived from information given by the teacher and not from an external and more objective examination as it is the case, for example, in the Programme for International Students Assessment (PISA) (OECD (2006)). Therefore, there is a chance that teachers from certain schools may tend to give higher marks (grade inflation) than those from another centre. For this reason, it is important to take into account that educational data on students have been sampled from many schools and hence form a cluster sample, where each school is a cluster. The latter implies that outcomes within a cluster are likely to be correlated and we need to allow for an unobserved cluster effect. For this reason, in the estimation we assume that observations are independent across schools but not necessarily within schools.[10] Results of the multivariate analysis are shown in Table 1. Alternatively, we have also undertaken the regression analysis including school fixed effects and we find that results do not change.[11]

Table 1: Parameter Estimates of Cognitive and Non-Cognitive Knowledge

Variables	*Global Knowledge*	*Catalan Knowledge*	*School Abilities*	*Social Behaviour*
Girl	0.075**	0.454***	0.332***	0.160***
	(0.031)	(0.118)	(0.049)	(0.023)
Age	0.274	1.955**	-0.143	-0.164
	(0.207)	(0.893)	(0.284)	(0.168)
Age square	-0.018*	-0.108**	0.005	0.010
	(0.010)	(0.042)	(0.015)	(0.009)

Continued on next page

[10] Clustering affects the estimated standard errors and the variance-covariance matrix of the estimators, but not the estimated coefficients.

[11] Estimates from the regression with school fixed effects are available upon request. We prefer the estimation with clusters than the estimation with school-fixed effects because we have a large number of schools (191 and hence the number of degrees of freedom left once school-dummies are included is small.

Table 1 – continued from previous page

Variables	*Global Knowledge*	*Catalan Knowledge*	*School Abilities*	*Social Behaviour*
Quarter of Birth (Birth quarter 1, omitted)				
Birth q. 2	-0.139***	-0.289*	-0.074	0.018
	(0.047)	(0.173)	(0.066)	(0.030)
Birth q. 3	-0.200***	-0.567***	-0.157**	0.019
	(0.055)	(0.203)	(0.070)	(0.036)
Birth q. 4	-0.296***	-0.793***	-0.301***	0.020
	(0.055)	(0.221)	(0.074)	(0.037)
Grade (Grade 2nd, omitted)				
Grade 4th	0.080	0.039	0.187	-0.026
	(0.098)	(0.453)	(0.140)	(0.052)
Grade 6th	0.202	0.533	0.069	-0.188*
	(0.163)	(0.726)	(0.257)	(0.099)
Age Start School (<=1, omitted)				
=1.5–2	0.056	0.224	0.058	0.004
	(0.039)	(0.143)	(0.059)	(0.029)
=2.5–3.5	-0.037	0.011	0.002	-0.025
	(0.049)	(0.172)	(0.074)	(0.033)
=4–5.5	0.004	-0.283	-0.064	0.010
	(0.136)	(0.623)	(0.166)	(0.096)
>=6–7	-0.150	-1.291*	-0.245	0.026
	(0.183)	(0.744)	(0.271)	(0.124)
Family Type (Nuclear, omitted)				
Monoparental	-0.035	-0.204	-0.166*	-0.054
	(0.062)	(0.215)	(0.084)	(0.044)
Extensive	-0.021	-0.332	0.081	-0.007
	(0.073)	(0.280)	(0.103)	(0.053)
Rebuilt	-0.295***	-0.783***	-0.350***	0.005
	(0.090)	(0.291)	(0.125)	(0.053)
N.Siblings	-0.025	-0.025	-0.009	-0.017
	(0.035)	(0.132)	(0.050)	(0.023)
Birth Order in the Family (Middle/Youngest, omitted)				

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Table 1 – continued from previous page

Variables	*Global Knowledge*	*Catalan Knowledge*	*School Abilities*	*Social Behaviour*
Single Child	0.068	0.489**	0.012	-0.054
	(0.064)	(0.230)	(0.101)	(0.046)
Eldest Child	0.040	0.275**	-0.052	-0.055**
	(0.037)	(0.131)	(0.059)	(0.028)
Birthplace (Africa, omitted)				
Catalonia	0.377**	1.608*	0.896***	0.485***
	(0.184)	(0.817)	(0.237)	(0.156)
Rest of Spain	0.372*	1.511*	0.740**	0.441**
	(0.214)	(0.910)	(0.308)	(0.199)
Eu,USA,Aus,NZ	0.110	0.312	0.956***	0.604***
	(0.244)	(1.144)	(0.337)	(0.160)
Asia	0.285	0.678	0.891**	0.473
	(0.221)	(1.052)	(0.399)	(0.308)
Latin America	0.139	0.633	0.857***	0.486***
	(0.182)	(0.864)	(0.246)	(0.159)
Home Language (Other, omitted)				
Catalan	0.059	0.012	0.059	0.042
	(0.105)	(0.548)	(0.188)	(0.068)
Spanish	0.109	-0.225	-0.025	-0.018
	(0.103)	(0.540)	(0.189)	(0.066)
Cat. and Span.	0.107	0.029	-0.023	0.013
	(0.108)	(0.582)	(0.210)	(0.074)
Monthly Net Family Income (Less than 1,800, omitted)				
1,800–3,000	0.079*	0.202	0.100	0.044
	(0.044)	(0.151)	(0.066)	(0.029)
More than 3,000	0.044	0.060	0.089	0.100***
	(0.054)	(0.192)	(0.073)	(0.035)
Missing	-0.156*	-0.398	-0.198*	-0.112*
	(0.090)	(0.326)	(0.120)	(0.059)
Family Education (Lower than Secondary High, omitted)				
Secondary High	0.113**	0.494**	0.028	-0.020

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Table 1 – continued from previous page

Variables	*Global Knowledge*	*Catalan Knowledge*	*School Abilities*	*Social Behaviour*
	(0.055)	(0.194)	(0.082)	(0.034)
University	0.216***	0.922***	0.082	-0.046
	(0.057)	(0.195)	(0.097)	(0.049)
Child Religion (Not religious, omitted)				
Relig./Pract.	-0.035	-0.202	-0.019	0.071**
	(0.049)	(0.183)	(0.064)	(0.034)
Relig./not Pract.	-0.107***	-0.396**	-0.028	0.076***
	(0.041)	(0.156)	(0.052)	(0.027)
Municipality Size (Over 500,000, omitted)				
50,000–500,000	0.095*	0.236	0.077	0.030
	(0.049)	(0.210)	(0.073)	(0.035)
5,000–50,000	0.087*	0.301	0.033	0.018
	(0.047)	(0.206)	(0.079)	(0.039)
Less than 5,000	0.108*	0.479*	0.114	0.021
	(0.065)	(0.273)	(0.106)	(0.049)
School Characteristics				
Public School	0.206***	0.528**	0.135*	-0.050
(Semi-private)	(0.051)	(0.232)	(0.081)	(0.044)
Number of students in the school (Less than 300, omitted)				
300–600 students	-0.011	0.002	-0.024	-0.030
	(0.046)	(0.198)	(0.071)	(0.037)
More than 600	0.117**	0.333	0.010	-0.056
	(0.054)	(0.277)	(0.085)	(0.048)
Hours in after-school activities				
Intellectual	0.036***	0.137***	0.023	-0.002
	(0.010)	(0.031)	(0.015)	(0.008)
Sports	0.015***	0.046*	0.010	0.002
	(0.005)	(0.024)	(0.008)	(0.005)
Reading	0.035***	0.132***	0.038***	0.008
	(0.007)	(0.026)	(0.013)	(0.007)
Homework	-0.007	-0.042**	-0.012	0.007

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Table 1 – continued from previous page

Variables	*Global Knowledge*	*Catalan Knowledge*	*School Abilities*	*Social Behaviour*
	(0.006)	(0.021)	(0.008)	(0.004)
TV	0.002	0.016	-0.001	-0.002
	(0.003)	(0.010)	(0.004)	(0.002)
Constant	0.458	-4.742	3.505**	2.906***
	(1.036)	(4.483)	(1.378)	(0.772)
Observations	913	922	904	912
R^2	0.241	0.260	0.178	0.137

*** p<0.01, ** p<0.05, * p<0.1

Standard errors clustered by school

Robust standard errors in parentheses

Personal Characteristics

Table 1 shows that girls do significatively better than boys in both cognitive and non-cognitive knowledge as measured by all four indicators. This finding differs from Calero and Waisgrais (2008) whose study found that girls performed worse than boys. In any case, it is important to point out that Calero and Waisgrais (2008)'s paper is based on the scores from the 2006 PISA exams and that this exam focuses completely on Science, a subject in which boys tend to outperform girls. Interestingly when we run the model for global knowledge separately by grade, the largest gender gap appears in sixth grade while the difference is very small for second and fourth grades. Across subjects, though, the gender gap reverses in second grade for math scores, with boys outperforming girls, while girls outperform boys in written and oral expression as well as reading throughout the three grades in the sample. These results are available from the authors upon request.

Results in Table 1 suggest that there are substantial differences in performance according to the quarter of birth of the child. Ceteris paribus, the scores of children born at the beginning of the academic year are in general higher in *Global Knowledge*, *Catalan Knowledge* and in *School Abilities*. This implies that children born at the end of the academic year may have an initial disadvantage compared to their other classmates. McEwan and Shapiro (2008), for example, find evidence in Chile that maturity at enrolment gives older students an advantage since they still have higher scores in fourth and eighth grade than those born close to the cutoff date. The authors also claim that the persistent effects suggest that older enrolment age

rather than age-at-test explain the better performance of these students. In these lines, Crawford et al. (2007) find that the month in which you are born matters for test scores at ages 7, 11, 14 and 16 in England, with younger children performing significantly worse, on average, than their older peers. In that paper the authors are able to exploit the geographic differences within England of the length of schooling and the age at which children start school to identify those effects. In our case, the school-entry policies are homogenous across all schools and our results need to be read within that framework.

In separate estimates that include interactions of quarter of birth with each grade level, we find some evidence that the maturity gap does not dissipate with age. Overall if anything it seems that the negative gap increases for those born in the last quarter of the year though none of the coefficients is significant.Interestingly, others have found a fading differential as children move to higher grades (Elder and Lubotsky (forthcoming 2009)).[12]

The fact that the quarter of birth matters for educational attainment raises questions on whether the allocation of children across academic years should be different or whether alternative policies could be implemented to help children who are relatively young at school enrolment. For instance, Bedard and Dhuey (2006) discuss the possibility of grouping students by ability, although this may place older children in the higher ability groups. Some researchers have undertaken randomized experiments to address this question. Cascio and Schanzenbach (2007) use data from one of the largest educational experiments ever undertaken in the US (project STAR) to look at whether relative age in a classroom matters. For this they randomly assigned children of the same biological age to different classrooms at school entry. They find no evidence that relative age matters for the average student, but it does for more disadvantaged students when placed among older children in the same classroom (e.g. less likely to take a college-entrance exam). An alternative type of policy would involve compensatory programs like remedial tutoring toward lower-achieving, relative young students (Chay et al. (2005)). Another possible solution would be increasing the number of grades so that the age spread between the children would be smaller. Interestingly, the gap in results between quarters only appears in academic performance measures and it is not present for *Social Behaviour*, a non-cognitive indicator. Results for the dummies for each grade are not statistically significant for the cognitive indicators and *School Abilities*. By contrast,

[12]Other studies have pointed out that the quarter of birth may be endogenous to some parental characteristics (e.g. age, marital status and education of the mother) that may account for part of the differential performance (Bound and Jaeger (2000), Buckles and Hungerman (2008)).

ceteris paribus, students in fourth and particularly those in sixth grade score worse in *Social Behaviour*, which is not surprising since they are close to adolescence.

Regarding the age when a child first attended any form of school, there is a strong negative correlation between starting school after turning two and half and cognitive knowledge, as shown in the correlation matrix in the Appendix. This association persists once other personal variables such as age, quarter of birth, grade level and the composition of the family are added in the regression (see Table 4 in Appendix D). However, when information about origin is included, we observe that some coefficients on age of first enrolment are not statistically significant any more and the significance disappears completely once variables such as income and education background of the parents are added in the multivariate analysis. This suggests that children starting later generally do worse mainly because most of them share also other personal characteristics that are strongly negatively related with general performance. For example, they tend to be born out of Catalonia and belong to a socioeconomic disadvantaged group. While the average age when children born in Catalonia or in the rest of Spain enter in some form of formal school is around one and a half, the average age for foreign born is six. Had we only looked at the correlation between age of entry at school and scores we would have prematurely concluded that the age of starting school is a key determinant for academic performance while other factors such as origin and education may be in fact more important.

This interesting finding matches some previous results in the literature. Cascio and Schanzenbach (2007) find that disadvantaged children who are older at the start of kindergarten are less likely to take college-entrance exams but the opposite is true for children with a high socioeconomic background. Similarly Elder and Lubotsky (forthcoming 2009) find that the differences by birth quarter may be related also to the previous experience of children in nursery school (prior to kindergarten in the US; or prior to *P3* in this context). Children who are born earlier in the year may have had a much longer exposure to pre-school and nursery environment before going into first grade than those who enter formal education half a year younger. But most importantly even if Elder and Lubotsky (forthcoming 2009) find in their paper that the differences in test scores according to entrance age decline sharply past kindergarten, they are especially large for children with more advantageous background. That is, children who are older at school entry but that given their family economic background may have been exposed to better or longer quality nursery/pre-school activities than those of a lower socioecomomic background do much better (particularly during the first years). Increasing access to pre-school and

nursery schools for more disadvantaged families is a potential policy implication of these findings.

Furthermore, Table 1 shows that there is no significant difference in general performance and social attitudes between children who went to nursery before turning one and a half and those who started between one and a half and two years of age. This finding eases the concern about the consequences that the rising mother labour force participation may have on child development.

Not surprisingly, children who begin school once they turn six or later score much lower in *Catalan Knowledge*. This suggests that bringing children at an early age to school improves their lifetime language knowledge. The result, though, is also related to the fact that most of those children starting school that late are newcomers into the country.

Alternatively, we have divided the children into three broad groups of 'academic' initiation: nursery, first year of pre-school (*P3*) and after. Results (not reported here) show that, ceteris paribus, children who went to nursery school have higher cognitive knowledge than those who started later, and the estimates are statistically significant for our *General Knowledge* indicator. Hence, overall there seems to be some academic gains of attending nursery school.

Family Structure

We observe in Table 1 that the structure of the family plays an important role in school performance. Children who live in a *Rebuilt* family score significatively less in *Global Knowledge*, *Catalan Knowledge* and *School Abilities* than children who live in a *Nuclear* family. Students from *Monoparental* and *Extensive* families also obtain lower marks than those in *Nuclear* families, although the coefficients are not statistically significant. Overall, this suggests that family stability tends to boost children's development.

The relationship between family composition (family size, birth order and child spacing) and children development has been widely discussed in the literature. Becker and Lewis (1973) introduced the concept of the trade-off between the quantity and the quality of children to explain the decrease in fertility in richer countries. In this framework, families value both the number of their offspring but also human capital investment in each child. In general, families with fewer children devote more material resources to each one of them, in the hope of obtaining a good return in their future human capital (Leibowitz (1974)). A negative association between family size and educational outcomes, however, is probably to be expected more in developing

countries – where children sometimes actively contribute in the family farm, for example – than in economies with low fertility rates. For example, while Li et al. (2007) find a negative and significant correlation for China, Angrist et al. (2005) find no evidence of family size and academic performance for Israel. Birth order (being the first born or the last born, for example) has also been shown to be associated with differential future earnings and educational attainment (Behrman and Taubman (1986) and Hanushek and Kimko (2000)). Finally, more density within the sibship, that is, less time between children, may also matter. For example, Powell and Steelman (1993) shows that close spacing increases the likelihood of dropping out of high school and decreases the odds of attending post-secondary school.

With this literature in mind we include measures of family composition in our model to study whether this previous findings hold in our data. We find a negligible negative relationship between the number of siblings and all four development indicators. Hence, family size turns out to be irrelevant for students in Catalonia. Our dataset does not have information on child spacing but we know whether the child does not have siblings, or he/she ranks first, middle or last. We observe in Table 1 that there are no significant differences in *Global Knowledge* between children of different birth order. However, it is interesting that, ceteris paribus, elder children and especially only children have significatively better Catalan skills than the rest but somehow score low in non-cognitive knowledge, especially in *Social Behaviour*. This is not surprising since first born tend to receive more attention early in life than their siblings and this should boost their language acquisition. At the same time, they probably spend more time on lonely play and without sharing family resources with others which may curtail the development of their social abilities.

Socioeconomic Characteristics of the Family

Table 1 shows that birth origin matters substantially for cognitive development. Children born both in Catalonia and in the rest of Spain score much higher in *Global Knowledge* and *Catalan Knowledge* than their counterparts. Interestingly, there is no significance difference between the coefficients of these two groups of students, which suggests that children born in Catalonia and in the rest of Spain perform similarly on average. Children born abroad, first generation immigrants, tend to display lower scores in cognitive knowledge than children born in Spain. The gap in non-cognitive knowledge, that is in (*School Abilities* and *Social Behaviour*), disappears for all immigrant groups, except for those born in Africa.

In addition, immigrants from Africa, our reference group, have lower cognitive de-

velopment than immigrants from any other region of the world but the difference is not significant. Hence among all immigrant children, Africans are, ceteris paribus, more vulnerable and may need more attention from policy-makers.[13]. Within cognitive knowledge, the gap between those born somewhere in Spain and those abroad is significant in reading, written and oral expression. However, Asians are the best performers in Mathematics. They score even above those born in Catalonia and in Spain. Results for the different components of *Global Knowledge* are available upon request.

In separate regressions we have studied whether there is any difference in the performance of children born in Catalonia of immigrant parents (second generation migrants) and the rest of native children. Interestingly, results do not display any disadvantage for the second generation immigrants, compared to children whose parents were born in Spain.[14] In addition, the coefficient for a dummy that indicates that a child speaks mainly Catalan at home is positive but not significant. This result suggests that rather than the language spoken at home, where the child is born and his/her capacities to integrate in the learning system through, for instance, understanding the local language are the most important. Our results about the immigration gap are in line to those reported by Calero and Waisgrais (2008) using PISA 2006 data.

Regarding the economic resources of the family, Table 1 shows a positive association between the monthly net income of the household and children's development. However, most of the coefficients are not significant once information on parents' education is included. In fact, we observe in Table 1 that parental education is crucial for cognitive learning, although it is not for non-cognitive development. This suggests that the educational profile of the family matters more for children's development than the level of family income.

Moreover, in regressions not reported here, there are no significant differences in children's performance across family labour force status.[15] That is, children whose mother and father work do not do any differently than their counterparts. In line with other studies, we find that other socioeconomic characteristics of the household

[13]It is important to remember, though, that there is some subjective component in these measures and we should contemplate the possibility of parents (and less likely, teachers) over or under-reporting the scores of certain ethnic groups.

[14]Regressions are available from authors. The estimates for the variables that controlled for second generation immigration were not statistically significant.

[15]Although the correlation between two working parents and the four development indicators is positive (see Appendix C), this variable is not significant once added into the regression and it does not improve the explanatory power of the model.

are more important for scholastic performance than mothers work outside the home (Hanushek and Kimko (2000)). Hence, we do not observe a detrimental effect of mother's employment on children's learning and social behavior. This is a relevant finding in the context of increasing female labour force participation.

Finally, Table 1 shows that the relationship between family religious background and global knowledge is U-shaped. Both children raised in either a practicing family or a non-religious family tend to have higher scores in cognitive indicators than those with a weak religious attachment. This relationship is less marked for Catalan knowledge, with those raised without a religious background performning the best. Interestingly, the opposite relationship is observed for *Social Behavior*. Children raised with some type of religious background – whether practicing or not – tend to demonstrate better social behavior than the rest. There is no relationship between religious background and school abilitites. Political inclination of the family does not play a role in any of the four performance measures employed.

Relationship between the Family and the School and School Characteristics

As noted in the sample description, a large majority of parents report attending parent-teacher conferences and hence there is no variance left to explore in that dimension. Unfortunately a lot of missing information in school expenditure and in extra-curricular activities prevents the inclusion of this variable in the analysis. Furthermore, in additional models not presented here, students whose parents claim they did not freely choose their children's school do not perform differently than their counterparts. This suggests that the degree of parental satisfaction with their school choice may not matter for scholastic achievement of the students. However, the available information is too limited to make any additional inferences in that regard. For a complete analysis of the issue, the alternative schools available for the children, their characteristics and the procedure for the ultimate matching of students and educational centers would be needed.

The size of the municipality where the school is located is strongly associated with performance. The smaller is the city where he/she lives, the higher are the cognitive scores of the child. The association is also positive for non-cognitive scores but coefficients are not significant. There is no clear explanation for this finding. It could partly be driven either by differential marking guidelines of teachers from schools located in smaller cities, by differential teacher ability (younger or more motivated), or by a more conducive learning environment among children whose relationships extend beyond the everyday school routine, among other things. In

fact, Calero and Waisgrais (2008) use external evaluation methods to the children's academic knowledge and find the opposite result, that is, higher scores for schools located in large cities.

Similarly, our results show that children in public schools do better in *General Knowledge*, *Catalan Knowledge* and *School Abilities* than children from private schools (with some partial public funding –'concertada'). This contrasts with the study by Calero and Waisgrais (2008) who find no difference in learning outcomes between the two types of schools. The disparity between the two studies suggests that teachers in public schools may have more propensity to grade inflation than teachers from private schools. In turn, this confirms that there are potential gains form standarised exams to assess learning skills, at least at certain grades. These grading differences may be relevant, for example, for university acceptance protocols since a student's placement is linked to his/her student high school marks and these should be as objective as possible.

Regarding the size of the centre, we find that students in larger schools score higher in cognitive development than those in small schools, in line with Calero and Waisgrais (2008). The positive relationship between school size and scholastic performance may be proxying the fact that large schools are more likely to have better general infrastructure, more extra-curricular activities and tutoring or remedial education for students in the center that the small schools.

Finally, we study whether there are negative peer effects from sharing the classroom with children who may potentially slowdown the progress of the whole group. In particular we consider the proportion of students who enrol late in the academic year (i.e., new arrivals in the middle of the year) as well as the proportion of students with special needs. Although we find a negative correlation between these two variables and both the cognitive and non-cognitive indicators (see Table 3 in Appendix C), the estimated coefficients lack significance once other variables are included into the analysis. Hence, there is no robust evidence of negative peer effects from these two groups. Moreover, we chose not to include these variables in the model in Table 1 because of their anomalous distribution (i.e., the number of students per class in certain centers is abnormally large, more than 50 pupils.)

Time Use by the Student

The last set of characteristics included in the model in Table 1 presents the association between the time children spend in certain activities and their cognitive and non-cognitive development. An additional hour in either language instruction,

computer science or music significatively increases cognitive knowledge and *School Abilities*. Similarly, there is a strong positive relationship between the time spent reading and academic performance. Ceteris paribus, an extra hour in sport related activities tends to increase cognitive knowledge, although the association is weaker than that found for reading. There is also a slight negative association between time spent doing homework and cognitive knowledge, possibly because children who do struggle may need to allocate extra time to homework. Finally, it is interesting that, despite the very strong negative correlation between TV watching and all four performance indicators (see Table 3 in Appendix C) the effect disappears once we include socioeconomic variables in the regression. The latter suggests that other factors that are correlated with TV watching are more important for educational outcomes than TV watching on its own.

Overall these results suggest that there are strong benefits for children's wellbeing from after school activities that involve language, computer science and music instruction as well as leisurely reading. To a lesser extent, sports activities are also helpful for educational achievement. Hence, encouraging the taste for reading and participating in certain extra-curricular activities should be beneficial for children's development.

6 Conclusions

This paper investigates the relationship between socioeconomic characteristics and children's cognitive and non-cognitive development in Catalonia using data from the project "Família i Educació a Catalunya" by the Fundació Jaume Bofill. Cognitive knowledge is calculated with two quantitative indicators reported by the teacher: *Global knowledge* and *Catalan Knowledge*. Non-cognitative knowledge is measured with two indicators, *School Abilities* and *Social Behaviour*. The former is reported by the teacher and the latter is constructed with a combination of several qualitative measures given by both the teachers and the parents.

Education has become increasingly important in today's economy and society. Hence, a better understanding of what matters for children's development can give us some hints about the sort of policies that can help in boosting the educational attainment of the population. We find that the following factors are relevant for educational attainment of children in our sample.

First, the youngest students in a class tend to underperform the rest in academic

measures and this maturity gap does not dissipate as children advance into latter grades. This suggests that decisions on cutoff rates are very important since they affect future learning outcomes. In this context, it may be useful to distribute children into grades with shorter age spread, especially for early years. However, in front of the material impossibility of targeting education at even thinner birth-intervals there should be a way to compensate for this gap such as the implementation of remedial tutoring for students born later in the year.

Second, our study finds that the age of enrolment somewhat matters for children development with children having ever attended nursery school doing generally better than those who started at the first year of pre-school (*P3*) or later (that is, at three years of age or later). This association, however, relaxes once birth origin and family education variables are included in the analysis, which suggests that those who start school late are disproportionately represented among disadvantaged groups. Overall, these results indicate that governments may want to allocate more money into preschool and encourage earlier enrolment of children of first generation immigrants since this would be clearly beneficial for their later development. Currently, resources devoted to preschool in Spain are much lower than those for primary, secondary and university. Public expenditure in nurseries (0 to 3 years old) is 0.1% of the GDP. The rates are 0.5%, 1.1%, 1.7% and 1% for pre-primary (3 to 6), primary, secondary and tertiary school, respectively. Among those having ever attended nursery school, there are no differences in academic results between those who start very early on, before the age of one, and the rest.

Third, children raised in non-nuclear families tend to underperform others at school. This raises a red flag that increasing trend in divorce rates in Catalonia may have adverse consequences on children's development. It is also interesting that while family size is not important for cognitive knowledge, elder and single children tend to portray better language skills than the rest.

Fourth, first generation immigrants, especially Africans, have worse academic performance than those born in Spain. Remarkably, there are no differences between students born in Catalonia and those born in the rest of Spain, and the language spoken at home, once birth origin is accounted for, is not a key factor for educational outcomes. The latter suggests that perhaps it is as (or even more) important the ability to understand and use the local language rather than speaking it at home.

Fifth, results point to long-lasting gains in investing in education since children born in families with higher educational attainment show in turn better scholastic results.

That is, we observe inter-generational educational spillovers. Results also show than parental education is much more important than both family income and parental labour force status for children's development.

Sixth, ceteris paribus, children in public schools score higher than those in schools 'concertadas' (private schools with some public funding). Although we do not have a clear prior about why this could be the case, this result brings up the importance of organising standarised tests to reach more objectivity in the evaluation. There is also inconclusive evidence that students who arrive in the middle of the academic year and those with special needs generate any negative peer effects.

Finally, this study finds strong benefits on children's development from devoting time to certain activities such as reading and language, computer science and music instruction. To a lesser extent, sport practice is also helpful for educational achievement. Hence, encouraging the taste for reading and participating in certain extra-school activities may be helpful for children's development. Interestingly, although there is a strong negative correlation between TV watching and scholastic results, this disappears once we include other socioeconomic characteristics.

A Construction of Cognitive and Non-cognitive Indicators

Global Knowledge

It is the arithmetic average of the valuations given by the teacher on seven subjects (Science, Catalan, Spanish, Foreign language, Mathematics, Art and Physical education). The teacher selects for each subject either low (1), average (2) or high (3). Hence, the average will be a number between 1 and 3.

The average is missing for 58 out of 942 individuals, mostly because the information of a few of the seven subjects is not available (the data is missing in all 7 subjects only for 3). If the missing observations are random, that is, they do not belong to students of certain profile (e.g. Catalan), they should not bias the results. Otherwise, they will bias the results unless we deal with them properly. With this purpose, we undertake the following two analyses.

First, we substitute the missing values in *Global Knowledge* by an alternative source of information. Besides the score on the seven subjects used to calculate *Global Knowledge*, the teacher provides an eighth score (*Global Achievement*) that roughly summarises the global performance of the child. In fact, the two measures, our *Global Knowledge* and *Global Achievement* are rather close, with an average difference of only around 0.02. Substituting the missing observations in *Global Knowledge* by *Global Achievement* reduces the number of missing values to 19.

Second, we use the sample bias correction model by Heckman (1979) to analyse whether the subsample containing missing observations on *Global Knowledge* is random. Although a priori there is no reason for the teacher to consistently not report the score for a specific type of students, it is important to double check it and correct it with the Heckman adjustment if needed. Results however indicate that no correction is granted. In the main estimates presented in the paper we use the first correction for missing values.

Catalan Knowledge

It is the arithmetic average of the following skills: writing, reading, oral expression and comprehension. The teacher asses the knowledge from none (0) to very high (10) and therefore the average is a number between 0 and 10. There are only 5 missing values.

School Abilities

This indicator has been built using the responses to questions on social competence and antisocial behaviour of children from the School Social Behaviour Scales (SSBS–2) in Merrell (2002). There are only 23 missing observations.

Social Behaviour

The *Social Behaviour* indicator is built using the responses of the Strengths and Difficulties Questionnaire (SDQ) in Goodman (1997). With these questions five dimensions of social behavior are measured: the *emotional symptoms score*, the *conduct problems score*, the *hyperactivity score*, the *peer problems score* and the *prosocial behaviour score*. The first four scores are negatively oriented and in turn can be regrouped into an indicator labeled as *total difficulties score*. Goodman (1997) explains in *http://www.sdqinfo.com* on how to build these scores from the questionnaire. The algorithm transforms responses from 25 variables (untrue, something is true and definitely true) plus a set of other variables that calibrate the impact of these factors on the wellbeing of the child into final scores (for each respondent). Our *Social Behaviour* is calculated as the average of the *prosocial behaviour score* for parents and teachers. There are only 15 cases missing.

Some of the questions in SDQ are positively phrased while others are negative. Moreover, responses to some questions are interrelated and need to be combined to make sense. Given these characteristics of the SDQ survey a simple average of the responses (as it is done for the *School Abilities* based on SSBS–2) does not provide the appropriate final indicator. Instead, it is necessary to use the algorithm to extract the scores from the responses of the survey and classify them into three levels 'normal', 'borderline', and 'abnormal' (see Goodman (1997) for guidelines).

In social sciences, it is common practice to derive indices for competence and social behaviour from a mix of questionnaires. For example, in this particular project, surveys were addressed to parents, teachers and 12 years old, and each contained various sections (e.g. SSBS–2, SDQ, APQ, etc.). How to summarizse all this information into a simplified indicator is not straightforward. Social researchers tend to use factor analysis, which is a statistical method used to describe variability among observed variables (responses) in terms of fewer unobserved variables called factors. The observed variables are modeled as linear combinations of the factors, plus "error" terms. The information gained about the interdependencies of different responses can be used later to reduce the set of variables in a dataset. Using this statistical instrument, Bonillo et al. (2007) transform all the information of the surveys into two indicators (personal competence and pro-social–normative behaviour). We

take a simplified version of this since we observe that, in fact, our defined four dependent variables are in line with the results of their factor analysis and the gains from undetaking factor analysis are small. For example, our cognitive measures and our non-cognitive measure *School Abilities* belong to their personal competence group, while the fourth indicator, the non-cognitive measure *Social Behaviour*, accounts for pro-social conduct.

B List of Variables

B.1 Individual

• *Age* and its square.

• *Girl* Dummy 1 if the student is a girl and 0 if it is a boy.

• Four 0–1 dummies for the quarter of birth. *Birth quarter 1* if the child is born from January to March; *Birth quarter 2* if the child is born from April to June; *Birth quarter 3* if the child is born from July to September; *Birth quarter 4* if the child is born from October to December.

• Three 0–1 dummies for the grade at which the child is currently enrolled in primary school. *Grade 2nd* for second, *Grade 4th* for fourth and *Grade 6th* for sixth.

• Ten 0–1 dummies for the age the child started school. *School<1* if child started school before turning one; *School=1* if child started school at age one; *School=1.5* if child started school at age one and a half; *School=2* if child started school at age two; *School=2.5* if child started school at age two and a half; *School=3.5* if child started school at three and a half; *School=4* if child started school at age four; *School=5.5* if child started school at five and a half; *School=6* if child started school at age six; *School>=7* if child started school at age seven or later. In regression analysis we regroup these categories.

• Three 0–1 dummies for the first type of school ever attended. *Nursery* if child went to nursery school before starting free pre-school (*P3*) at age 3 (compulsory school in Catalonia starts at age 6); *Pre-school–P3* if child started at *P3*; *After P3* if child started after *P3*. This variable has been constructed using the combination of the previous dummies on the age of first school attendance and the month of birth, and taking into account that the academic year starts in September.

B.2 Family Structure

• Four 0–1 dummies for the order of the siblings. *Single child* if the child does not have any brother or sister; *Eldest child* if the child is the eldest sibling; *Middle child* if the child is in the middle of the siblings; *Youngest child* if the child is the youngest sibling.

• *N.Siblings* is the number of siblings a child has.

• *Always parents* is a dummy variable that takes value one if the child has always lived with both parents; other cases include situations in which the child has not always lived with the father or with the mother or with any of the two.

• Four 0–1 dummies on the structure of the family: *Nuclear*, *Monoparental*, *Extensive* and *Rebuilt*. In an *extensive* family there are other family members in the household such as the grandparents besides siblings and parents. The category *Reconstructed* includes families where individuals not members of the family also live in the household (for example, a remarried mother) and other non-specified types of families.

B.3 Socioeconomic Characteristics of the Family

• Eight 0–1 dummies for the birth origin of the child. The same eight dummies are created for the father and the mother origin. *Catalonia*, *Rest of Spain*, *Magrhib* which includes Marocco and Algeria, *Subsaharian*, *Europe,USA,Aus,NZ* for Europe, North America, Australia and New Zealand, *Asia*, *Latin America* for America Latina and *Other*.

• Four 0–1 dummies for a combination of the origin of the parents. *Bothfamocat* if both parents are Catalan; *Faormocat* if either the father or the mother is Catalan (regardless of the origin of the other parent); *Faormospain* if either the father or the mother is from the rest of Spain (but none is Catalan); *Bothfamooutspain* if both father and mother are born out of Spain.

• *Years since arrival* is the number of years that non-catalan children have spent in Catalonia. We also calculate its square.

• Four 0–1 dummies for the language spoken at home. *Catalan* if only Catalan, *Spanish* if only Spanish, *Cat–Span* if some Catalan or Spanish and *Other* if neither Catalan nor Spanish.

• Four 0–1 dummies that capture the highest education level achieved by the father. The same variables are created for the mother. *None* if father/mother is analfabet or did not finish primary education; *Secondary low* if father/mother finished compulsory secondary school (16 years old); *Secondary high* if father/mother finished upper secondary school; *University Degree* if father/mother completed a university degree.

• Three 0–1 dummies that capture the family education level: *Low Education*, *Medium Education* and *High Education*.

• Three 0–1 dummies for the labour market status of the father of the child: *Inactivefa*, *Unemployedfa*, *Employedfa*.

• Three 0–1 dummies for the labour market status of the mother of the child: *Inactivemo*, *Unemployedmo*, *Employedmo*.

• Four 0–1 dummies for the combination of labour market status of the father or mother of the child. *Monoplfs* if it is a monoparental family; *None employed* if neither the father nor the mother is employed; *One employed* if either the father or the mother is employed; *Both employed* if both father and mother are employed.

• Three 0–1 dummies for the net monthly income of the household. *Low income* if monthly net income of the family is less than 1800 euros; *Medium income* if the monthly net income of the family is between 1800–3000 euros; *High income* if the monthly income of the family is more than 3000 euros. The level of income is missing for 45 observations. For those, we have used the average income of the sample and added a dummy variable in the regression that takes value one whenever the income information has been imputed (Cohen et al. (2003)).

• Three 0–1 dummies for the socioeconomic status of the family that has been constructed combining information on the level of education, labour force status and income. *Socioec1* if family belongs to low–average status; *Socioec2* if family belongs to average–high status; and *Socioec3* if family belongs to high status.

• Three 0–1 dummies for the religious background of the child: *Religious/practice* if the child is religious and practising; *Religious/not practice* if the child is religious but does not practise; *Not Religious* otherwise.

B.4 Relationship between Family and School

• Three 0–1 dummies for parent-teacher conference attendance (school meetings with the tutor of the class). *Meeting1* if either the mother or the father or the two assist to the meetings; *Meeting2* if a family member other than the father or the mother assists to the meetings; *Meeting3* if nobody assists to the meetings.

• *School expenditures* is the total amount in euros that parents spend monthly for school.

• *Extra-school expenditures* is the total amount in euros that parents spend monthly for extra-curricular activities.

• *School choice* Dummy 1 if the parents claim that they could not choose the school and 0 otherwise.

B.5 School Characteristics

• Six 0–1 regional dummies. *Barcelona*, *RMB* for rest of the metropolitan area around Barcelona, *Central* for central areas ('comarques'), *Girona*, *Lleida* and *Tarragona*.

• Four 0–1 dummies for the size of the place of residence (number of inhabitants): *>500 thousand*, *50–500 thousand*, *5–50 thousand*, *<5 thousand*.

• *Public* Dummy 1 if school is public and 0 if private with some public funding ('concertada').

• *Late enrolments* The proportion of children who arrive in the middle of the school year with respect to the total number of students in the class.

• *Special Needs* The proportion of students with special needs with respect to the total number of students in the class.

• *Number students* is the number of students in the class.

• Three 0–1 dummies for the size of the school: *School* $<=$ 300 if there are up to 300 students; *School 300–600* if there are between 300 and 600 students; *School* $>$ 600 if there are more than 600 students. Each group within the breakdown contains roughly one third of the sample.

B.6 Time Use by the student

• *Intellectual* is the total number of hours per week that the child spends in more academic after–school activities (language, computer science and music).

• *Sports* is the total number of hours per week that the child spends in sport related after–school activities (dance, sports and psychomotor activity).

• *Reading* is the total number of hours per week that the child spends reading.

• *Homework* is the total number of hours per week that the child spends on homework.

• *Tv* is the total number of hours per week that the child watches TV.

C Descriptive Statistics of the Variables and Bivariate Analysis

Table 2: Descriptive Statistics

Variables	*Observations*	*Mean*	*Std. Dev.*
Global Knowledge	928	2.326	0.519
Catalan Knowledge	937	7.137	2.018
School Abilities	919	3.903	0.721
Social Behaviour	927	2.819	0.359
Girl	942	0.491	0.500
Age	940	9.652	1.660
Birth Quarter 1	942	0.262	0.440
Birth Quarter 2	942	0.251	0.434
Birth Quarter 3	942	0.220	0.415
Birth Quarter 4	942	0.263	0.440
Grade 2nd	942	0.336	0.472
Grade 4th	942	0.371	0.483
Grade 6th	942	0.291	0.454
Age Start School			
<=1	939	0.342	0.474
=1.5–2	939	0.374	0.484

Continued on next page

Table 2 – continued from previous page

Variables	*Observations*	*Mean*	*Std. Dev.*
=2.5–3.5	942	0.238	0.426
=4–5.5	942	0.031	0.175
>=6–7	942	0.010	0.102
Nursery	942	0.736	0.440
P3	942	0.165	0.371
Start after P3	942	0.097	0.297
Family Type			
Nuclear	941	0.790	0.407
Monoparental	941	0.106	0.308
Extensive	941	0.057	0.232
Rebuilt	942	0.045	0.208
Always parents	916	0.968	0.175
N. Siblings	941	1.031	0.722
Single Child	940	0.200	0.400
Eldest Child	940	0.385	0.486
Middle Child	940	0.074	0.262
Youngest Child	940	0.340	0.474
Birthplace			
Catalonia	940	0.892	0.309
Rest of Spain	940	0.019	0.137
Eu,USA,Aus,NZ	940	0.008	0.091
Asia	940	0.003	0.056
Latin America	940	0.067	0.250
Africa	940	0.009	0.097
Parents Birthplace			
Both Catalan	941	0.596	0.490
One Catalan	941	0.217	0.413
At least one Spain (none Catalan)	941	0.086	0.280
Out of Spain	941	0.099	0.300
Years since arrival	81	3.740	2.571
Home Language			
Catalan	941	0.523	0.499
Spanish	942	0.361	0.480

Continued on next page

Table 2 – continued from previous page

Variables	*Observations*	*Mean*	*Std. Dev.*
Catalan and Spanish	941	0.102	0.302
Education Father			
None/Primary	850	0.047	0.211
Secondary Low	850	0.194	0.395
Secondary High	850	0.396	0.489
University	942	0.326	0.469
Education Mother			
None/Primary	928	0.038	0.193
Secondary Low	928	0.196	0.397
Secondary High	928	0.394	0.488
University	942	0.365	0.481
Family Education			
None/Primary	937	0.001	0.032
Secondary Low	942	0.149	0.356
Secondary High	937	0.406	0.491
University	942	0.439	0.496
Labour Force Status Family			
Monoparental	940	0.106	0.308
None employed	940	0.007	0.086
One employed	940	0.205	0.404
Both employed	940	0.680	0.466
Monthly Net Family Income			
Less than 600	942	0.007	0.085
600–1,800	942	0.312	0.463
1,800–3,000	942	0.423	0.494
More than 3,000	942	0.256	0.437
Missing	942	0.047	0.213
Social Class			
Low/Average	813	0.376	0.484
High/Average	813	0.405	0.491
High	813	0.217	0.412
Child Religion			
Religious/Practice	942	0.215	0.411
Religious/not practice	942	0.402	0.490

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Table 2 – continued from previous page

Variables	*Observations*	*Mean*	*Std. Dev.*
Not Religious	942	0.382	0.486
Political Views			
Father left	676	0.477	0.499
Father Center	676	0.465	0.499
Father Right	676	0.056	0.230
Mother Left	726	0.488	0.500
Mother Center	726	0.471	0.499
Mother Right	726	0.039	0.195
Attendance School Meetings			
Both/one Parent	941	0.995	0.065
Other Family	941	0.003	0.056
Nobody	941	0.001	0.032
Monthly School Fees	883	114.363	103.825
Monthly After-school Fees	794	60.314	62.706
No School Choice	942	0.101	0.302
Residence Area			
Barcelona (City)	942	0.212	0.409
Barcelona (Metro Area)	942	0.459	0.498
Central Counties	942	0.063	0.244
Girona	942	0.097	0.297
Lleida	942	0.056	0.230
Tarragona	942	0.110	0.313
Municipality Size			
More than 500,000	942	0.212	0.409
50,000–500,000	942	0.321	0.467
5,000–50,000	942	0.357	0.479
Less than 5,000	942	0.108	0.310
School Characteristics			
Public School	942	0.636	0.481
% Late Arrivals	915	0.024	0.067
% Special Education	912	0.046	0.087
Less than 300 Students	935	0.294	0.455
300–600 Students	935	0.372	0.483

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Table 2 – continued from previous page

Variables	*Observations*	*Mean*	*Std. Dev.*
More than 600 Students	935	0.333	0.471
Hours in after-school activities			
Intellectual	942	1.203	1.775
Sports	942	2.871	2.728
Reading	942	2.634	2.157
Homework	942	5.138	3.550
TV	942	9.360	6.490

Table 3: Correlations between Variables and Development Indicators

Variables	*Global Knowledge*	*Catalan Knowledge*	*School Abilities*	*Social Behaviour*
Girl	-0.0534	-0.0089	-0.0084	-0.0537
Birth Quarter	-0.1552*	-0.1156*	-0.0195	-0.1245*
Grade	-0.0566*	-0.0102	-0.0207	-0.0630*
Age Start Sch.	-0.1621*	-0.1933*	-0.0488	-0.0807*
Family Type				
Nuclear	0.1332*	0.1445*	0.0632*	0.1187*
Monoparental	-0.0300	-0.0518	-0.0574*	-0.0721*
Extensive	-0.0733*	-0.1014*	-0.0508	-0.0224
Rebuilt	-0.1363*	-0.0921*	0.0181	-0.0991*
Always parents	0.0736*	0.0450	-0.0192	0.0207
N. Siblings	-0.0381	-0.0369	-0.0018	-0.0049
Single Child	0.0094	0.0118	-0.0177	-0.0076
Eldest Child	0.0386	0.0627*	-0.0366	-0.0172
Birthplace				
Catalonia	0.1769*	0.2320*	0.0544*	0.1015*
Rest of Spain	0.0190	-0.0007	-0.0095	-0.0211
Eu,USA,Aus,NZ	-0.0394	-0.0292	0.0470	0.0309
Asia	-0.0201	-0.0272	0.0023	-0.0006
Latin America	-0.1602*	-0.2135*	-0.0335	-0.0812*
Africa	-0.0441	-0.0351	0.0499	0.0378
Home Language				
Catalan	0.1021*	0.1878*	0.0902*	0.1229*

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Table 3 – continued from previous page

Variables	*Global Knowledge*	*Catalan Knowledge*	*School Abilities*	*Social Behaviour*
Spanish	-0.1127*	-0.2060*	-0.0979*	-0.1269*
Cat–Span	0.0625*	0.0664*	0.0247	0.0190
Relig./pract.	-0.0272	-0.0422	0.0351	-0.0090
Relig./no pract.	-0.1039*	-0.0935*	0.0760*	-0.0242
Not Religious	0.1280*	0.1303*	-0.1065*	0.0321
Family Characteristics				
Origen	-0.1410*	-0.2201*	-0.0993*	-0.1300*
Income	0.1803*	0.2051*	0.1388*	0.1407*
Social Class	0.1769*	0.2052*	0.0882*	0.1145*
Education	0.2295*	0.2680*	0.0577*	0.1435*
Labour Status	0.0628*	0.0905*	0.0940*	0.1060*
Religious View	0.0645*	0.0722*	-0.0516	0.0368
Political View	-0.0417	-0.0373	0.0081	0.0078
School Characteristics				
No School Choice	-0.0248	-0.0470	-0.0132	-0.0131
School Fees	0.0128	0.0407	0.0434	-0.0112
After-sch. Fees	-0.0149	0.0033	0.0596*	-0.0083
Municip. Size	0.0499	0.0629*	-0.0094	0.0467
Public School	0.0404	-0.0046	-0.1013*	0.0290
300–600 Stud.	0.0110	-0.0072	-0.0604*	0.0169
>= 600 Stud.	0.0321	0.0607*	0.0771*	-0.0022
% Late Arrivals	-0.0975*	-0.1250*	-0.0851*	-0.0733*
% Special Edu.	-0.0785*	-0.0765*	-0.0345	-0.0469
Hours in after-school activities				
Intellectual	0.1923*	0.2223*	0.0330	0.1121*
Sports	0.0787*	0.0728*	-0.0097	-0.0026
Reading	0.1825*	0.1819*	0.1040*	0.1625*
Homework	-0.0727*	-0.0715*	0.0773*	-0.0582*
TV	-0.0995*	-0.1027*	-0.0913*	-0.1038*

* p<0.1

D Contribution of the Multivariate Analysis

Table 4: Parameter Estimates of *Global Knowledge*

Variables	(1)	(2)	(3)	(4)
Girl	0.073**	0.081**	0.075**	0.075**
	(0.030)	(0.031)	(0.032)	(0.031)
Age	0.330*	0.355*	0.320	0.274
	(0.194)	(0.197)	(0.202)	(0.207)
Age square	-0.023**	-0.024**	-0.022**	-0.018*
	(0.010)	(0.010)	(0.010)	(0.010)
Quarter of Birth (Birth quarter 1, omitted)				
Birth quarter 2	-0.139***	-0.138***	-0.136***	-0.139***
	(0.053)	(0.052)	(0.051)	(0.047)
Birth quarter 3	-0.221***	-0.218***	-0.215***	-0.200***
	(0.057)	(0.056)	(0.056)	(0.055)
Birth quarter 4	-0.310***	-0.311***	-0.307***	-0.296***
	(0.056)	(0.055)	(0.054)	(0.055)
Grade (Grade 2nd, omitted)				
Grade 4th	0.160*	0.141	0.130	0.080
	(0.095)	(0.092)	(0.092)	(0.098)
Grade 6th	0.429**	0.394**	0.370**	0.202
	(0.172)	(0.162)	(0.160)	(0.163)
Age Start School (<=1, omitted)				
=1.5–2	0.004	-0.006	0.009	0.056
	(0.041)	(0.041)	(0.041)	(0.039)
=2.5–3.5	-0.134**	-0.134**	-0.101*	-0.037
	(0.052)	(0.053)	(0.054)	(0.049)
=4–5.5	-0.440***	-0.409***	-0.170	0.004
	(0.109)	(0.107)	(0.132)	(0.136)
>=6–7	-0.601***	-0.562***	-0.263	-0.150
	(0.123)	(0.126)	(0.166)	(0.183)
Family Type (Nuclear, omitted)				

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Table 4 – continued from previous page

Variables	(1)	(2)	(3)	(4)
Monoparental		-0.100	-0.097	-0.035
		(0.061)	(0.061)	(0.062)
Extensive		-0.094	-0.049	-0.021
		(0.068)	(0.072)	(0.073)
Rebuilt		-0.350***	-0.350***	-0.295***
		(0.096)	(0.097)	(0.090)
N.Siblings		-0.023	-0.019	-0.025
		(0.034)	(0.035)	(0.035)
Birth Order in the Family (Middle/Youngest, omitted)				
Single Child		0.052	0.071	0.068
		(0.059)	(0.063)	(0.064)
Eldest Child		0.045	0.045	0.040
		(0.038)	(0.038)	(0.037)
Birthplace (Africa, omitted)				
Catalonia			0.488**	0.377**
			(0.189)	(0.184)
Rest of Spain			0.508**	0.372*
			(0.217)	(0.214)
Europe,USA,Aus,NZ			0.323	0.110
			(0.260)	(0.244)
Asia			0.515*	0.285
			(0.285)	(0.221)
Latin America			0.286	0.139
			(0.191)	(0.182)
Home Language (Other, omitted)				
Catalan			0.086	0.059
			(0.120)	(0.105)
Spanish			0.042	0.109
			(0.120)	(0.103)
Catalan and Spanish			0.120	0.107
			(0.121)	(0.108)

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Table 4 – continued from previous page

Variables	(1)	(2)	(3)	(4)
Monthly Net Family Income (Less than 1,800, omitted)				
1,800–3,000				0.079*
				(0.044)
More than 3,000				0.044
				(0.054)
Missing				-0.156*
				(0.090)
Family Education (Lower than Secondary High, omitted)				
Secondary High				0.113**
				(0.055)
University				0.216***
				(0.057)
Child Religion (Not religious, omitted)				
Religious/Practice				-0.035
				(0.049)
Religious/not Practice				-0.107***
				(0.041)
Municipality Size (Over 500,000, omitted)				
50,000–500,000				0.095*
				(0.049)
5,000–50,000				0.087*
				(0.047)
Less than 5,000				0.108*
				(0.065)
School Characteristics				
Public School				0.206***
(Semi-private, omitted)				(0.051)
Number of students in the school (Less than 300, omitted)				
300–600 students				-0.011
				(0.046)
More than 600 students				0.117**

Continued on next page

Table 4 – continued from previous page

Variables	(1)	(2)	(3)	(4)
				(0.054)
Hours in after-school activities				
Intellectual				0.036***
				(0.010)
Sports				0.015***
				(0.005)
Reading				0.035***
				(0.007)
Homework				-0.007
				(0.006)
TV				0.002
				(0.003)
Constant	1.373	1.249	0.839	0.458
	(0.932)	(0.945)	(0.980)	(1.036)
Observations	925	925	924	913
R^2	0.094	0.118	0.133	0.241

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Standard errors clustered by id

References

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