

Family environment affects parental involvement in homework during adolescence

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Acknowledgements: Toni Mora gratefully acknowledges the financial support of 09SGR102 (Generalitat of Catalonia).

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Abstract

This paper examines the effects of the home environment on parental involvement in homework during adolescence. While it is well documented that parental effort is a strong determinant of a child's educational achievement, here, by way of alternative, we additionally explore the influence of the household environment rather than that of family structure alone. Our findings corroborate previous reports that family structure has no impact on parental involvement once parental education is taken into account, but that family environment by contrast exerts a strong influence.

Key words: parental involvement, homework assistance, family environment, family structure

JEL codes: I20, J12

1. Introduction

It is well known that parental effort makes a difference in educational outcomes and general child well-being. Indeed, greater academic achievement is predicted when parents are actively involved in their children's educational process (Houtenville and Conway, 2008). Empirical evidence of this relationship is mounting thanks to the fact that the further allocation of public funds for education seems unable to eradicate educational failure. Schools, teachers and peers constitute complementary agents with parental effort often being crowded out by school resources and school size (Houtenville and Conway, 2008; Walsh, 2010). Yet, households and students' own efforts play a key role in accounting for academic achievement (De Fraja, Oliveira and Zanchi, 2010). In the specific case of household impact, a vast empirical literature has been accumulated on parental time use, especially in the United States, indicating that the age of the parents' youngest child, gender, family structure and mother's educational attainment levels are all relevant driving factors (Zick and Bryant, 1996; Sayer, Bianchi and Robinson, 2004; Guryan, Hurst and Kearney, 2008; Bonesrønning, 2010). Additionally, parental involvement programs have been shown to be notably effective (Avvisati, Gurgand, Guyon and Maurin, 2010).

This paper examines the effects of the home environment on parental involvement in homework. It is our belief that not only must we account for family structure but that household environment should also be considered. Our specific contribution is to disentangle these two family features in explaining parental involvement in homework during adolescence. Two issues are worth stressing. First, even in those instances where divorce does not affect educational achievement since its main effect is the impact of the change on a family's economic resources (Sanz-de-Galdeano and Vuri, 2007; Francesconi, Jenkins and Siedler, 2010), "non-intact" families are more likely to allocate less time to the children's educational production function as a consequence of damage to the parent-adolescent relationship (Amato and Sobolewski, 2001). Second, the family environment needs to be taken into account because divorce is not always the final outcome of poor household environments in which, for instance, parental arguments are constant. Thus, an intact family does not necessarily mean a healthy

environment for children, as there can be considerable differences in the families' conflict records. Thus, independent of divorce, children might experience parental conflict that has consequences on their educational outcomes and adolescent behavior (Musick and Meier, 2010). In line with these two arguments (divorce and unhealthy environments), reduced efforts in monitoring children's education are to be expected in association with poor parenting quality.

The empirical analysis conducted here explores the reasons underpinning parental involvement in the provision of homework assistance to adolescents in Catalonia. We employ a unique data survey containing information about parental involvement in homework assistance and an extensive list of covariates describing the following three levels of characteristics: individual, scholar and parental. Although we use cross-sectional data, we are able to consider two specific student traits (conscientiousness and motivation) that both capture individual heterogeneity. Our results confirm previous findings in the literature on educational achievement, namely, that family structure does not have a direct incidence on parental involvement. Yet, we do provide evidence to show that family environment is a determinant of homework assistance practices. We corroborate these findings of a causal relationship by applying the method of instrumental variables (IV), given that unobservables may drive both factors and, similarly, because misreporting might be present. Finally, we implement robustness tests to verify whether these findings hold for different subsamples, including gender and students with certain apparent advantages.

The paper is structured as follows. The next section summarizes previous empirical evidence. The third section describes the database and the econometric procedures adopted whilst the fourth section shows our empirical results. Finally, the last section concludes.

2. Previous empirical evidence

Parental behavior in responding to their children's educational needs is, along with the genetic mechanism, one of the intergenerational channels of transmission that serves to improve children's educational performance. Given this state of affairs, it is interesting to identify just what falls within the umbrella of decisions concerning parental effort or, more specifically, what are the factors that induce parents to allocate greater amounts of time to the educational process of their children? In an attempt, therefore, to go beyond the traditional nature-nurture debate and the associated examination of social environment factors, in line with Canova and Vaglio (2010), we seek to identify within-family influences, i.e. a child's home inputs (Todd and Wolpin, 2007). Specifically, family features can be broken down into two main factors influencing parental involvement: (i) educational attainment levels and labor market participation, and; (ii) day-to-day interactions within family that alter the household environment.

Research on parental background has identified the effects of this factor through mothers' occupation status and mothers' educational attainment levels. It is well known that mothers play a leading role in the educational process since they dedicate more time than fathers do, although this gap is narrowing (Bianchi, 2000; Sayer, Bianchi and Robinson, 2004). Additionally, higher educated women, who are more likely to be employed and to have fewer children, spend more time on child care than their not so highly educated counterparts (Guryan, Hurst and Kearney, 2008; Gutiérrez-Domènech, 2010; Rønning, 2011). Other studies argue that the amount of time is not important and that what counts is the quality of the mothers' activities with their children (see Bianchi, 2000 for a review). Similarly, Ruhm (2008) concludes that maternal employment has dissimilar effects on adolescent development depending on the children's cognitive abilities.

Family structure has also been considered a relevant determinant of a child's educational performance. Whilst there is a general consensus among demographers, sociologists and psychologists as to the negative impact of non-intact families (not

formed or unstable)¹ on children's behavior and well-being, economists question the existence of any influence of family structure on educational achievement. Yet, researchers in all fields agree that the father's absence harms children because of the household's shortage of monetary resources. In fact, research that neglects the impact of family structure finds that lone parenthood may be correlated with other socioeconomic disadvantages, usually unobservables in the causality relationship (see a review in Francesconi, Jenkins and Siedler, 2010).

However, here, we seek specifically to examine the effects arising out of the home environment rather than from its structure. Our line of argument is that although non-intact families clearly have an impact, at least through the monetary channel, it is the household atmosphere that alters children's behavior through day-to-day interactions. In essence, ethical values or personal example induce children to study or not (Canova and Vaglio, 2010). Independent of family structure, a harmful home environment affects children's behavior and their attitude to learn since this factor has been shown to be a determinant of the production of cognitive achievement (Todd and Wolpin, 2007). However, to the best of our knowledge, little evidence has been presented in the literature as regards the impact of the household environment on parental effort and, more specifically, as regards parental involvement in homework assistance conditioned to family structure.

Here, we focus on parental involvement during adolescence, a critical developmental period in which young people face many new situations: continually adjusting to physical changes, exploring their sexuality, establishing their personal identity, seeking greater independence and increasingly relying on friendship groups. At this age, individuals begin to mature and to experience the need to develop their independence separate from their families. At the same time, parents modify their roles to allow their children to develop their own self-identity. Indeed, parental involvement practices

¹ See, for instance, Lansford (2009), Amato (2000) and Amato and Keith (2001) for a review of the range of outcomes for which negative effects are found (well-being, behaviour problems, school grades, school dropout, educational attainment, idleness, marital dissolution and teenage pregnancy). On educational grounds, adults reared in single-parent families are less likely to complete high school and attend college (Ginther and Pollak, 2004).

declines during adolescence (Milgram and Toubiana, 1999). For this reason, we limit our analysis strictly to those students attending compulsory schooling, given that some parents may well decide to stop assisting in their homework once adolescents achieve the minimum legally required level of education.

3. Data and econometric methodology

The data for this analysis are drawn from a sample of secondary school students in Catalonia (which has one of the highest GDPs per capita in Spain). The data sampling took place between February and June 2008. The survey targeted secondary students. We restricted the sample to two specific age cohorts, both enrolled in compulsory secondary education.² This enables us to consider individual satisfaction scores employing very close reference levels. The final sample contained information for more than 2,300 students at 70 high schools. The questionnaire was supplied on-line. Given that not all the high schools had computer room facilities or sufficient time schedules, some of those who agreed to participate received the questionnaire in paper format. The questionnaire contained six blocks of questions: personal data (including self-reported anthropometric data); scholar characteristics; math's teaching questions; parental background information; conscientiousness and motivation questions; and lifestyle conditions.

Parental engagement in the education process at home is consistently associated with school performance through three tasks: (i) active organization and monitoring of the child's time; (ii) homework assistance, and; (iii) discussion of school matters with the child. See Hoover-Dempsey *et al.* (2001) for a review of research on parental

² We have detailed information of students' maths grades obtained in an international award (Cangur 2008). We are indebted to the Catalan Society of Mathematics and Antoni Gomà for supplying the names of contacts in each high school in which at least one student participates. So as to avoid sample selection bias in the initial step, we decided to contact all Catalan high schools. None of the students had access to the questionnaire prior to responding which enabled us to avoid any attrition effects, but students were free not to respond to some questions. Yet, sample selectivity might appear due to the under-representation of certain areas or certain schools based on their managerial characteristics (public, semi-private or private). Therefore, some administrative information was sought from the Catalan Ministry of Education for reasons of sample representation.

involvement in student homework. Our empirical paper is concerned with the second of these three tasks, which can be considered one of supervision. Previous studies have found that parental assistance with homework is positively related to the amount of time adolescents spend on their homework (Keith *et al.*, 1986; Hewison, 1988). Specifically, Table 1 shows the descriptive results indicating the source of homework supervision received by the adolescent students. Columns 3 and 4 examine the impact on the responses of those whose mothers report higher educational attainment and who are in employment, respectively. Our descriptive results indicate that almost half the sample does not receive any assistance from parents, or from peers or extra private tuition (lessons). Yet, the percentage of adolescent students obtaining assistance from one or both parents is greater once we include the condition that the mothers in question have attained higher education qualifications, but this is not the case for those in employment. Clearly, these descriptives only show an association rather than representing a causal effect.

[Insert Table 1 around here]

In order to accommodate for ordinality in the econometric analysis, parental effort via homework assistance was regressed with an Ordered Logit model. This model takes into account that the distances between response categories do not provide any information. This implies that although parental effort (P^*) is unknown, the individual reports the range in which it lies (P). The model for parental assistance to homework can therefore be estimated as follows:

$$P_i^* = \alpha + H_i' \beta + x_i' \delta + \varepsilon_i \quad (1)$$

where y_i , $i = 1, \dots, N$, denote the dependent ordered variable, H_i represents household environment, x_i is the k-vector of instrumental explanatory variables, δ is a k-vector of unknown parameters such as β and ε_i represents the independently distributed random

error term. P_i^* ranges from 1 (no assistance is obtained) to 6 (both parents assist in their homework). The results presented in the paper are obtained considering robust clustered standard errors at classroom level. Home environment is measured through students' self-perception and was measured on a Likert scale from 1 to 5.³ The average value was 4.15 points, although it should be noted that adolescent students living in non-intact households scored an average of 3.92 points.

As controls, we used a long list of covariates ($x_{k,i}$) affecting parental involvement. Amongst these, we included adolescent characteristics (age, gender, immigrant status and the number of extracurricular activities in which they were involved), scholar features (school academic year, grade obtained in mathematics during the last academic year, the kind of school enrolled in, the time taken to get to school and student aversion to sharing school notes), family characteristics (family structure, the number of years since parents had divorced, difference in age between the mother and the adolescent, mother's educational attainment level, the number of books at home, parents employment status, students' self-reported perception of parents' health status and the student receiving an award from parents based on school performance) and some class-level characteristics (percentage of mothers with university education; percentage of female students, percentage of immigrants and the percentage of parents that had divorced) which allowed us to consider certain class fixed effects. Finally, ethnic differences were controlled for, given that immigration waves had influenced recent schooling profiles.

As students may be enrolled in a certain school as a result of parental decisions taking tuition and homework practices into consideration, family resources were found to be a determinant factor. We, therefore, included controls for parental background (e.g. mother's educational attainment) and made use of information for those attending semi-public or private schools. Yet, despite this, it is quite likely that certain unobservables continue to affect decisions concerning parental effort. Thus, school fixed effects can

³ One caveat constitutes the fact that family environment has been captured through adolescent's perception rather than by asking their parents about the presence of marital quality and marital conflict. However, in this regard, we should note that whilst parents are more likely to overreport the family climate, students tend to underreport this satisfaction measure.

control for influences on parental involvement, such as those derived from dissimilar homework practices or alternative activities in the curriculum, school size (Walsh, 2010) and neighborhood heterogeneity (Jones, Toma and Zimmer, 2008).

A further point to note is the inclusion of personality traits and student motivation as proxies for individual heterogeneity.⁴ Note that in this way we include a measure of ability in the sense of a school skill rather than a measure of knowledge which is related to high school grades (also available through the questionnaire). Since the present sample is a cross-section, we need to control for these psychological traits, although Boyce (2010) argues that personality accounts for greater individual heterogeneity than does the inclusion of fixed effects in a panel data approach. We grouped conscientiousness and motivational items into two unique factors, one for each concept. To measure variability in the resulting dimension, we quantified Cronbach's alpha reliability (0.743 and 0.736, respectively). Additionally, the Kaiser-Meyer-Olkin measure of sampling adequacy indicated that multivariate analysis provides excellent results (both factors accounted for 95% of the overall variability in each concept). Subsequently, we re-scaled the factor predictions to [0-1], as the individual opinions should not have a negative value, whilst 1 should represent either being fully confident in oneself or being fully motivated. After showing that its exclusion/inclusion did not affect the rest of the determinants, we preferred to include this substitute of ability since biasing effects might be expected when omitting this measure.

In a further step, we decided to estimate a logit procedure instead of an ordinal logit. This decision was taken as some categories presented a smaller sample size and because we wished to test for the parallel regression assumption. As this assumption was rejected ($\chi^2=294.72$; p-value=0.00), we were obliged to estimate a logit regression. Specifically, we built a dichotomous variable representing those adolescents that did not receive any homework assistance from anyone. Alternative dichotomous variables could

⁴ Because of the time constraints operating in the application of the survey, we conducted several interviews with psychologists to ensure inclusion of the most relevant questions. Thus, seven questions were considered for conscientiousness (one of the big five personality components) and fifteen specific items for motivation. In the case of the latter, we followed mainly Alonso-Tapia and Arce-Sáez (1992) specific items for Spanish teenagers.

have been defined to represent partial receipt of parental assistance. However, parents could also allocate financial resources for private tuition (lessons) instead of dedicating their own time, or convince other parents that classmates should help each other to do their homework.

However, it remains quite likely that there are still some unobserved factors that could be driving both parental effort and home environment, such as unobserved socioeconomic disadvantages, even though we have conditioned for an extensive list of covariates. Alternatively, it might be the case that family environment (H_i) contains measurement errors because students tend to underreport this satisfaction measure. Recall that students responded to this question during adolescence, which is a difficult time in their growing up process. Thus, and given that we were working with observational data, we finally estimated causality using instrumental variables. Thus, a probit combined with an instrumental variables model provides consistent estimations for the dichotomous analysis (here, we used Newey's two-step estimator). This estimator is usually expressed in terms of a continuous latent variable (P_i^*) which accounts for, as discussed above, parental involvement in homework supervision. See equation (2), where $P_i^* = 1$, the case of an individual i not being supervised by his or her parents, \widehat{H} represents the predicted household environment, $x_{k,i}$ is the k -vector of explanatory variables, z_i are the instrumental variables, δ are the k -vectors of unknown parameters and ε_i represents the independently distributed random error term.

$$P_i^* = \begin{cases} 1 & \text{if } \widehat{H}_i' \beta + x_i' \delta + \varepsilon_i > 0 \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

$$H_i = z_i' \gamma + \omega_i$$

The aim is to find an instrument that is highly correlated with home environment but not with parental effort. Several covariates are candidates for use as such instruments thanks to the richness of the database employed. In fact, we used some measures that presented

a low correlation with parental effort: student's self-perception of his or her relationship with their father and mother and the adolescent's state of mind. All these measures are strongly related to the household environment, whereas they do not show a strong link to parental effort.⁵ It is apparent that those parents that argue most frequently with their adolescent children have a weaker relationship (Amato and Sobolewski, 2001) and, thus, they present a poorer household environment. As a result, it might be argued that the same should hold regarding the link between not obtaining supervision and, for instance, an adolescent's poor relationship with his or her father. Yet, it should be noted that our definition of the endogenous dichotomous variable denoting assistance is obtained by including other options such as mother, relatives, friends and classmates. This results in a somewhat weak link between our instruments as regards the parental/child relationship and the parental involvement variable. Finally, the student's state of mind is very closely related to any self-reported score by the student.

4. Empirical results

Table 2 contains ordinal logit estimates of the household environment effects on parental effort. The first column of Table 2 shows baseline estimates only including individual and scholar features as well as household environment parameters. Consistent with our expectations, home environment has an influence on parental effort. Indeed, the higher the adolescent's perception of the home environment, the greater is the involvement of his or her parents in the provision of homework support. The second column of Table 2 includes parental characteristics such as family structure and parental educational attainment levels. No changes with regards to our main parameter of interest were observed.

It can be seen that few of the covariates capturing parental characteristics proved to be statistically significant. However, as expected, the higher the mother's education the greater was the parental involvement recorded, corroborating the existence of an educational gradient in childcare (in this case, during adolescence). Additionally, family

⁵ In our dataset, the correlation between these measures and household environment was 0.60, 0.66 and 0.29, respectively; whereas their correlation with our parental effort measure was considerably lower or even null (0.15, 0.11 and 0.005, respectively).

structure did not have any impact on parental involvement, once household environment had been included. Thus, through an indirect channel (homework assistance) at least, our findings are in line with those that fail to show the influence of family structure on the achievement production function, although regarding this specific covariate we are unable to claim a causal interpretation. All these results were robust to the inclusion of conscientiousness and motivation proxies as well as to the consideration of school fixed effects.

[Insert Table 2 around here]

However, as mentioned, the ordinal logit estimates are not valid for interpretation because the parallel regression assumption was rejected. Consequently, we adopted a logit estimation procedure that included conscientiousness and motivation as well as school fixed effects. Table 3, column (1) shows these estimates for the full sample and corroborate our previous findings (i.e. the higher the adolescent's perception of the home environment, the greater is the involvement of his or her parents in the provision of homework support). Then, in a subsequent step, we disentangled the sample based on gender to observe whether differential effects exist. An inspection of our descriptives shows that female students received greater attention from their parents during adolescence, receiving also more attention from their mothers than from their fathers. This was corroborated through our logit estimates. This is in line with reports of higher engagement between adolescent sons (as opposed to daughters) and their fathers (Lamb and Lewis, 2004) and of gender bias in parental effort (Bonesrønning, 2010).⁶ Yet, after differentiating by gender, similar patterns regarding the impact of household were observed. Similarly, none of the effects of the main covariates changed their sign or statistical significance.

[Insert Table 3 around here]

⁶ An alternative interpretation might be that female students report greater parental effort. The latter would be in accordance with Gutiérrez-Domènech (2010). This provides evidence that both genders enjoy similar dedication measured in time for their educational activities.

However, we further questioned the causal interpretation of our results. For this purpose, we adopted an instrumental variables approach as outlined above. Our instruments showed statistical significance in their explanatory power when explaining household environment. Yet, our findings with regards to home environment estimates showed no changes to those obtained without using the instrumental procedure. In other words, family environment remained just as strong a determinant, while here again family structure was not statistically significant. At this juncture, it should be clarified that the exogeneity test indicated that the main covariate was not endogenous. Note, however, that although this is only a statistical test and it is closely related to the choice of instruments, our main findings hold. In addition, our findings were robust to the inclusion of additional covariates that drive parent-adolescent relationships or that capture the impact of classmates (the number of siblings⁷, parents prohibiting children from going out too often, the number of students who nominated the student in question as a friend, the number of peers within the self declared clique, the percentage of classmates likely to dropout and the class-size or the percentage of classmates consuming pot) and which were excluded from the previous estimates for reasons of efficiency. Thus, the percentage number of classmates not receiving homework supervision was included. Our results are shown in Table 4, column (2). Here again our main findings did not change.

[Insert Table 4 around here]

In a final step and accordingly to previous literature (Rønning, 2011; Walsh, 2010), we explored household environment effects disentangling the sample based on some covariates that may drive our results to dissimilar findings: (i) students who obtained greater academic achievement over the last academic year (pass very good or excellent); (ii) larger classrooms; (iii) students whom their mothers attain the greater educational attainment level, and; (iv) classes in which the mathematics teacher usually do not

⁷ We are unable to distinguish between boys and girls, although siblings' gender plays a role within parent-children interactions (Mammen, 2011). However, sibship size attenuates the negative effects of divorce on children's educational outcomes (Sun and Li, 2009).

assign homework (similar rules were expected for the rest of subjects). Results shown in Table 5 (columns 1 to 4) corroborated our previous findings, i.e. the greater family environment the lesser probability to not receive homework assessment.

[Insert Table 5 around here]

5. Conclusions

This paper has sought to explore the influence of family environment, rather than that of family structure, on parental involvement in homework supervision during adolescence. In seeking to make a causal interpretation, we instrumented family environment to account for the presence of either unobservables or measurement errors. Our findings serve to reinforce the relevance of household characteristics in accounting for children's educational outcomes through an indirect channel (parental involvement). In this sense, our findings are line with the literature in other fields where it has been stressed that non-conflict helps students overcome adolescent educational failures. Hence, while family structure remained statistically non significant, poor environments are prone to become dissolved marriages in a not too distant future. Specifically, some parents may decide to get divorced once their children have finished their compulsory studies or when they become adults. Thus, although divorced families did not present any statistical significance, poor environments tended to capture these effects through as yet unobserved marriage breakdowns.

Two points should be stressed. First, given the relevance of parental involvement in educational decisions and in a child's educational achievement (Houtenville and Conway, 2008), several policies need to be specifically addressed. Initiatives, such as the program described in Avvisati et al. (2010) with its positive effects for student attitudes and outcomes, should seek the allocation of greater efforts to parenting policies. Second, further research needs to focus on the caveat that here our family environment measure was captured through student perceptions. One option would be

to obtain parental participation through more sophisticated measures such as the Family Environment Scale. However, the parameter of interest might be affected, as it was here, by conflict underreporting (students), or equally overreporting (parents) given that household environment will be biased by the perspective of the source. This suggests that the two perceptions (adolescent and parent) need to be jointly accounted for.

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Table 1. Who assists students in their homework?

	Full sample	Female students	Higher educated mothers	Employed mothers
Nobody	1216 [44.77]	589 [41.6]	331 [45.03]	824 [44.42]
Friends	97 [3.57]	58 [4.1]	16 [2.18]	73 [3.94]
Lessons	424 [15.61]	215 [15.18]	86 [11.7]	275 [14.82]
Relatives & Brothers	387 [14.25]	231 [16.31]	97 [13.2]	275 [14.82]
Father or Mother	390 [14.36]	213 [15.04]	124 [16.87]	263 [14.18]
Both parents	202 [7.44]	110 [7.77]	81 [11.02]	145 [7.82]

Note: We report absolute frequencies for each category with relative frequencies in brackets.

Table 2. Ordinal logit results for homework assistance

	Baseline & scholar features	Parental effects	Personality & Motivation	School fixed effects
Household environment satisfaction	0.301 (0.04)***	0.270 (0.05)***	0.258 (0.05)***	0.284 (0.05)***
Age	-0.189 (0.07)***	-0.191 (0.08)**	-0.186 (0.08)**	-0.156 (0.09)*
Being female	0.263 (0.08)***	0.290 (0.09)***	0.244 (0.09)***	0.250 (0.10)**
Grade in mathematics past academic year	-0.106 (0.03)***	-0.116 (0.03)***	-0.104 (0.03)***	-0.086 (0.03)***
Being immigrant	-0.488 (0.15)***	-0.433 (0.18)**	-0.502 (0.18)***	-0.572 (0.18)***
Number of extracurricular activities	0.147 (0.05)***	0.109 (0.06)*	0.115 (0.06)**	0.111 (0.06)*
4th academic year of ESO	-0.265 (0.11)**	-0.279 (0.12)**	-0.271 (0.12)**	-0.378 (0.13)***
Student states school notes should be shared	0.052 (0.05)	0.061 (0.05)	0.068 (0.05)	0.082 (0.05)
Attending a semi-public or a private school	-0.082 (0.09)	-0.145 (0.09)	-0.139 (0.10)	-2.072 (0.66)***
Time to get to school	0.002 (0.00)	0.003 (0.00)	0.003 (0.00)	0.003 (0.00)
Parents' civil status: not being married		0.030 (0.14)	0.019 (0.15)	0.064 (0.15)
Number of years since divorce		-0.022 (0.02)	-0.018 (0.02)	-0.017 (0.02)
Differential in years with mother		0.009 (0.01)	0.009 (0.01)	0.005 (0.01)
Mother's attaining secondary education		0.165 (0.09)*	0.168 (0.09)*	0.170 (0.10)*
Mother's attaining tertiary education		0.274 (0.12)**	0.292 (0.12)**	0.298 (0.12)**
Number of books at home above 100		0.111 (0.08)	0.116 (0.09)	0.132 (0.09)
Father being employed		0.161 (0.16)	0.186 (0.16)	0.224 (0.17)
Mother being employed		-0.003 (0.09)	0.026 (0.09)	-0.043 (0.10)
Father's health status degree		-0.062 (0.06)	-0.041 (0.06)	-0.033 (0.06)
Mother's health status degree		-0.040 (0.07)	-0.056 (0.07)	-0.058 (0.07)
Receiving an award from parents for doing homework		0.238 (0.04)***	0.238 (0.04)***	0.232 (0.04)***
% Mother's attaining higher education in the class		0.473 (0.32)	0.458 (0.33)	0.374 (0.42)
% Immigrants in the class		0.275 (0.34)	0.280 (0.34)	-0.004 (0.50)
% Female classmates		-0.099 (0.39)	-0.096 (0.40)	1.198 (0.50)**
% Divorced parents in the class		-0.646 (0.43)	-0.654 (0.41)	-0.500 (0.48)
Conscientiousness factor			-1.357 (0.38)***	-1.564 (0.40)***
Motivation factor			0.925 (0.29)***	1.155 (0.30)***
School Fixed Effects	NO	NO	NO	YES
N	2,321	2,135	2,135	2,135
Wald χ^2	118.30 (0.00)	206.59 (0.00)	237.94	924.08 (0.00)
Pseudo-R ²	0.0180	0.0266	0.0317	0.0469

Note: Adjusted robust standard errors for clustering at the classroom level are reported in brackets. ***, ** and * denote significance at 1, 5 and 10% respectively.

Table 3. Logit estimates for students not receiving homework assistance

	Full sample	Male students	Female students
Household environment satisfaction	-0.265 (0.05)***	-0.269 (0.09)***	-0.294 (0.07)***
Age	0.211 (0.10)**	0.282 (0.15)*	0.113 (0.15)
Being female	-0.337 (0.12)***		
Grade in mathematics past academic year	0.206 (0.04)***	0.162 (0.05)***	0.259 (0.05)***
Being immigrant	0.631 (0.18)***	0.738 (0.30)**	0.549 (0.24)**
Number of extracurricular activities	-0.041 (0.07)	-0.147 (0.12)	-0.004 (0.09)
4th academic year of ESO	0.233 (0.15)	0.103 (0.21)	0.424 (0.24)*
Student states school notes should be shared	-0.116 (0.06)**	-0.218 (0.09)**	-0.028 (0.08)
Attending a semi-public or a private school	2.489 (0.64)***	0.439 (0.67)	2.203 (0.86)**
Time to get to school	-0.005 (0.00)	-0.006 (0.01)	-0.002 (0.01)
Parents' civil status: not being married	-0.091 (0.17)	0.055 (0.26)	-0.293 (0.24)
Number of years since divorce	0.020 (0.02)	0.009 (0.04)	0.040 (0.03)
Differential in years with mother	-0.026 (0.01)**	-0.022 (0.02)	-0.035 (0.02)**
Mother's attaining secondary education	-0.235 (0.12)**	-0.338 (0.19)*	-0.143 (0.16)
Mother's attaining tertiary education	-0.169 (0.13)	-0.253 (0.22)	-0.036 (0.18)
Number of books at home above 100	-0.062 (0.10)	0.127 (0.17)	-0.236 (0.15)
Father being employed	-0.262 (0.20)	-0.382 (0.26)	-0.052 (0.32)
Mother being employed	0.032 (0.12)	0.059 (0.16)	0.049 (0.17)
Father's health status degree	0.073 (0.08)	0.054 (0.12)	0.117 (0.10)
Mother's health status degree	-0.007 (0.08)	0.059 (0.13)	-0.136 (0.11)
Receiving an award from parents for doing homework	-0.270 (0.05)***	-0.401 (0.08)***	-0.182 (0.08)**
% Mother's attaining higher education in the class	-0.809 (0.51)	-0.673 (0.68)	-1.876 (0.82)**
% Immigrants in the class	-0.220 (0.63)	-0.972 (0.78)	0.193 (1.12)
% Female classmates	-1.142 (0.63)*	-1.639 (0.90)*	-0.771 (1.02)
% Divorced parents in the class	0.516 (0.54)	0.695 (0.76)	0.225 (0.86)
Conscientiousness factor	1.542 (0.46)***	2.213 (0.65)***	0.885 (0.64)
Motivation factor	-1.223 (0.35)***	-1.748 (0.55)***	-2.035 (0.73)***
School Fixed Effects	YES	YES	YES
N	2,131	998	1,115
Wald χ^2	233.44 (0.00)	128.43 (0.00)	157.08 (0.00)
Pseudo-R ²	0.0989	0.1179	0.1199

Note: Adjusted robust standard errors for clustering at the classroom level are reported in brackets. ***, ** and * denote significance at 1, 5 and 10% respectively.

Table 4. Instrumental variables estimates for students not receiving assistance

	(1)	(2)
Household environment satisfaction	-0.205 (0.05)***	-0.203 (0.05)***
Share of classmates not receiving assistance (& additional covariates)	NO	2.659 (0.12)***
Individual and scholar covariates	YES	YES
Parental features	YES	YES
Conscientiousness factor	YES	YES
Motivation factor	YES	YES
School Fixed Effects	YES	YES
N	2,113	2,109
Wald χ^2	216.40 (0.00)	1,043.97 (0.00)
Exogeneity test	2.16 (0.14)	1.95 (0.16)

Note: Adjusted robust standard errors for clustering at the classroom level are reported in brackets. ***, ** and * denote significance at 1, 5 and 10% respectively.

Table 5. Instrumental variables: disentangling the sample

	(1) Advantaged students	(2) Larger classrooms	(3) Higher educated mothers	(4) Not assigning homework
Household environment satisfaction	-0.269 (0.11)**	-0.224 (0.08)***	-0.248 (0.11)**	-0.250 (0.12)**
Individual and scholar covariates	YES	YES	YES	YES
Parental features	YES	YES	YES	YES
Conscientiousness factor	YES	YES	YES	YES
Motivation factor	YES	YES	YES	YES
School Fixed Effects	YES	YES	YES	YES
N	841	365	604	373
Wald χ^2	9,874.40 (0.00)	1,706.79 (0.00)	5,309.98 (0.00)	22,784.11 (0.00)
Exogeneity test	3.67 (0.05)	0.12 (0.73)	0.35 (0.56)	10.09 (0.00)

Note: Adjusted robust standard errors for clustering at the classroom level are reported in brackets. ***, ** and * denote significance at 1, 5 and 10% respectively.