Students' homework: useful for their learning?

John Jerrim[1]; Luis Alejandro Lopez-Agudo[2]; Oscar D. Marcenaro-Gutierrez[3]

Abstract

The debate on the effect of students' homework time on their academic achievement has been extensively discussed; nevertheless, international research does not seem to have reach to any definitive result. This homework time subject is studied in this research for primary education students of 24 countries, using student fixed effects within-students between-subjects. For the countries under analysis our results show that homework time does not seem to affect the academic achievement of primary education students, and these results hold after many robustness checks. The policy implications derived from this analysis show that the current particularities of homework have to be improved for the countries under analysis to help students make a better use of their time.

Keywords: homework time; student fixed effects; primary education.

JEL Codes: I20, I21, I28, C10.

---

[1] Corresponding author. Department of Social Science, UCL Institute of Education, University College London, 20 Bedford Way, WC1H 0AL, London. E-mail: j.jerrim@ucl.ac.uk.

[2] Departamento de Economía Aplicada (Estadística y Econometría). Facultad de Ciencias Económicas y Empresariales. Universidad de Málaga. Plaza de El Ejido s/n, 29013, Málaga (España). E-mail: lopezagudo@uma.es.

[3] Departamento de Economía Aplicada (Estadística y Econometría). Facultad de Ciencias Económicas y Empresariales. Universidad de Málaga. Plaza de El Ejido s/n, 29013, Málaga (España). E-mail: odmarcenaro@uma.es.

1. Introduction

Homework has been considered by teachers and educators as one of the main mechanisms to continue students' learning when they are not at school. Authors like Corno and Xu (2004) defined homework as the "job of childhood" to the extent that it develops students' responsibility and attitude, preparing them for their future work. However, in spite of its apparent positive effect on students' academic achievement, homework has become one of the main causes of problems between schools and parents (Cooper, 2001) due to the – sometimes – excessive amount of it that students are assigned at early ages. This situation has reached to the point that, as e.g., Spanish parents have considered their children to be "losing their childhood"[4]. This has driven parental organizations, particularly, the Spanish Confederation of Fathers' and Mothers' Associations (*Confederación Española de Asociaciones de Padres y Madres*, CEAPA) to initiate "homework strikes", such as that in November 2016[5]. These mobilisations against homework are not a practice which is exclusive for this country, as recent homework research has encouraged teachers and schools to reduce or even eliminate homework in primary education classes around the world[6].

In this international context of the homework debate, the existing heterogeneity in the amount of homework that countries give to children and its association with academic achievement denote how important is to analyse homework in the particular case of each country. This heterogeneity can be quickly spotted when taking a look at the PISA 2012 data (OECD, 2014a; 2014b): countries as, e.g., Finland, which present a reduced amount of homework, are amongst the highest performers in PISA 2012. Nevertheless, other countries like Hong-Kong or Singapore – two of the highest performers – present a positive high correlation of homework with academic achievement. Hence, the literature is mainly split into those works which highlight the existence of a positive association between homework and academic achievement and those which state that this effect is weak or null.

Within the "positive-effect" strand of the literature, Cooper, Robinson, and Patall (2006) performed a comprehensive meta-analysis on the effect of homework on students' academic achievement focused on research from the United States in the years 1987 to 2003. They found that there is a positive correlation between homework and students' academic achievement, but there is not any evidence on the association of this effect and the outcome measure (grades or standardised tests) or the subject (reading or mathematics). Dettmers, Trautwein, and Lüdtke (2009) studied the relationship between homework and academic achievement in mathematics using data from 40 countries which participated in PISA 2003, finding a positive relationship between homework and academic achievement in most of those countries. With similar results, Trautwein (2007) analysed PISA data (2000) for an extended German sample and found that homework assignments are positively associated with achievement when using homework frequency and effort variables, but that homework time does not seem to affect achievement gains. This homework issue was also studied by Murillo and Martinez-Garrido (2014) for primary education students in 16 Latin American countries, finding also that homework time is relevant, but only when incorporated into classroom dynamics in the case that

---

[4] Referred article in the Spanish newspaper "*El país*": https://elpais.com/elpais/2016/11/03/inenglish/1478172531_599502.html

[5] Referred article in "The guardian" newspaper: https://www.theguardian.com/world/2016/nov/02/spanish-parents-urged-to-put-children-on-weekend-homework-strike

[6] Some examples in Dailymail Online: http://www.dailymail.co.uk/wires/ap/article-3807263/Goodbye-homework-elementary-schools-classes.html

teachers build on them for their classes and correct it. Other authors such as Falch and Rønning (2012) studied the effect of homework frequency on primary education students' academic achievement in 16 countries, finding that it has a significant positive effect which ranges from 4 to 21 standard deviations, depending on the country. Hence, there is much evidence which highlights a positive relationship between homework and students' academic achievement, but getting a causal effect is much more difficult.

On the other strand of the homework debate, authors as Baş, Şentürk, and Ciğerci (2017) performed a meta-analysis on homework assignments and their effect on students' academic achievement, finding an effect size of 0.229, what denoted that its effect is very small. As highlighted by Trautwein and Köller (2003), who performed a review of twentieth-century review on homework, in spite of the long list of research on this issue, the empirical evidence on the positive effect of homework on students' academic achievement is weak. In this issue, the UK Education Endowment Foundation has reported that "A number of reviews and meta-analyses have explored this issue. There is stronger evidence that it is helpful at secondary level, but there is much less evidence of benefit at primary level"[7]. Kohn (2006) also supported this argument, indicating that there are very few researches which show that homework benefits students' academic achievement in primary school; he also indicated that homework studies have many limitations, being the most relevant that they show only association between homework and academic achievement, rely on students' self-reported homework time and the confusion between the outcome being measured: scores obtained in tests designed by teachers or standardised test scores. Working on this latter argument on the homework effect conditioned on the grade students are taking, the current research aims to explore this homework time issue for primary education students.

To perform this research we make use of the rich information on homework provided by the Progress in International Reading Literacy Study (PIRLS) 2011 and the Trends in International Mathematics and Science Study (TIMSS) 2011. These databases offer us information on the assigned homework time reported by teachers for their students in three different subjects – reading, mathematics and science – which let us use student fixed effects within-students between-students to get the effect of homework time on students' academic achievement. This strategy has been used to study homework for secondary education students at the United States (Eren & Henderson, 2011) or by Falch and Rønning (2012) for primary education students in 16 countries which participated in TIMSS 2007 (so they used only mathematics and science information; in addition, they focused on homework frequency and not on homework time).

The rest of the paper is structured as follows: first, the data and methodology employed for this analysis are described. After that, the main results and robustness checks are presented, ending with a conclusion section.

2. Data

Our analysis focuses on those students who participated both in PIRLS 2011 and TIMSS 2011, which are organized by the International Association for the Evaluation of Educational Achievement (IEA). The aim of TIMSS is to report fourth (aged 9-10) and eighth grade (aged 13-14) students' achievement in mathematics and science (Mullis, Martin, Foy, & Arora, 2012; Martin, Mullis, Foy, & Stanco, 2012), while the objective of PIRLS is to provide information about reading literacy achievement of fourth grade

---

[7] More information about the research on homework time from this group can be found in: https://educationendowmentfoundation.org.uk/evidence-summaries/teaching-learning-toolkit/homework-primary

students (aged 9-10) for the participating countries (Mullis, Martin, Foy, & Drucker, 2012). A total of 45 countries participated in fourth grade in PIRLS and 50 in fourth grade in TIMSS. The particular advantage of using both PIRLS and TIMSS 2011 is that, in many of these countries, almost all fourth grade students took both PIRLS and TIMSS.

The sampling procedure employed for PIRLS and TIMSS is a two-stage cluster sample design (Martin & Mullis, 2012). In the first stage, schools are sampled using probabilities proportional to their size (PPS). In the second stage, all students in one or more classes of the grade under analysis are selected. Besides from students' academic achievement, PIRLS and TIMSS gathered contextual information with four questionnaires: student, home (only in PIRLS), school and teacher questionnaires.

The use of this database has many advantages: first, it provides information about assigned homework and many homework practices that students are receiving, being these reported directly by the teachers. The latter has the advantage that this measure is less likely to be biased as, e.g., students' self-reported homework time (Kohn, 2006). Although some relevant International Large Scale Assessment tests like PISA 2015 have this teacher information, it is not directly linkable to the student level, but only to school level (OECD, 2017). In addition, linking PIRLS and TIMSS databases let us obtain information for students in the subjects of reading, mathematics and science, which is essential to perform our identification strategy – as described in the methodology section.

The main variable used for this research is that related to the homework time assigned by the teacher (from the teacher background questionnaire; R15 in PIRLS for reading, M9B in TIMSS for mathematics and S8B in TIMSS for science). The wording of this variable is the following[8]:

When you assign (subject) homework to the students in this class, about how many minutes do you usually assign? (Consider the time it would take an average student in your class).

-15 minutes or less.

-16-30 minutes.

-31-60 minutes.

-More than 60 minutes.

In addition, a fifth category ["I do not assign (subject) homework"] is included in this variable, from a previous question[9].

Regarding to the sample used for this analysis, only common countries in PIRLS and TIMSS were selected, meaning this a total of 37 countries[10]. Five out of these countries (Denmark, England, Netherlands, New Zealand and the United States) do not

---

[8] The wording of this variable is not exactly the same in PIRLS, but it is measuring the same as in TIMSS.
[9] This previous question is R14 in PIRLS and M9A and S8A in TIMSS (from the teacher questionnaire): "How often do you usually assign (subject) homework to the students in this class?", with the options: "I do not assign (subject) homework", "Less than once a week", "1 or 2 times a week", "3 or 4 times a week" and "Every day".
[10] These countries are: Australia, Austria, Azerbaijan, Chinese Taipei, Croatia, Czech Republic, Denmark, England, Finland, Georgia, Germany, Hong Kong SAR, Hungary, Iran, Islamic Rep. Of, Ireland, Italy, Lithuania, Malta, Morocco, Netherlands, New Zealand, Northern Ireland, Norway, Oman, Poland, Portugal, Qatar, Romania, Russian Federation, Saudi Arabia, Singapore, Slovak Republic, Slovenia, Spain, Sweden, United Arab Emirates and the United States.

share a common sample of students for PIRLS and TIMSS, so they were not included[11]. Afterwards, Hong Kong SAR was not included because any of the teachers in PIRLS was in TIMSS. In order to perform the current identification strategy, we kept those students who were taught by the same teacher in the three subjects, what meant that we did not include in our analysis those countries whose sample was highly reduced by this criterion (less than one-third of the common PIRLS and TIMSS sample did not remain). This supposed eliminating Chinese Taipei (only 3.77% of the initial students remained), Italy (10.62%), Morocco (6.05%), Oman (0.94%), Qatar (9.62%), Saudi Arabia (0%) and United Arab Emirates (16.48%)[12]. Finally, those teachers with missing observations in the main homework time variable in any of the three subjects were not included in the analysis. Information about the percentage of the initial PIRLS and TIMSS common sample in the final sample for the used countries is presented in Table A1 – Appendix A. There are some cases in which students were taught by two teachers in the three subjects: in these cases, each teacher was considered as a separate observation, being this last sample (column (4) in Table A1, Appendix A) used for estimations of the base model – this model is described in the methodology section. Descriptive statistics for this last sample are presented in Table A2 – Appendix A.

3. Methodology

The identification strategy employed in the current research makes use of the heterogeneity in homework time within-students between-subjects to analyse its effect on the variability in students' academic achievement between-subjects, by the use of student fixed effects. It is important to highlight that PIRLS/TIMSS recommended practices to deal with its data have been applied[13] (Martin & Mullis, 2002) – authors as Jerrim, Lopez-Agudo, Marcenaro-Gutierrez, and Shure (2017) have highlighted the relevance of using the recommended practices by the organisers of International Large-Scale Assessment tests. We depart from the initial model:

$$Y_{its} = \alpha + \beta HT_{ts} + \gamma X_{its} + \delta T_{ts} + \varepsilon_{its} \qquad (1)$$

where i represents the student, t the teacher and s the school. Y_{its} is students' standardised academic achievement[14]; HT_{ts} the homework time reported by the teacher; X_{its} student characteristics which are the same within-students between-subjects; T_{ts} teacher characteristics which are the same within-teacher between-subjects.

---

[11] There is an exception: Spain, which extended its sample in PIRLS for the Autonomous Communities of Andalusia and Canary Islands (a total of 8,580 students), but not in TIMSS (4,183 students). Hence, only the observations of TIMSS were included for this country. This should not drive to sample problems, as the TIMSS's sample is representative.

[12] The percentages for the rest of the countries are: Australia (86.79%), Austria (90.69%), Azerbaijan (59.89%), Croatia (100%), Czech Republic (74.83%), Finland (90.84%), Georgia (65.06%), Germany (50.76%), Hungary (54.19%), Iran, Islamic Rep. Of (100%), Ireland (100%), Lithuania (97.67%), Malta (80.93%), Northern Ireland (96.34%), Norway (49.31%), Poland (100%), Portugal (100%), Romania (100%), Russian Federation (96.56%), Singapore (40.13%), Slovak Republic (60.29%), Slovenia (99.26%), Spain (100%) and Sweden (47.84%).

[13] Both PIRLS and TIMSS Jackknife and student weights have been applied, depending on the subject (PIRLS's weights for reading and TIMSS's weights for mathematics and science). The main results have been replicated using, alternatively, only PIRLS and TIMSS weights, and results do not change.

[14] Standardisation has been performed using each country's mean and standard deviation for each subject (Mullis, Martin, Foy, & Drucker, 2012; Mullis, Martin, Foy, & Arora, 2012; Martin, Mullis, Foy, & Stanco, 2012).

We estimate the model in (1) by the use of student fixed effects. To do this, we differentiate each variable within-students between-subjects and eliminate sub-indexes, obtaining the following model – our base model, from now on:

$$\Delta Y = \beta \Delta HT + \gamma \Delta X + \delta \Delta T + \Delta \varepsilon \qquad (2)$$

These Xs are the same within-students, so $\Delta X = 0$. As we are using students taught by the same teacher in the three subjects under analysis, this same happens for these Ts, which are the same within-teachers, so $\Delta T = 0$. This let us obtain β, which is the effect of homework time on students' academic achievement, as this homework time varies between subjects.

The current identification strategy relies upon two main pillars: first, the existence of variability in the homework time variable. This variability has been checked for each pair of subjects by country (analysing the cases in which the homework time reported by teachers is different between each pair of subjects), finding that for reading and mathematics between 28% and 70% of teachers reported different homework time (in the categorical homework time variable), with an average for all countries of 48%; in the case reading and science pair, between 44% and 83% reported different homework time (with an average for all countries of 61%); for the pair of mathematics and science, these figures range between 76% and 32%, with an average of 50% for all countries. Hence, it seems that there is an adequate amount of variability in homework time to perform this research.

The second pillar is the assumption that the effect of homework time is the same for the three subjects, i.e., β does not change between-subjects, so students' education production function for homework time is the same for the three subjects. Some authors like Metzler and Woessmann (2012) or Cattaneo, Oggenfuss, and Wolter (2017) – based on the previous ones – proposed to check this by the use of an equality test of the observable and unobservable effects between-subjects of the variable under analysis. We consider that these tests, although being useful, impose many other restrictions – as, e.g., relying on estimations with omitted variables, so we cannot control by every variable explaining students' academic achievement – which are similar or even stronger to the departing one consisting of the effect of β being the same for all subjects. Because of that, we are cautious and stick to interpreting β as the effect of homework time on students' academic achievement, but not as a causal effect. Nevertheless, we checked this equality of the homework time effect between subjects in the robustness checks' section by restricting our estimations only to those students who indicated that they like the three subjects at the same level and, alternatively, to those students who are confident at the same level in the three subjects. Additional robustness checks have supported the results obtained by the base model.

4. Results

4.1. Main results

The main results of our analysis are presented in Table 1. The homework time variable has been expressed in a quasi-continuous way and its unit of measurement is a ten-minute change in homework time[15].

---

[15] Concretely, the homework time variable has been translated into a ten-minute quasi-continuous variable in the following way: "I do not assign (subject) homework" is 0 ten-minutes, "15 minutes or less" is 0.75, "16-30 minutes" is 2.3, "31-60 minutes" is 4.55 and "More than 60 minutes" is 6. Alternatively, all the estimations and robustness checks performed in the current research have been replicated using for the "More than 60 minutes" category the values of 7.5 and 9, and results do not change. These estimations are available from authors upon request.

Table 1. Effect of assigned homework time on students' academic achievement

Countries	Assigned homework time		Subject: Reading (Ref.: Science)		Subject: Mathematics (Ref.: Science)		Constant		Observations	R-squared
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Australia	-0.004	0.010	-0.001	0.027	0.011	0.030	0.013	0.052	10,407	0.843
Austria	0.019	0.013	-0.001	0.031	-0.026	0.034	-0.033	0.048	11,781	0.810
Azerbaijan	0.016	0.018	-0.052	0.056	0.008	0.024	0.080	0.086	7,956	0.737
Croatia	-0.009	0.010	0.004	0.033	0.008	0.027	0.023	0.038	13,254	0.790
Czech Republic	-0.005	0.013	-0.013	0.027	-0.007	0.021	0.039	0.047	9,813	0.810
Finland	0.017	0.019	-0.023	0.039	-0.009	0.037	-0.031	0.055	11,850	0.775
Georgia	0.024**	0.009	0.003	0.031	-0.009	0.039	-0.045	0.058	8,727	0.825
Germany	0.007	0.017	0.018	0.034	0.001	0.047	-0.048	0.058	5,688	0.812
Hungary	-0.007	0.011	0.009	0.028	0.007	0.030	-0.014	0.075	7,521	0.863
Iran, Islamic Rep. Of	0.002	0.007	0.003	0.022	-0.005	0.018	-0.017	0.039	16,305	0.844
Ireland	0.002	0.017	-0.008	0.033	0.002	0.032	0.015	0.038	12,939	0.823
Lithuania	0.022**	0.010	-0.020	0.026	-0.013	0.018	-0.025	0.044	13,206	0.831
Malta	0.010	0.009	-0.020	0.024	-0.006	0.018	-0.058**	0.028	7,668	0.814
Northern Ireland	0.008	0.009	0.009	0.042	0.001	0.032	0.012	0.043	8,037	0.830
Norway	-0.019	0.015	0.050	0.040	0.050	0.033	0.005	0.059	4,233	0.790
Poland	0.001	0.011	-0.006	0.025	0.003	0.025	0.001	0.039	14,442	0.830
Portugal	-0.003	0.016	0.001	0.033	0.007	0.017	0.007	0.073	11,409	0.806
Romania	-0.014	0.010	0.025	0.039	0.015	0.026	0.042	0.055	13,476	0.847
Russian Federation	0.011	0.014	-0.018	0.031	-0.007	0.026	-0.037	0.065	12,822	0.796
Singapore	-0.004	0.008	-0.019	0.021	0.005	0.015	0.065	0.065	6,939	0.850
Slovak Republic	-0.017	0.018	0.036	0.027	0.002	0.022	0.000	0.071	9,675	0.846
Slovenia	-0.006	0.012	0.002	0.032	-0.001	0.025	0.016	0.038	12,738	0.836
Spain	0.003	0.016	-0.048	0.044	-0.010	0.031	0.004	0.052	10,608	0.806
Sweden	-0.020	0.015	0.007	0.056	0.018	0.038	0.005	0.061	4,680	0.780

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. The "Assigned homework time" variable is measured in ten-minutes. "Coeff." stands for "Coefficient" and "S.E." for "Standard error".
Estimation method: Student fixed effects.
Dependent variable: PIRLS/TIMSS standardised five plausible values.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

The obtained results show that it seems that there is not any effect of homework time on students' academic achievement for most of the analysed countries. Particularly, in the cases of Georgia and Lithuania, they show a significant effect of 0.022 and 0.024 standard deviations (SDs) of every 10-minute increase in homework time, respectively. Nevertheless, although this is a significant effect, when put in the context of PIRLS and TIMSS[16] (in which scores have an average of 500 and standard deviation of 100), 1-hour increase in homework time would mean an increase of 0.132 and 0.144 SDs, respectively, which is relatively small. Hence, the main results of this analysis would indicate that homework time does not have effect on students' academic achievement. These estimations have been replicated by the use of the original categorical homework time variable (Table A3, Appendix A) and, alternatively, including all countries in the same regression, interacting them with homework time[17], as results do not change.

4.2. Robustness checks

The first robustness check aims at checking whether the identification strategy of using student fixed effects is appropriate, as described in the methodology section. To do this, we have restricted the sample to those students who reported that they liked learning the three subjects in the same level and, in another specification, students who were

---

[16] Particularly, in the case of the countries with significant effect of homework their SDs are lower than 100: Georgia has a standard deviation of 76 in reading, 90 in mathematics and 87 in science and, for Lithuania, these figures are 66, 74 and 68, respectively (Mullis, Martin, Foy, & Drucker, 2012; Mullis, Martin, Foy, & Arora, 2012; Martin, Mullis, Foy, & Stanco, 2012).

[17] These estimations will be provided by authors upon request.

confident in the same level about the three subjects. This is measured by the "Students like learning the subject scale"[18] and "Students confident in the subject scale"[19] indexes provided by PIRLS and TIMSS, for the three subjects, with categories "Like learning the subject", "Somewhat like learning the subject" or "Do not like learning the subject" for the first index and "Confident", "Somewhat confident" or "Not confident" for the second one (Martin, & Mullis, 2002); hence, those students who reported the same category in the three subjects were kept.

The results for the sample of students who like learning the three subjects in the same level are presented in Table A4 and for those who are confident in the same level on the three subjects are presented in Table A5 (both in Appendix A). As happened with the main results, homework time does not seem to be significant and, when it does, the effect is relatively small[20].

Another set of robustness checks has been performed employing the remaining homework-related variables in the teacher questionnaire[21]: the weekly homework frequency variable described in the Data section and other three homework control variables[22]. These variables have been interacted with the homework time variable, and their results have been presented in Tables A6-A9 – Appendix A – (for frequency of homework, correcting assignments and giving feedback, discussing the homework in class and monitoring whether or not the homework was completed, respectively). This robustness check has been performed due to, as it was indicated by Trautwein (2007), homework time can be decomposed into homework-related variables (e.g., frequency) as taking only homework time variable may show and aggregated effect of all of them

---

[18] It was created by IEA using the questions of the student questionnaire for each subject: "I enjoy learning [the subject]", "I wish I did not have to study [the subject]", "[the subject] is boring", "I learn many interesting things in [the subject]" and "I like [the subject]", being [the subject] mathematics or science. For reading, the questions were "I read only if I have to", "I like talking about what I read with other people", "I would be happy if someone gave me a book as a present", "I think reading is boring", "I would like to have more time for reading" and "I enjoy reading". Students could answer to these questions if they "Agree a lot", "Agree a little", "Disagree a little" or "Disagree a lot". Additionally, for reading, the answers to the question "How often do you do these things outside of school?": "I read for fun" and "I read things that I choose myself", with answers "Every day or almost every day", "Once or twice per week", "Once or twice a month" or "Never or almost never" were used to create the reading index.

[19] It was created by IEA using the questions of the student questionnaire for each subject: "I usually do well in [the subject]", "[the subject] is harder for me than for many of my classmates", "I am just not good at [the subject]", "I learn things quickly in [the subject]", "I am good at working out difficult [the subject] problems" (question only for mathematics), "My teacher tells me I am good at [the subject]" and "[the subject] is harder for me than any other subject", being [the subject] mathematics or science. For reading, the questions were "I usually do well in reading", "Reading is easy for me", "Reading is harder for me than for many of my classmates", "If a book is interesting, I don't care how hard it is to read", "I have trouble reading stories with difficult words", "My teacher tells me I am a good reader" and "Reading is harder for me than any other subject". Students could answer to these questions if they "Agree a lot", "Agree a little", "Disagree a little" or "Disagree a lot".

[20] Furthermore, these estimations were also replicated using the whole sample of countries and interacting homework time with countries, and results hold. These estimations will be provided by authors upon request.

[21] Whenever a teacher presented a missing observation in any of the three subjects' robustness check homework variables he/she was not included for the specific robustness check using that variable.

[22] These variables are those in R16 in PIRLS and M9C and S8C in TIMSS: "How often do you do the following with the (subject) homework assignments for this class?", being the three variables "Correct assignments and give feedback to students", "Discuss the homework in class" and "Monitor whether or not the homework was completed". The answers to these variables are "Always or almost always", "Sometimes" and "Never or almost never".

causing a null effect, as we obtained. However, once, again, our main results do not change.

5. Conclusions

The main results of the current analysis have shown that homework time does not seem to affect students' academic achievement in the case of the countries under analysis. This conclusion, although being very strong, has been corroborated by many robustness checks. As previously highlighted, homework research is far from conclusive: it has indicated that a positive or null correlation seems to be happening between homework time and academic achievement, but empirical evidence further than correlation is needed. The current research has worked on this issue using a student fixed effects identification strategy and has shown that, although homework might be different across countries, it seems that fourth grade students do no benefit from it. Furthermore, it has highlighted the relevance of studying the particular case of each country, as a quick look on the heterogeneous amount of assigned homework in each of them and their students' academic achievement may anticipate biased conclusions.

In order to interpret this "null" result it is also relevant to consider that PIRLS and TIMSS measure students' skills or competencies in the three subjects, and not content-based knowledge of students (Kohn, 2006), meaning that these competences are the actual skills that students will be using in the labour market. Thus, the quality of the homework that fourth grade students are performing in the analysed countries does not seem to be enough to develop students' competencies. This could motivate the implementation of two policies: the first one, to increase the quality of this homework, so that fourth grade students can improve their learning at a competence level; the second one, to provide students with the necessary formation in the classroom so that they do not need to devote so much time at home to studying. Hence, these two policies would provide students with few but high quality homework, which may increase their academic achievement. Furthermore, these policies could help students to have more time for extra-curricular activities which can develop other of their skills or to have more leisure time.

To conclude, this research has shown that, in spite of the relevance that society is placing nowadays in getting competitive and productive workers by loads of homework and study hours since early ages, children also need to enjoy their childhood: they will only have one.

References

Baş, G., Şentürk, C., & Ciğerci, F. M. (2017). Homework and academic achievement: A meta-analytic review of research. *Issues in Educational Research, 27*(1), 31–50.

Cattaneo, M. A., Oggenfuss, C., & Wolter, S. C. (2017). The more, the better? The impact of instructional time on student performance. *Education Economics*, 25(5), 433–445. doi: 10.1080/09645292.2017.1315055

Cooper, H. (2001). *The Battle Over Homework: Common Ground for Administrators, Teachers, and Parents*. Thousand Oaks: Corwin Press.

Cooper, H., Robinson, J. C., & Patall, E. A. (2006). Does Homework Improve Academic Achievement? A Synthesis of Research, 1987–2003. *Review of Educational Research, 76*(1), 1–62. doi: 10.3102/00346543076001001

Corno, L., & Xu, J. (2004). Homework as the Job of Childhood. *Theory into practice, 43*(3), 227–233. doi: 10.1207/s15430421tip4303_9

Dettmers, S., Trautwein, U., & Lüdtke, O. (2009). The relationship between homework time and achievement is not universal: evidence from multilevel analyses in 40 countries. *School Effectiveness and School Improvement, An international Journal of Research, Policy and Practice, 20*(4), 375–405. doi: 10.1080/09243450902904601

Eren, O., & Henderson, D. J. (2011). Are we wasting our children's time by giving them more homework? *Economics of Education Review, 30*(5), 950–961. doi: 10.1016/j.econedurev.2011.03.011

Falch, T., & Rønning, M. (2012). *Homework assignment and student achievement in OECD countries*. Discussion Papers No. 711, Statistics Norway, Research Department.

Jerrim, J., Lopez-Agudo, L. A., Marcenaro-Gutierrez, O. D., & Shure, N. (2017). What happens when econometrics and psychometrics collide? An example using the PISA data. *Economics of Education Review, 61*, 51–58. doi: 10.1016/j.econedurev.2017.09.007

Kohn, A. (2006). Does Homework Improve Learning? A fresh look at the evidence, in Da Capo Press (Ed.) *The Homework Myth: Why Our Kids Get Too Much of a Bad Thing* (pp. 25–48). Cambridge, MA: Da Capo Life Long.

Martin, M. O., & Mullis, I. V. S. (2002). *Methods and procedures in TIMSS and WPIRLS 2011*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Martin, M. O., Mullis, I. V. S., Foy, P., & Stanco, G. M. (2012). *TIMSS 2011 International Results in Science*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Metzler, J., & Woessmann, L. (2012). The impact of teacher subject knowledge on student achievement: Evidence from within-teacher within-student variation. *Journal of Development Economics, 99*(2), 486–496. doi: 10.1016/j.jdeveco.2012.06.002

Mullis, I. V. S., Martin, M. O., Foy, P., & Arora, A. (2012). *TIMSS 2011 International Results in Mathematics*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Mullis, I. V. S., Martin, M. O., Foy, P., & Drucker, K. T. (2012). *PIRLS 2011 International Results in Reading*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Murillo, F. J., & Martinez-Garrido, C. (2014). Homework and primary-school students' academic achievement in Latin America. *International Review of Education, 60*(5), 661–681. doi: 10.1007/s11159-014-9440-2

OECD (2014a). *Does homework perpetuate inequities in education?* PISA, OECD Publishing. doi: 10.1787/5jxrhqhtx2xt-en

OECD (2014b). *PISA 2012 Results: What Students Know and Can Do – Student Performance in Mathematics, Reading and Science (Volume I, Revised edition, February 2014)*. PISA, OECD Publishing. doi: 10.1787/9789264208780-en

OECD (2017). *PISA 2015 Technical Report*. PISA, OECD Publishing. Retrieved from http://www.oecd.org/pisa/data/2015-technical-report/

Trautwein, U. (2007). The homework-achievement relation reconsidered: Differentiating homework time, homework frequency, and homework effort. *Learning and Instruction, 17*(3), 372–388. doi: 10.1016/j.learninstruc.2007.02.009

Trautwein, U., & Köller, O. (2003). The Relationship Between Homework and Achievement—Still Much of a Mystery. *Educational Psychology Review, 15(2), 115-145. doi:* 10.1023/A:1023460414243

Appendix A

Table A1. Percentage of students of the initial common PIRLS and TIMSS sample in the final sample, and their teachers

Country	Initial sample (1)	Final sample (2)	Percentage of the initial sample in the final sample (3)	Final sample with different teachers as individuals (4)
Australia	5,943	3,364	56.60%	3,469
Austria	4,587	3,927	85.61%	3,927
Azerbaijan	4,871	2,652	54.44%	2,652
Croatia	4,545	4,418	97.21%	4,418
Czech Republic	4,433	3,271	73.79%	3,271
Finland	4,541	3,914	86.19%	3,950
Georgia	4,774	2,909	60.93%	2,909
Germany	3,928	1,836	46.74%	1,896
Hungary	5,149	2,507	48.69%	2,507
Iran, Islamic Rep. Of	5,734	5,435	94.79%	5,435
Ireland	4,383	4,313	98.40%	4,313
Lithuania	4,584	4,402	96.03%	4,402
Malta	3,492	2,556	73.20%	2,556
Northern Ireland	3,469	2,679	77.23%	2,679
Norway	3,054	1,411	46.20%	1,411
Poland	4,962	4,814	97.02%	4,814
Portugal	3,991	3,803	95.29%	3,803
Romania	4,643	4,428	95.37%	4,492
Russian Federation	4,450	4,274	96.04%	4,274
Singapore	6,208	2,313	37.26%	2,313
Slovak Republic	5,561	3,214	57.80%	3,225
Slovenia	4,433	4,246	95.78%	4,246
Spain	4,105	3,536	86.14%	3,536
Sweden	4,482	1,519	33.89%	1,560
Total	110,322	81,741	74.09%	82,058

Notes:
(1) Common PIRLS and TIMSS students' initial sample.
(2) Final sample of students after keeping teachers who teach the three subjects and without missings in the homework time variable for the three subjects.
(3) Percentage of students from the initial sample in the final sample [(2)/(1)]*100.
(4) Student observations of the final sample in (2) after considering students taught by two teachers in the three subjects as two students.
Source: Authors' own calculations.

Table A2. Descriptive statistics

			Australia			Austria			Azerbaijan			Croatia			Czech Republic			Finland			Georgia			Germany		
			Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.
Scores		Reading	3,469	527.218	3.734	3,927	528.671	2.082	2,652	468.131	5.238	4,418	553.200	1.866	3,271	545.916	2.661	3,950	566.799	2.167	2,909	490.971	3.816	1,896	539.739	3.344
		Mathematics	3,469	517.530	4.481	3,927	507.205	2.977	2,652	475.201	8.958	4,418	490.421	1.920	3,271	512.676	3.352	3,950	544.161	3.232	2,909	451.610	5.047	1,896	526.292	3.180
		Science	3,469	516.838	4.220	3,927	530.901	3.205	2,652	449.195	8.381	4,418	516.271	2.107	3,271	538.228	3.196	3,950	569.762	2.772	2,909	456.597	4.772	1,896	525.382	3.954
Sex of the student		Male	3,469	0.513	0.012	3,927	0.523	0.012	2,652	0.538	0.010	4,418	0.505	0.008	3,271	0.532	0.014	3,950	0.516	0.008	2,909	0.516	0.010	1,896	0.537	0.014
		Female	3,469	0.487	0.012	3,927	0.477	0.012	2,652	0.462	0.010	4,418	0.495	0.008	3,271	0.468	0.014	3,950	0.484	0.008	2,909	0.484	0.010	1,896	0.463	0.014
Highest level of education completed by the child's father (or stepfather or male guardian)		Beyond <ISCED Level 5A, first degree>	1,768	0.126	0.013	3,555	0.143	0.011	2,272	0.054	0.006	4,047	0.015	0.002	3,043	0.154	0.012	3,544	0.157	0.014	2,308	0.134	0.011	1,364	0.133	0.016
		<ISCED Level 5A, first degree>	1,768	0.159	0.013	3,555	0.020	0.003	2,272	0.161	0.013	4,047	0.099	0.007	3,043	0.032	0.006	3,544	0.111	0.008	2,308	0.190	0.012	1,364	0.074	0.008
		<ISCED Level 5B>	1,768	0.133	0.012	3,555	0.122	0.007	2,272	0.000	0.000	4,047	0.083	0.007	3,043	0.008	0.002	3,544	0.185	0.011	2,308	0.200	0.011	1,364	0.257	0.012
		<ISCED Level 4>	1,768	0.272	0.013	3,555	0.013	0.002	2,272	0.227	0.013	4,047	0.132	0.006	3,043	0.026	0.003	3,544	0.059	0.006	2,308	0.144	0.011	1,364	0.000	0.000
		<ISCED Level 3>	1,768	0.178	0.011	3,555	0.639	0.010	2,272	0.385	0.016	4,047	0.552	0.012	3,043	0.746	0.014	3,544	0.383	0.020	2,308	0.288	0.016	1,364	0.077	0.007
		<ISCED Level 2>	1,768	0.122	0.013	3,555	0.052	0.005	2,272	0.130	0.015	4,047	0.112	0.009	3,043	0.033	0.005	3,544	0.100	0.008	2,308	0.039	0.007	1,364	0.416	0.019
		Some <ISCED Level 1 or 2>	1,768	0.008	0.002	3,555	0.008	0.002	2,272	0.034	0.006	4,047	0.005	0.002	3,043	0.001	0.001	3,544	0.005	0.002	2,308	0.002	0.001	1,364	0.040	0.005
		Did not go to school	1,768	0.002	0.001	3,555	0.003	0.001	2,272	0.009	0.002	4,047	0.002	0.001	3,043	0.000	0.000	3,544	0.000	0.000	2,308	0.003	0.002	1,364	0.003	0.002
Highest level of education completed by the child's mother (or stepmother or female guardian)		Beyond <ISCED Level 5A, first degree>	1,799	0.101	0.012	3,617	0.101	0.009	2,190	0.041	0.008	4,106	0.019	0.003	3,056	0.127	0.010	3,589	0.179	0.013	2,430	0.148	0.012	1,379	0.096	0.014
		<ISCED Level 5A, first degree>	1,799	0.237	0.017	3,617	0.023	0.003	2,190	0.115	0.010	4,106	0.115	0.009	3,056	0.021	0.003	3,589	0.141	0.007	2,430	0.185	0.011	1,379	0.057	0.008
		<ISCED Level 5B>	1,799	0.167	0.011	3,617	0.085	0.005	2,190	0.000	0.000	4,106	0.090	0.005	3,056	0.021	0.003	3,589	0.262	0.011	2,430	0.183	0.010	1,379	0.259	0.014
		<ISCED Level 4>	1,799	0.176	0.012	3,617	0.076	0.005	2,190	0.210	0.014	4,106	0.077	0.005	3,056	0.070	0.006	3,589	0.041	0.005	2,430	0.166	0.010	1,379	0.000	0.000
		<ISCED Level 3>	1,799	0.232	0.017	3,617	0.624	0.011	2,190	0.407	0.019	4,106	0.570	0.012	3,056	0.714	0.013	3,589	0.311	0.014	2,430	0.244	0.016	1,379	0.111	0.011
		<ISCED Level 2>	1,799	0.078	0.011	3,617	0.077	0.007	2,190	0.168	0.016	4,106	0.124	0.011	3,056	0.046	0.007	3,589	0.063	0.006	2,430	0.068	0.009	1,379	0.444	0.022
		Some <ISCED Level 1 or 2>	1,799	0.006	0.003	3,617	0.011	0.002	2,190	0.040	0.007	4,106	0.003	0.001	3,056	0.001	0.001	3,589	0.002	0.001	2,430	0.003	0.002	1,379	0.029	0.005
		Did not go to school	1,799	0.003	0.002	3,617	0.003	0.001	2,190	0.019	0.008	4,106	0.002	0.001	3,056	0.000	0.000	3,589	0.001	0.000	2,430	0.003	0.001	1,379	0.004	0.002
Reading	Frequency assigning reading homework to the students in the class	Every day	3,237	0.591	0.044	3,814	0.295	0.036	2,493	0.720	0.047	4,378	0.407	0.033	3,271	0.125	0.031	3,897	0.355	0.044	2,794	0.411	0.052	1,876	0.203	0.042
		3 or 4 times a week	3,237	0.203	0.037	3,814	0.265	0.031	2,493	0.069	0.025	4,378	0.305	0.034	3,271	0.237	0.045	3,897	0.415	0.039	2,794	0.152	0.038	1,876	0.157	0.033
		1 or 2 times a week	3,237	0.170	0.034	3,814	0.343	0.035	2,493	0.125	0.033	4,378	0.234	0.030	3,271	0.410	0.050	3,897	0.209	0.027	2,794	0.347	0.050	1,876	0.486	0.052
		Less than once a week	3,237	0.020	0.012	3,814	0.091	0.020	2,493	0.086	0.024	4,378	0.034	0.013	3,271	0.204	0.037	3,897	0.016	0.009	2,794	0.080	0.028	1,876	0.135	0.039
		I do not assign mathematics homework	3,237	0.016	0.008	3,814	0.006	0.004	2,493	0.000	0.000	4,378	0.020	0.011	3,271	0.024	0.017	3,897	0.005	0.005	2,794	0.010	0.007	1,876	0.019	0.014
	Minutes of reading homework usually assigned by the teacher to an average student in the class	More than 60 minutes	3,469	0.021	0.014	3,927	0.000	0.000	2,652	0.351	0.052	4,418	0.026	0.010	3,271	0.000	0.000	3,950	0.000	0.000	2,909	0.119	0.030	1,896	0.000	0.000
		31–60 minutes	3,469	0.042	0.022	3,927	0.008	0.006	2,652	0.236	0.050	4,418	0.247	0.030	3,271	0.056	0.021	3,950	0.127	0.025	2,909	0.342	0.041	1,896	0.017	0.013
		16–30 minutes	3,469	0.482	0.050	3,927	0.453	0.038	2,652	0.322	0.047	4,418	0.572	0.037	3,271	0.680	0.047	3,950	0.588	0.032	2,909	0.480	0.043	1,896	0.526	0.052
		15 minutes or less	3,469	0.440	0.051	3,927	0.533	0.037	2,652	0.091	0.025	4,418	0.136	0.023	3,271	0.240	0.043	3,950	0.280	0.034	2,909	0.049	0.024	1,896	0.438	0.050
		I do not assign mathematics homework	3,469	0.015	0.008	3,927	0.006	0.004	2,652	0.000	0.000	4,418	0.019	0.011	3,271	0.024	0.017	3,950	0.005	0.005	2,909	0.010	0.007	1,896	0.019	0.013
	Frequency correcting reading assignments and giving feedback to students	Always or almost always	3,436	0.707	0.041	3,815	0.757	0.032	2,533	0.851	0.037	4,368	0.753	0.031	3,235	0.869	0.034	3,753	0.227	0.037	2,738	0.736	0.036	1,825	0.400	0.056
		Sometimes	3,436	0.204	0.033	3,815	0.208	0.030	2,533	0.149	0.037	4,368	0.227	0.028	3,235	0.106	0.030	3,753	0.708	0.038	2,738	0.254	0.035	1,825	0.534	0.054
		Never or almost never	3,436	0.074	0.021	3,815	0.029	0.011	2,533	0.000	0.000	4,368	0.000	0.000	3,235	0.000	0.000	3,753	0.060	0.017	2,738	0.000	0.000	1,825	0.047	0.023
		I do not assign mathematics homework	3,436	0.015	0.008	3,815	0.006	0.004	2,533	0.000	0.000	4,368	0.020	0.011	3,235	0.025	0.017	3,753	0.005	0.005	2,738	0.010	0.008	1,825	0.019	0.014
	Frequency discussing the reading homework in class	Always or almost always	3,418	0.674	0.042	3,894	0.647	0.031	2,507	0.730	0.043	4,340	0.700	0.028	3,182	0.517	0.042	3,941	0.778	0.030	2,825	0.749	0.049	1,889	0.717	0.045
		Sometimes	3,418	0.254	0.041	3,894	0.306	0.033	2,507	0.249	0.038	4,340	0.277	0.029	3,182	0.458	0.043	3,941	0.212	0.030	2,825	0.241	0.049	1,889	0.246	0.041
		Never or almost never	3,418	0.057	0.020	3,894	0.041	0.013	2,507	0.021	0.021	4,340	0.003	0.003	3,182	0.000	0.000	3,941	0.005	0.005	2,825	0.000	0.000	1,889	0.018	0.018
		I do not assign mathematics homework	3,418	0.015	0.008	3,894	0.006	0.004	2,507	0.000	0.000	4,340	0.020	0.011	3,182	0.025	0.017	3,941	0.005	0.005	2,825	0.010	0.007	1,889	0.019	0.013
	Frequency monitoring whether or not the reading homework was completed	Always or almost always	3,428	0.933	0.017	3,847	0.909	0.020	2,476	0.949	0.020	4,365	0.940	0.019	3,145	0.962	0.021	3,892	0.941	0.020	2,724	0.952	0.017	1,866	0.866	0.041
		Sometimes	3,428	0.047	0.014	3,847	0.068	0.018	2,476	0.051	0.020	4,365	0.040	0.015	3,145	0.001	0.001	3,892	0.049	0.018	2,724	0.032	0.014	1,866	0.115	0.039
		Never or almost never	3,428	0.005	0.003	3,847	0.017	0.009	2,476	0.000	0.000	4,365	0.000	0.000	3,145	0.012	0.012	3,892	0.005	0.005	2,724	0.006	0.006	1,866	0.000	0.000
		I do not assign mathematics homework	3,428	0.015	0.008	3,847	0.006	0.004	2,476	0.000	0.000	4,365	0.020	0.011	3,145	0.025	0.017	3,892	0.005	0.005	2,724	0.010	0.008	1,866	0.019	0.014
Mathematics	Frequency assigning mathematics homework to the students in the class	Every day	3,237	0.226	0.043	3,814	0.423	0.034	2,493	0.763	0.042	4,378	0.413	0.037	3,271	0.041	0.016	3,897	0.202	0.032	2,794	0.911	0.029	1,876	0.800	0.039
		3 or 4 times a week	3,237	0.160	0.039	3,814	0.452	0.039	2,493	0.183	0.038	4,378	0.550	0.036	3,271	0.266	0.044	3,897	0.776	0.031	2,794	0.069	0.026	1,876	0.166	0.039
		1 or 2 times a week	3,237	0.468	0.052	3,814	0.117	0.025	2,493	0.019	0.011	4,378	0.024	0.008	3,271	0.653	0.048	3,897	0.022	0.011	2,794	0.020	0.012	1,876	0.028	0.016
		Less than once a week	3,237	0.074	0.020	3,814	0.001	0.001	2,493	0.030	0.014	4,378	0.010	0.009	3,271	0.034	0.019	3,897	0.000	0.000	2,794	0.000	0.000	1,876	0.000	0.000
		I do not assign mathematics homework	3,237	0.072	0.018	3,814	0.007	0.007	2,493	0.005	0.005	4,378	0.003	0.003	3,271	0.006	0.006	3,897	0.000	0.000	2,794	0.000	0.000	1,876	0.006	0.006
	Minutes of mathematics	More than 60 minutes	3,469	0.000	0.000	3,927	0.000	0.000	2,652	0.049	0.024	4,418	0.000	0.000	3,271	0.000	0.000	3,950	0.000	0.000	2,909	0.063	0.022	1,896	0.000	0.000
		31–60 minutes	3,469	0.080	0.025	3,927	0.145	0.025	2,652	0.108	0.033	4,418	0.213	0.032	3,271	0.011	0.011	3,950	0.017	0.011	2,909	0.308	0.050	1,896	0.160	0.041

Subject	Question	Response	N	Est	SE	N	Est	SE	N	Est	SE	N	Est	SE	N	Est	SE	N	Est	SE	N	Est	SE	N	Est	SE
	homework usually assigned by the teacher to an average student in the class	16–30 minutes	3,469	0.396	0.052	3,927	0.789	0.028	2,652	0.449	0.048	4,418	0.699	0.036	3,271	0.470	0.047	3,950	0.544	0.038	2,909	0.514	0.049	1,896	0.779	0.043
		15 minutes or less	3,469	0.455	0.044	3,927	0.059	0.020	2,652	0.390	0.045	4,418	0.085	0.019	3,271	0.513	0.049	3,950	0.439	0.038	2,909	0.115	0.032	1,896	0.055	0.025
		I do not assign mathematics homework	3,469	0.069	0.016	3,927	0.007	0.007	2,652	0.004	0.004	4,418	0.003	0.003	3,271	0.006	0.006	3,950	0.000	0.000	2,909	0.000	0.000	1,896	0.006	0.006
	Frequency correcting mathematics assignments and giving feedback to students	Always or almost always	3,436	0.783	0.039	3,815	0.952	0.013	2,533	0.847	0.040	4,368	0.686	0.036	3,235	0.921	0.027	3,753	0.277	0.042	2,738	0.729	0.040	1,825	0.542	0.054
		Sometimes	3,436	0.097	0.025	3,815	0.041	0.011	2,533	0.148	0.040	4,368	0.311	0.037	3,235	0.073	0.026	3,753	0.546	0.041	2,738	0.259	0.039	1,825	0.429	0.054
		Never or almost never	3,436	0.051	0.021	3,815	0.000	0.000	2,533	0.000	0.000	4,368	0.000	0.000	3,235	0.000	0.000	3,753	0.177	0.021	2,738	0.012	0.008	1,825	0.022	0.015
		I do not assign mathematics homework	3,436	0.069	0.016	3,815	0.007	0.007	2,533	0.005	0.005	4,368	0.003	0.003	3,235	0.006	0.006	3,753	0.000	0.000	2,738	0.007	0.007	1,825	0.007	0.007
	Frequency discussing the mathematics homework in class	Always or almost always	3,418	0.714	0.039	3,894	0.555	0.037	2,507	0.726	0.047	4,340	0.696	0.035	3,182	0.429	0.040	3,941	0.741	0.044	2,825	0.746	0.040	1,889	0.766	0.041
		Sometimes	3,418	0.196	0.031	3,894	0.413	0.039	2,507	0.269	0.046	4,340	0.298	0.035	3,182	0.565	0.041	3,941	0.247	0.047	2,825	0.247	0.039	1,889	0.217	0.038
		Never or almost never	3,418	0.020	0.012	3,894	0.025	0.011	2,507	0.000	0.000	4,340	0.003	0.003	3,182	0.000	0.000	3,941	0.012	0.006	2,825	0.007	0.007	1,889	0.011	0.011
		I do not assign mathematics homework	3,418	0.070	0.017	3,894	0.007	0.007	2,507	0.005	0.005	4,340	0.003	0.003	3,182	0.006	0.006	3,941	0.000	0.000	2,825	0.000	0.000	1,889	0.006	0.006
	Frequency monitoring whether or not the mathematics homework was completed	Always or almost always	3,428	0.888	0.022	3,847	0.980	0.011	2,476	0.928	0.024	4,365	0.972	0.011	3,145	0.972	0.013	3,892	0.957	0.016	2,724	0.957	0.018	1,866	0.908	0.029
		Sometimes	3,428	0.022	0.009	3,847	0.006	0.006	2,476	0.067	0.023	4,365	0.025	0.010	3,145	0.010	0.009	3,892	0.043	0.016	2,724	0.037	0.017	1,866	0.086	0.028
		Never or almost never	3,428	0.020	0.012	3,847	0.007	0.005	2,476	0.000	0.000	4,365	0.000	0.000	3,145	0.012	0.012	3,892	0.000	0.000	2,724	0.006	0.006	1,866	0.000	0.000
		I do not assign mathematics homework	3,428	0.070	0.017	3,847	0.007	0.007	2,476	0.005	0.005	4,365	0.003	0.003	3,145	0.006	0.006	3,892	0.000	0.000	2,724	0.000	0.000	1,866	0.006	0.006
Science	Frequency assigning science homework to the students in the class	Every day	3,237	0.000	0.000	3,814	0.000	0.000	2,493	0.169	0.041	4,378	0.039	0.013	3,271	0.000	0.000	3,897	0.042	0.025	2,794	0.086	0.029	1,876	0.010	0.010
		3 or 4 times a week	3,237	0.000	0.000	3,814	0.004	0.004	2,493	0.006	0.006	4,378	0.214	0.031	3,271	0.002	0.002	3,897	0.311	0.034	2,794	0.391	0.048	1,876	0.011	0.011
		1 or 2 times a week	3,237	0.045	0.020	3,814	0.116	0.026	2,493	0.734	0.049	4,378	0.681	0.039	3,271	0.188	0.037	3,897	0.602	0.047	2,794	0.446	0.052	1,876	0.343	0.048
		Less than once a week	3,237	0.348	0.049	3,814	0.608	0.037	2,493	0.086	0.030	4,378	0.062	0.017	3,271	0.755	0.041	3,897	0.040	0.015	2,794	0.070	0.031	1,876	0.500	0.051
		I do not assign mathematics homework	3,237	0.607	0.051	3,814	0.272	0.034	2,493	0.005	0.005	4,378	0.004	0.003	3,271	0.055	0.025	3,897	0.005	0.005	2,794	0.007	0.007	1,876	0.136	0.037
	Minutes of science homework usually assigned by the teacher to an average student in the class	More than 60 minutes	3,469	0.028	0.017	3,927	0.000	0.000	2,652	0.034	0.020	4,418	0.002	0.002	3,271	0.003	0.002	3,950	0.000	0.000	2,909	0.044	0.019	1,896	0.000	0.000
		31–60 minutes	3,469	0.026	0.015	3,927	0.020	0.011	2,652	0.084	0.025	4,418	0.060	0.015	3,271	0.048	0.020	3,950	0.012	0.007	2,909	0.232	0.041	1,896	0.029	0.016
		16–30 minutes	3,469	0.115	0.033	3,927	0.221	0.030	2,652	0.626	0.050	4,418	0.627	0.032	3,271	0.411	0.045	3,950	0.559	0.039	2,909	0.536	0.046	1,896	0.375	0.054
		15 minutes or less	3,469	0.267	0.049	3,927	0.493	0.039	2,652	0.251	0.045	4,418	0.307	0.031	3,271	0.483	0.044	3,950	0.424	0.039	2,909	0.181	0.037	1,896	0.462	0.056
		I do not assign mathematics homework	3,469	0.564	0.052	3,927	0.266	0.032	2,652	0.005	0.005	4,418	0.004	0.003	3,271	0.055	0.025	3,950	0.005	0.005	2,909	0.007	0.007	1,896	0.134	0.036
	Frequency correcting science assignments and giving feedback to students	Always or almost always	3,436	0.320	0.045	3,815	0.622	0.035	2,533	0.751	0.043	4,368	0.665	0.037	3,235	0.783	0.040	3,753	0.244	0.028	2,738	0.699	0.044	1,825	0.420	0.054
		Sometimes	3,436	0.069	0.024	3,815	0.066	0.018	2,533	0.238	0.043	4,368	0.331	0.037	3,235	0.147	0.032	3,753	0.576	0.033	2,738	0.290	0.045	1,825	0.415	0.056
		Never or almost never	3,436	0.048	0.023	3,815	0.042	0.017	2,533	0.006	0.006	4,368	0.000	0.000	3,235	0.015	0.015	3,753	0.175	0.025	2,738	0.011	0.008	1,825	0.048	0.022
		I do not assign mathematics homework	3,436	0.563	0.052	3,815	0.270	0.033	2,533	0.005	0.005	4,368	0.004	0.003	3,235	0.055	0.025	3,753	0.005	0.005	2,738	0.005	0.005	1,825	0.117	0.035
	Frequency discussing the science homework in class	Always or almost always	3,418	0.314	0.051	3,894	0.600	0.032	2,507	0.730	0.050	4,340	0.746	0.032	3,182	0.783	0.042	3,941	0.875	0.027	2,825	0.706	0.048	1,889	0.741	0.043
		Sometimes	3,418	0.103	0.030	3,894	0.125	0.025	2,507	0.265	0.050	4,340	0.247	0.032	3,182	0.145	0.032	3,941	0.120	0.027	2,825	0.294	0.048	1,889	0.112	0.025
		Never or almost never	3,418	0.021	0.010	3,894	0.006	0.005	2,507	0.000	0.000	4,340	0.003	0.003	3,182	0.016	0.015	3,941	0.000	0.000	2,825	0.000	0.000	1,889	0.012	0.012
		I do not assign mathematics homework	3,418	0.562	0.052	3,894	0.269	0.032	2,507	0.005	0.005	4,340	0.004	0.003	3,182	0.056	0.025	3,941	0.005	0.005	2,825	0.000	0.000	1,889	0.135	0.036
	Frequency monitoring whether or not the science homework was completed	Always or almost always	3,428	0.387	0.054	3,847	0.691	0.032	2,476	0.920	0.027	4,365	0.937	0.017	3,145	0.901	0.032	3,892	0.957	0.017	2,724	0.941	0.021	1,866	0.776	0.039
		Sometimes	3,428	0.027	0.011	3,847	0.032	0.012	2,476	0.075	0.026	4,365	0.059	0.017	3,145	0.015	0.010	3,892	0.038	0.016	2,724	0.053	0.020	1,866	0.065	0.026
		Never or almost never	3,428	0.027	0.011	3,847	0.009	0.005	2,476	0.000	0.000	4,365	0.000	0.000	3,145	0.028	0.019	3,892	0.000	0.000	2,724	0.006	0.006	1,866	0.023	0.013
		I do not assign mathematics homework	3,428	0.559	0.052	3,847	0.268	0.033	2,476	0.005	0.005	4,365	0.004	0.003	3,145	0.056	0.026	3,892	0.005	0.005	2,724	0.000	0.000	1,866	0.136	0.037

Table A2. Descriptive statistics (continued I)

		Hungary			Iran, Islamic Rep. Of			Ireland			Lithuania			Malta			Northern Ireland			Norway			Poland		
		Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.
Scores	**Reading**	2,507	537.102	5.499	5,435	456.182	2.841	4,313	552.343	2.202	4,402	529.205	2.096	2,556	471.798	1.692	2,679	561.211	2.749	1,411	507.569	3.160	4,814	525.771	2.137
	Mathematics	2,507	513.337	6.714	5,435	429.635	3.441	4,313	528.690	2.680	4,402	534.345	2.669	2,556	492.983	1.415	2,679	564.911	3.515	1,411	495.597	4.305	4,814	481.416	2.196
	Science	2,507	532.031	6.207	5,435	451.860	3.716	4,313	517.504	3.330	4,402	515.484	2.637	2,556	441.320	2.195	2,679	518.244	3.109	1,411	492.965	3.458	4,814	505.204	2.592
Sex of the student	**Male**	2,507	0.525	0.012	5,435	0.509	0.029	4,313	0.506	0.022	4,402	0.517	0.008	2,556	0.480	0.006	2,679	0.501	0.016	1,411	0.469	0.014	4,814	0.518	0.009
	Female	2,507	0.475	0.012	5,435	0.491	0.029	4,313	0.494	0.022	4,402	0.483	0.008	2,556	0.520	0.006	2,679	0.499	0.016	1,411	0.531	0.014	4,814	0.482	0.009
Highest level of education completed by the child's father (or stepfather or male guardian)	**Beyond <ISCED Level 5A, first degree>**	2,194	0.075	0.013	5,085	0.031	0.004	3,800	0.093	0.006	3,753	0.098	0.008	1,939	0.068	0.005	1,368	0.118	0.013	1,205	0.077	0.011	4,430	0.137	0.011
	<ISCED Level 5A, first degree>	2,194	0.092	0.011	5,085	0.089	0.008	3,800	0.131	0.008	3,753	0.113	0.007	1,939	0.065	0.005	1,368	0.116	0.011	1,205	0.314	0.024	4,430	0.051	0.004
	<ISCED Level 5B>	2,194	0.018	0.003	5,085	0.042	0.004	3,800	0.173	0.007	3,753	0.048	0.003	1,939	0.051	0.004	1,368	0.099	0.010	1,205	0.092	0.009	4,430	0.000	0.000
	<ISCED Level 4>	2,194	0.039	0.004	5,085	0.015	0.002	3,800	0.124	0.007	3,753	0.234	0.010	1,939	0.048	0.005	1,368	0.016	0.004	1,205	0.196	0.015	4,430	0.037	0.003
	<ISCED Level 3>	2,194	0.185	0.012	5,085	0.237	0.010	3,800	0.194	0.010	3,753	0.388	0.011	1,939	0.145	0.007	1,368	0.331	0.017	1,205	0.234	0.023	4,430	0.225	0.007
	<ISCED Level 2>	2,194	0.423	0.021	5,085	0.253	0.009	3,800	0.189	0.010	3,753	0.101	0.009	1,939	0.573	0.011	1,368	0.128	0.012	1,205	0.081	0.012	4,430	0.481	0.012
	Some <ISCED Level 1 or 2>	2,194	0.166	0.021	5,085	0.267	0.012	3,800	0.093	0.007	3,753	0.017	0.003	1,939	0.044	0.006	1,368	0.190	0.013	1,205	0.005	0.002	4,430	0.068	0.006
	Did not go to school	2,194	0.002	0.001	5,085	0.066	0.007	3,800	0.003	0.001	3,753	0.001	0.000	1,939	0.006	0.002	1,368	0.002	0.001	1,205	0.001	0.001	4,430	0.001	0.000
Highest level of education completed by the child's mother (or stepmother or female guardian)	**Beyond <ISCED Level 5A, first degree>**	2,220	0.068	0.012	4,979	0.013	0.002	3,922	0.087	0.005	3,973	0.125	0.011	1,949	0.043	0.003	1,341	0.140	0.013	1,215	0.054	0.008	4,551	0.203	0.013
	<ISCED Level 5A, first degree>	2,220	0.137	0.014	4,979	0.072	0.009	3,922	0.158	0.011	3,973	0.151	0.007	1,949	0.082	0.005	1,341	0.167	0.013	1,215	0.453	0.023	4,551	0.060	0.004
	<ISCED Level 5B>	2,220	0.050	0.006	4,979	0.028	0.003	3,922	0.251	0.009	3,973	0.077	0.005	1,949	0.058	0.005	1,341	0.101	0.007	1,215	0.098	0.010	4,551	0.000	0.000
	<ISCED Level 4>	2,220	0.045	0.005	4,979	0.028	0.002	3,922	0.137	0.008	3,973	0.210	0.008	1,949	0.048	0.005	1,341	0.028	0.007	1,215	0.137	0.014	4,551	0.087	0.005
	<ISCED Level 3>	2,220	0.236	0.015	4,979	0.227	0.010	3,922	0.194	0.007	3,973	0.318	0.010	1,949	0.172	0.010	1,341	0.398	0.018	1,215	0.194	0.014	4,551	0.278	0.009
	<ISCED Level 2>	2,220	0.262	0.013	4,979	0.212	0.009	3,922	0.119	0.007	3,973	0.107	0.010	1,949	0.571	0.012	1,341	0.073	0.009	1,215	0.055	0.011	4,551	0.304	0.011
	Some <ISCED Level 1 or 2>	2,220	0.197	0.028	4,979	0.307	0.013	3,922	0.052	0.005	3,973	0.011	0.002	1,949	0.024	0.004	1,341	0.091	0.010	1,215	0.006	0.002	4,551	0.068	0.006
	Did not go to school	2,220	0.005	0.002	4,979	0.113	0.011	3,922	0.002	0.001	3,973	0.001	0.000	1,949	0.002	0.001	1,341	0.002	0.001	1,215	0.003	0.002	4,551	0.000	0.000
Reading — **Frequency assigning reading homework to the students in the class**	**Every day**	2,483	0.508	0.057	5,229	0.302	0.039	4,244	0.610	0.040	4,351	0.640	0.034	2,305	0.410	0.002	2,592	0.499	0.048	1,394	0.645	0.063	4,814	0.492	0.036
	3 or 4 times a week	2,483	0.314	0.048	5,229	0.175	0.027	4,244	0.277	0.037	4,351	0.242	0.028	2,305	0.167	0.002	2,592	0.294	0.046	1,394	0.213	0.055	4,814	0.263	0.030
	1 or 2 times a week	2,483	0.130	0.034	5,229	0.375	0.038	4,244	0.090	0.023	4,351	0.084	0.018	2,305	0.299	0.002	2,592	0.203	0.042	1,394	0.142	0.060	4,814	0.171	0.026
	Less than once a week	2,483	0.048	0.021	5,229	0.092	0.025	4,244	0.023	0.010	4,351	0.034	0.012	2,305	0.061	0.001	2,592	0.004	0.004	1,394	0.000	0.000	4,814	0.050	0.013
	I do not assign mathematics homework	2,483	0.000	0.000	5,229	0.056	0.019	4,244	0.000	0.000	4,351	0.000	0.000	2,305	0.063	0.001	2,592	0.000	0.000	1,394	0.000	0.000	4,814	0.024	0.013
Minutes of reading homework usually assigned by the teacher to an average student in the class	**More than 60 minutes**	2,507	0.020	0.019	5,435	0.045	0.015	4,313	0.000	0.000	4,402	0.023	0.010	2,556	0.000	0.000	2,679	0.026	0.016	1,411	0.012	0.012	4,814	0.011	0.011
	31–60 minutes	2,507	0.208	0.040	5,435	0.252	0.028	4,313	0.040	0.013	4,402	0.254	0.036	2,556	0.221	0.002	2,679	0.192	0.040	1,411	0.091	0.026	4,814	0.086	0.018
	16–30 minutes	2,507	0.699	0.044	5,435	0.452	0.038	4,313	0.353	0.034	4,402	0.619	0.040	2,556	0.589	0.002	2,679	0.579	0.048	1,411	0.794	0.046	4,814	0.729	0.031
	15 minutes or less	2,507	0.073	0.024	5,435	0.193	0.033	4,313	0.607	0.036	4,402	0.104	0.018	2,556	0.133	0.002	2,679	0.203	0.032	1,411	0.103	0.032	4,814	0.150	0.022
	I do not assign mathematics homework	2,507	0.000	0.000	5,435	0.058	0.018	4,313	0.000	0.000	4,402	0.000	0.000	2,556	0.057	0.001	2,679	0.000	0.000	1,411	0.000	0.000	4,814	0.024	0.013
Frequency correcting reading assignments and giving feedback to students	**Always or almost always**	2,450	0.787	0.039	5,429	0.709	0.027	4,251	0.834	0.028	4,262	0.748	0.032	2,497	0.602	0.002	2,679	0.848	0.034	1,394	0.615	0.060	4,814	0.885	0.027
	Sometimes	2,450	0.204	0.037	5,429	0.232	0.025	4,251	0.159	0.028	4,262	0.245	0.032	2,497	0.255	0.002	2,679	0.121	0.030	1,394	0.348	0.063	4,814	0.091	0.024
	Never or almost never	2,450	0.009	0.008	5,429	0.001	0.001	4,251	0.007	0.005	4,262	0.007	0.006	2,497	0.085	0.001	2,679	0.031	0.016	1,394	0.037	0.022	4,814	0.000	0.000
	I do not assign mathematics homework	2,450	0.000	0.000	5,429	0.058	0.018	4,251	0.000	0.000	4,262	0.000	0.000	2,497	0.058	0.001	2,679	0.000	0.000	1,394	0.000	0.000	4,814	0.024	0.013
Frequency discussing the reading homework in class	**Always or almost always**	2,478	1.000	0.000	5,389	0.484	0.043	4,265	0.760	0.029	4,285	0.857	0.027	2,497	0.597	0.002	2,625	0.739	0.043	1,394	0.567	0.066	4,773	0.753	0.030
	Sometimes	2,478	0.000	0.000	5,389	0.447	0.042	4,265	0.230	0.029	4,285	0.143	0.027	2,497	0.257	0.002	2,625	0.250	0.043	1,394	0.412	0.067	4,773	0.220	0.030
	Never or almost never	2,478	0.000	0.000	5,389	0.010	0.007	4,265	0.010	0.007	4,285	0.000	0.000	2,497	0.088	0.001	2,625	0.011	0.008	1,394	0.021	0.015	4,773	0.003	0.003
	I do not assign mathematics homework	2,478	0.000	0.000	5,389	0.059	0.019	4,265	0.000	0.000	4,285	0.000	0.000	2,497	0.058	0.001	2,625	0.000	0.000	1,394	0.000	0.000	4,773	0.024	0.013
Frequency monitoring whether or not the reading homework was completed	**Always or almost always**	2,459	0.983	0.012	5,389	0.799	0.025	4,278	0.969	0.011	4,237	0.928	0.020	2,497	0.817	0.002	2,651	0.929	0.022	1,394	0.838	0.045	4,773	0.955	0.016
	Sometimes	2,459	0.017	0.012	5,389	0.142	0.023	4,278	0.031	0.011	4,237	0.072	0.020	2,497	0.111	0.001	2,651	0.054	0.018	1,394	0.140	0.043	4,773	0.021	0.010
	Never or almost never	2,459	0.000	0.000	5,389	0.000	0.000	4,278	0.000	0.000	4,237	0.000	0.000	2,497	0.014	0.001	2,651	0.017	0.012	1,394	0.022	0.015	4,773	0.000	0.000
	I do not assign mathematics homework	2,459	0.000	0.000	5,389	0.059	0.019	4,278	0.000	0.000	4,237	0.000	0.000	2,497	0.058	0.001	2,651	0.000	0.000	1,394	0.000	0.000	4,773	0.024	0.013
Mathematics — **Frequency assigning mathematics homework to the students in the class**	**Every day**	2,483	0.486	0.047	5,229	0.169	0.025	4,244	0.623	0.037	4,351	0.365	0.033	2,305	0.842	0.001	2,592	0.158	0.035	1,394	0.100	0.037	4,814	0.500	0.040
	3 or 4 times a week	2,483	0.494	0.047	5,229	0.431	0.040	4,244	0.326	0.035	4,351	0.564	0.036	2,305	0.124	0.001	2,592	0.318	0.051	1,394	0.385	0.068	4,814	0.398	0.034
	1 or 2 times a week	2,483	0.020	0.019	5,229	0.353	0.036	4,244	0.048	0.017	4,351	0.064	0.019	2,305	0.034	0.001	2,592	0.524	0.053	1,394	0.515	0.067	4,814	0.091	0.023
	Less than once a week	2,483	0.000	0.000	5,229	0.028	0.012	4,244	0.003	0.003	4,351	0.004	0.004	2,305	0.000	0.000	2,592	0.000	0.000	1,394	0.000	0.000	4,814	0.011	0.007
	I do not assign mathematics homework	2,483	0.000	0.000	5,229	0.019	0.010	4,244	0.000	0.000	4,351	0.003	0.003	2,305	0.000	0.000	2,592	0.000	0.000	1,394	0.000	0.000	4,814	0.000	0.000
Minutes of mathematics	**More than 60 minutes**	2,507	0.000	0.000	5,435	0.062	0.018	4,313	0.000	0.000	4,402	0.000	0.000	2,556	0.000	0.000	2,679	0.000	0.000	1,411	0.000	0.000	4,814	0.000	0.000
	31–60 minutes	2,507	0.042	0.019	5,435	0.402	0.038	4,313	0.005	0.004	4,402	0.037	0.016	2,556	0.188	0.002	2,679	0.248	0.041	1,411	0.142	0.035	4,814	0.057	0.016

			N	%	SE	N	%	SE	N	%	SE	N	%	SE	N	%	SE	N	%	SE	N	%	SE	N	%	SE
	homework usually assigned by the teacher to an average student in the class	16–30 minutes	2,507	0.596	0.052	5,435	0.438	0.040	4,313	0.382	0.038	4,402	0.711	0.032	2,556	0.740	0.002	2,679	0.702	0.043	1,411	0.741	0.048	4,814	0.600	0.039
		15 minutes or less	2,507	0.362	0.049	5,435	0.080	0.017	4,313	0.613	0.039	4,402	0.249	0.029	2,556	0.072	0.001	2,679	0.050	0.017	1,411	0.117	0.037	4,814	0.343	0.038
		I do not assign mathematics homework	2,507	0.000	0.000	5,435	0.018	0.010	4,313	0.000	0.000	4,402	0.003	0.003	2,556	0.000	0.000	2,679	0.000	0.000	1,411	0.000	0.000	4,814	0.000	0.000
	Frequency correcting mathematics assignments and giving feedback to students	Always or almost always	2,450	0.713	0.042	5,429	0.732	0.037	4,251	0.930	0.019	4,262	0.689	0.034	2,497	0.886	0.002	2,679	0.967	0.016	1,394	0.730	0.059	4,814	0.812	0.029
		Sometimes	2,450	0.249	0.041	5,429	0.250	0.040	4,251	0.066	0.019	4,262	0.308	0.034	2,497	0.114	0.002	2,679	0.033	0.016	1,394	0.260	0.057	4,814	0.185	0.029
		Never or almost never	2,450	0.038	0.018	5,429	0.000	0.000	4,251	0.004	0.004	4,262	0.000	0.000	2,497	0.000	0.000	2,679	0.000	0.000	1,394	0.010	0.010	4,814	0.003	0.003
		I do not assign mathematics homework	2,478	0.000	0.000	5,429	0.018	0.010	4,251	0.000	0.000	4,262	0.003	0.003	2,497	0.000	0.000	2,679	0.000	0.000	1,394	0.000	0.000	4,814	0.000	0.000
	Frequency discussing the mathematics homework in class	Always or almost always	2,478	0.978	0.013	5,389	0.572	0.042	4,265	0.858	0.027	4,285	0.791	0.030	2,497	0.913	0.002	2,625	0.864	0.031	1,394	0.441	0.067	4,773	0.743	0.035
		Sometimes	2,478	0.022	0.013	5,389	0.404	0.041	4,265	0.139	0.026	4,285	0.205	0.030	2,497	0.087	0.002	2,625	0.136	0.031	1,394	0.545	0.066	4,773	0.257	0.035
		Never or almost never	2,478	0.000	0.000	5,389	0.005	0.005	4,265	0.003	0.003	4,285	0.000	0.000	2,497	0.000	0.000	2,625	0.000	0.000	1,394	0.014	0.011	4,773	0.000	0.000
		I do not assign mathematics homework	2,478	0.000	0.000	5,389	0.019	0.010	4,265	0.000	0.000	4,285	0.004	0.003	2,497	0.000	0.000	2,625	0.000	0.000	1,394	0.000	0.000	4,773	0.000	0.000
	Frequency monitoring whether or not the mathematics homework was completed	Always or almost always	2,459	0.983	0.012	5,389	0.874	0.021	4,278	0.997	0.003	4,237	0.921	0.021	2,497	0.987	0.001	2,651	0.973	0.015	1,394	0.893	0.039	4,773	0.982	0.009
		Sometimes	2,459	0.017	0.012	5,389	0.107	0.022	4,278	0.003	0.003	4,237	0.073	0.022	2,497	0.013	0.001	2,651	0.027	0.015	1,394	0.107	0.039	4,773	0.018	0.009
		Never or almost never	2,459	0.000	0.000	5,389	0.000	0.000	4,278	0.000	0.000	4,237	0.003	0.003	2,497	0.000	0.000	2,651	0.000	0.000	1,394	0.000	0.000	4,773	0.000	0.000
		I do not assign mathematics homework	2,459	0.000	0.000	5,389	0.019	0.010	4,278	0.000	0.000	4,237	0.003	0.003	2,497	0.000	0.000	2,651	0.000	0.000	1,394	0.000	0.000	4,773	0.000	0.000
Science	Frequency assigning science homework to the students in the class	Every day	2,483	0.005	0.005	5,229	0.000	0.000	4,244	0.000	0.000	4,351	0.008	0.006	2,305	0.000	0.000	2,592	0.000	0.000	1,394	0.000	0.000	4,814	0.000	0.000
		3 or 4 times a week	2,483	0.023	0.015	5,229	0.103	0.023	4,244	0.000	0.000	4,351	0.009	0.006	2,305	0.000	0.000	2,592	0.000	0.000	1,394	0.000	0.000	4,814	0.006	0.005
		1 or 2 times a week	2,483	0.874	0.033	5,229	0.506	0.038	4,244	0.136	0.024	4,351	0.627	0.035	2,305	0.127	0.001	2,592	0.003	0.003	1,394	0.243	0.066	4,814	0.415	0.035
		Less than once a week	2,483	0.098	0.030	5,229	0.214	0.036	4,244	0.453	0.036	4,351	0.340	0.036	2,305	0.390	0.003	2,592	0.372	0.047	1,394	0.369	0.065	4,814	0.544	0.035
		I do not assign mathematics homework	2,483	0.000	0.000	5,229	0.177	0.025	4,244	0.411	0.038	4,351	0.016	0.007	2,305	0.483	0.003	2,592	0.625	0.047	1,394	0.388	0.052	4,814	0.035	0.014
	Minutes of science homework usually assigned by the teacher to an average student in the class	More than 60 minutes	2,507	0.000	0.000	5,435	0.045	0.014	4,313	0.003	0.003	4,402	0.005	0.005	2,556	0.000	0.000	2,679	0.000	0.000	1,411	0.000	0.000	4,814	0.004	0.004
		31–60 minutes	2,507	0.009	0.009	5,435	0.232	0.029	4,313	0.012	0.012	4,402	0.017	0.008	2,556	0.055	0.001	2,679	0.057	0.024	1,411	0.042	0.026	4,814	0.063	0.020
		16–30 minutes	2,507	0.452	0.051	5,435	0.421	0.041	4,313	0.168	0.031	4,402	0.436	0.035	2,556	0.305	0.002	2,679	0.202	0.035	1,411	0.335	0.058	4,814	0.319	0.034
		15 minutes or less	2,507	0.539	0.049	5,435	0.133	0.023	4,313	0.416	0.038	4,402	0.524	0.034	2,556	0.179	0.001	2,679	0.137	0.031	1,411	0.239	0.053	4,814	0.579	0.040
		I do not assign mathematics homework	2,507	0.000	0.000	5,435	0.169	0.024	4,313	0.401	0.038	4,402	0.018	0.008	2,556	0.461	0.002	2,679	0.604	0.047	1,411	0.384	0.051	4,814	0.035	0.014
	Frequency correcting science assignments and giving feedback to students	Always or almost always	2,450	0.704	0.046	5,429	0.563	0.036	4,251	0.508	0.042	4,262	0.479	0.036	2,497	0.386	0.002	2,679	0.318	0.045	1,394	0.379	0.062	4,814	0.831	0.028
		Sometimes	2,450	0.261	0.044	5,429	0.264	0.040	4,251	0.073	0.019	4,262	0.479	0.035	2,497	0.097	0.001	2,679	0.057	0.021	1,394	0.174	0.050	4,814	0.134	0.024
		Never or almost never	2,450	0.035	0.020	5,429	0.003	0.002	4,251	0.015	0.009	4,262	0.023	0.011	2,497	0.045	0.001	2,679	0.021	0.014	1,394	0.059	0.033	4,814	0.000	0.000
		I do not assign mathematics homework	2,450	0.000	0.000	5,429	0.170	0.024	4,251	0.404	0.038	4,262	0.019	0.008	2,497	0.472	0.002	2,679	0.604	0.047	1,394	0.388	0.052	4,814	0.035	0.014
	Frequency discussing the science homework in class	Always or almost always	2,478	0.984	0.011	5,389	0.514	0.032	4,265	0.453	0.040	4,285	0.804	0.034	2,497	0.384	0.002	2,625	0.307	0.047	1,394	0.319	0.061	4,773	0.789	0.032
		Sometimes	2,478	0.016	0.011	5,389	0.310	0.040	4,265	0.137	0.025	4,285	0.177	0.033	2,497	0.104	0.001	2,625	0.072	0.025	1,394	0.293	0.061	4,773	0.176	0.029
		Never or almost never	2,478	0.000	0.000	5,389	0.005	0.005	4,265	0.008	0.006	4,285	0.000	0.000	2,497	0.040	0.001	2,625	0.009	0.006	1,394	0.000	0.000	4,773	0.000	0.000
		I do not assign mathematics homework	2,478	0.000	0.000	5,389	0.171	0.024	4,265	0.402	0.038	4,285	0.019	0.008	2,497	0.472	0.002	2,625	0.612	0.047	1,394	0.388	0.052	4,773	0.035	0.015
	Frequency monitoring whether or not the science homework was completed	Always or almost always	2,459	0.983	0.012	5,389	0.673	0.033	4,278	0.535	0.040	4,237	0.857	0.023	2,497	0.453	0.002	2,651	0.318	0.047	1,394	0.539	0.058	4,773	0.936	0.018
		Sometimes	2,459	0.017	0.012	5,389	0.154	0.037	4,278	0.054	0.016	4,237	0.114	0.022	2,497	0.050	0.001	2,651	0.065	0.025	1,394	0.073	0.032	4,773	0.029	0.011
		Never or almost never	2,459	0.000	0.000	5,389	0.002	0.002	4,278	0.005	0.005	4,237	0.010	0.006	2,497	0.025	0.001	2,651	0.009	0.006	1,394	0.000	0.000	4,773	0.000	0.000
		I do not assign mathematics homework	2,459	0.000	0.000	5,389	0.171	0.024	4,278	0.406	0.038	4,237	0.019	0.008	2,497	0.472	0.002	2,651	0.608	0.046	1,394	0.388	0.052	4,773	0.035	0.015

Table A2. Descriptive statistics (continued II)

		Portugal			Romania			Russian Federation			Singapore			Slovak Republic			Slovenia			Spain			Sweden		
		Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.	Obs.	Mean	S.E.
Scores	Reading	3,803	541.076	2.737	4,492	502.601	4.398	4,274	567.359	2.869	2,313	569.919	5.318	3,225	535.597	3.425	4,246	530.423	2.050	3,536	512.319	3.052	1,560	539.785	3.419
	Mathematics	3,803	532.304	3.626	4,492	483.276	6.002	4,274	541.187	3.768	2,313	610.248	4.996	3,225	505.264	5.047	4,246	513.325	2.282	3,536	481.426	3.146	1,560	502.432	3.616
	Science	3,803	521.987	4.041	4,492	506.785	6.066	4,274	551.482	3.584	2,313	587.493	5.371	3,225	530.231	5.068	4,246	520.643	2.784	3,536	505.035	3.100	1,560	531.535	4.283
Sex of the student	Male	3,803	0.509	0.012	4,492	0.517	0.009	4,274	0.512	0.011	2,313	0.498	0.012	3,225	0.507	0.010	4,246	0.524	0.008	3,536	0.512	0.010	1,560	0.492	0.018
	Female	3,803	0.491	0.012	4,492	0.483	0.009	4,274	0.488	0.011	2,313	0.502	0.012	3,225	0.493	0.010	4,246	0.476	0.008	3,536	0.488	0.010	1,560	0.508	0.018
Highest level of education completed by the child's father (or stepfather or male guardian)	Beyond <ISCED Level 5A, first degree>	3,411	0.029	0.004	3,991	0.026	0.003	3,579	0.032	0.004	2,101	0.098	0.008	2,994	0.172	0.014	3,976	0.035	0.004	2,963	0.147	0.013	1,204	0.018	0.008
	<ISCED Level 5A, first degree>	3,411	0.129	0.007	3,991	0.072	0.007	3,579	0.278	0.012	2,101	0.185	0.012	2,994	0.012	0.002	3,976	0.097	0.007	2,963	0.101	0.008	1,204	0.233	0.023
	<ISCED Level 5B>	3,411	0.026	0.003	3,991	0.041	0.005	3,579	0.000	0.000	2,101	0.137	0.007	2,994	0.004	0.001	3,976	0.145	0.008	2,963	0.041	0.005	1,204	0.100	0.011
	<ISCED Level 4>	3,411	0.041	0.005	3,991	0.086	0.007	3,579	0.501	0.011	2,101	0.147	0.008	2,994	0.033	0.004	3,976	0.000	0.000	2,963	0.074	0.007	1,204	0.149	0.013
	<ISCED Level 3>	3,411	0.292	0.013	3,991	0.412	0.015	3,579	0.124	0.008	2,101	0.231	0.009	2,994	0.689	0.015	3,976	0.627	0.011	2,963	0.251	0.011	1,204	0.380	0.029
	<ISCED Level 2>	3,411	0.210	0.010	3,991	0.235	0.013	3,579	0.061	0.006	2,101	0.080	0.007	2,994	0.067	0.009	3,976	0.080	0.006	2,963	0.286	0.012	1,204	0.097	0.011
	Some <ISCED Level 1 or 2>	3,411	0.268	0.013	3,991	0.095	0.014	3,579	0.004	0.001	2,101	0.117	0.009	2,994	0.020	0.008	3,976	0.015	0.002	2,963	0.093	0.008	1,204	0.023	0.005
	Did not go to school	3,411	0.005	0.002	3,991	0.033	0.005	3,579	0.000	0.000	2,101	0.005	0.001	2,994	0.003	0.001	3,976	0.001	0.000	2,963	0.007	0.002	1,204	0.000	0.000
Highest level of education completed by the child's mother (or stepmother or female guardian)	Beyond <ISCED Level 5A, first degree>	3,458	0.035	0.004	4,022	0.027	0.003	3,939	0.032	0.003	2,125	0.044	0.005	3,036	0.176	0.014	4,012	0.031	0.003	2,991	0.162	0.012	1,195	0.013	0.004
	<ISCED Level 5A, first degree>	3,458	0.180	0.010	4,022	0.078	0.008	3,939	0.341	0.013	2,125	0.174	0.012	3,036	0.034	0.004	4,012	0.154	0.009	2,991	0.138	0.010	1,195	0.347	0.024
	<ISCED Level 5B>	3,458	0.033	0.004	4,022	0.049	0.006	3,939	0.000	0.000	2,125	0.111	0.008	3,036	0.019	0.003	4,012	0.210	0.009	2,991	0.037	0.004	1,195	0.117	0.016
	<ISCED Level 4>	3,458	0.036	0.005	4,022	0.083	0.006	3,939	0.466	0.012	2,125	0.178	0.007	3,036	0.047	0.005	4,012	0.000	0.000	2,991	0.072	0.006	1,195	0.184	0.016
	<ISCED Level 3>	3,458	0.328	0.011	4,022	0.357	0.016	3,939	0.092	0.007	2,125	0.306	0.012	3,036	0.626	0.014	4,012	0.524	0.011	2,991	0.252	0.015	1,195	0.257	0.028
	<ISCED Level 2>	3,458	0.186	0.008	4,022	0.268	0.018	3,939	0.060	0.005	2,125	0.079	0.006	3,036	0.083	0.013	4,012	0.074	0.006	2,991	0.258	0.013	1,195	0.068	0.011
	Some <ISCED Level 1 or 2>	3,458	0.198	0.011	4,022	0.100	0.014	3,939	0.008	0.001	2,125	0.098	0.009	3,036	0.013	0.007	4,012	0.005	0.002	2,991	0.075	0.008	1,195	0.014	0.003
	Did not go to school	3,458	0.004	0.001	4,022	0.038	0.005	3,939	0.001	0.001	2,125	0.010	0.002	3,036	0.002	0.001	4,012	0.002	0.001	2,991	0.006	0.002	1,195	0.000	0.000
Reading	Frequency assigning reading homework to the students in the class — Every day	3,699	0.255	0.050	4,391	0.070	0.025	4,246	0.531	0.041	1,924	0.044	0.019	3,202	0.420	0.042	4,218	0.232	0.029	3,444	0.371	0.043	1,521	0.014	0.011
	3 or 4 times a week	3,699	0.406	0.048	4,391	0.086	0.021	4,246	0.223	0.031	1,924	0.074	0.028	3,202	0.437	0.048	4,218	0.313	0.036	3,444	0.130	0.033	1,521	0.096	0.037
	1 or 2 times a week	3,699	0.289	0.041	4,391	0.503	0.039	4,246	0.220	0.030	1,924	0.377	0.057	3,202	0.100	0.025	4,218	0.382	0.043	3,444	0.364	0.042	1,521	0.514	0.063
	Less than once a week	3,699	0.037	0.013	4,391	0.314	0.036	4,246	0.026	0.011	1,924	0.360	0.051	3,202	0.027	0.010	4,218	0.063	0.017	3,444	0.083	0.024	1,521	0.365	0.071
	I do not assign mathematics homework	3,699	0.013	0.007	4,391	0.027	0.014	4,246	0.000	0.000	1,924	0.145	0.036	3,202	0.016	0.010	4,218	0.010	0.008	3,444	0.052	0.022	1,521	0.011	0.011
	Minutes of reading homework usually assigned by the teacher to an average student in the class — More than 60 minutes	3,803	0.010	0.010	4,492	0.351	0.037	4,274	0.118	0.018	2,313	0.037	0.017	3,225	0.000	0.000	4,246	0.000	0.000	3,536	0.000	0.000	1,560	0.000	0.000
	31–60 minutes	3,803	0.178	0.033	4,492	0.420	0.040	4,274	0.554	0.030	2,313	0.183	0.036	3,225	0.101	0.024	4,246	0.112	0.026	3,536	0.157	0.030	1,560	0.086	0.029
	16–30 minutes	3,803	0.652	0.039	4,492	0.185	0.033	4,274	0.328	0.024	2,313	0.450	0.043	3,225	0.420	0.039	4,246	0.615	0.037	3,536	0.608	0.040	1,560	0.749	0.058
	15 minutes or less	3,803	0.148	0.028	4,492	0.018	0.011	4,274	0.000	0.000	2,313	0.209	0.035	3,225	0.463	0.045	4,246	0.263	0.032	3,536	0.184	0.027	1,560	0.154	0.053
	I do not assign mathematics homework	3,803	0.012	0.007	4,492	0.026	0.014	4,274	0.000	0.000	2,313	0.121	0.031	3,225	0.016	0.010	4,246	0.010	0.008	3,536	0.051	0.021	1,560	0.011	0.010
	Frequency correcting reading assignments and giving feedback to students — Always or almost always	3,724	0.888	0.023	4,406	0.893	0.020	4,223	0.810	0.026	2,313	0.591	0.043	3,132	0.670	0.042	4,140	0.690	0.038	3,493	0.863	0.035	1,509	0.702	0.061
	Sometimes	3,724	0.092	0.022	4,406	0.080	0.016	4,223	0.169	0.023	2,313	0.224	0.038	3,132	0.312	0.039	4,140	0.291	0.037	3,493	0.074	0.027	1,509	0.252	0.060
	Never or almost never	3,724	0.007	0.005	4,406	0.000	0.000	4,223	0.021	0.011	2,313	0.064	0.020	3,132	0.002	0.002	4,140	0.009	0.006	3,493	0.011	0.007	1,509	0.035	0.022
	I do not assign mathematics homework	3,724	0.013	0.007	4,406	0.027	0.014	4,223	0.000	0.000	2,313	0.121	0.031	3,132	0.016	0.010	4,140	0.010	0.008	3,493	0.052	0.021	1,509	0.011	0.011
	Frequency discussing the reading homework in class — Always or almost always	3,717	0.730	0.035	4,444	0.882	0.022	4,274	0.878	0.025	2,313	0.625	0.041	3,170	0.623	0.045	4,085	0.845	0.025	3,485	0.695	0.040	1,480	0.450	0.067
	Sometimes	3,717	0.241	0.036	4,444	0.091	0.019	4,274	0.122	0.025	2,313	0.221	0.036	3,170	0.351	0.046	4,085	0.141	0.024	3,485	0.235	0.037	1,480	0.459	0.070
	Never or almost never	3,717	0.016	0.012	4,444	0.000	0.000	4,274	0.000	0.000	2,313	0.033	0.017	3,170	0.010	0.010	4,085	0.004	0.004	3,485	0.018	0.005	1,480	0.080	0.037
	I do not assign mathematics homework	3,717	0.013	0.007	4,444	0.027	0.014	4,274	0.000	0.000	2,313	0.121	0.031	3,170	0.016	0.010	4,085	0.010	0.008	3,485	0.052	0.022	1,480	0.011	0.011
	Frequency monitoring whether or not the reading homework was completed — Always or almost always	3,745	0.957	0.016	4,428	0.966	0.015	4,224	0.991	0.006	2,313	0.740	0.035	3,171	0.893	0.030	4,013	0.958	0.016	3,466	0.903	0.022	1,543	0.923	0.040
	Sometimes	3,745	0.027	0.014	4,428	0.007	0.005	4,224	0.009	0.006	2,313	0.095	0.024	3,171	0.091	0.028	4,013	0.031	0.014	3,466	0.040	0.016	1,543	0.066	0.039
	Never or almost never	3,745	0.003	0.003	4,428	0.000	0.000	4,224	0.000	0.000	2,313	0.044	0.020	3,171	0.000	0.000	4,013	0.001	0.001	3,466	0.005	0.005	1,543	0.000	0.000
	I do not assign mathematics homework	3,745	0.013	0.007	4,428	0.027	0.014	4,224	0.000	0.000	2,313	0.121	0.031	3,171	0.016	0.010	4,013	0.010	0.008	3,466	0.052	0.022	1,543	0.011	0.011
Mathematics	Frequency assigning mathematics homework to the students in the class — Every day	3,699	0.101	0.023	4,391	0.582	0.040	4,246	0.526	0.038	1,924	0.383	0.042	3,202	0.169	0.034	4,218	0.471	0.033	3,444	0.378	0.040	1,521	0.000	0.000
	3 or 4 times a week	3,699	0.441	0.042	4,391	0.363	0.042	4,246	0.463	0.037	1,924	0.461	0.045	3,202	0.645	0.045	4,218	0.522	0.033	3,444	0.358	0.038	1,521	0.007	0.007
	1 or 2 times a week	3,699	0.443	0.044	4,391	0.055	0.021	4,246	0.006	0.006	1,924	0.156	0.033	3,202	0.146	0.026	4,218	0.007	0.003	3,444	0.233	0.036	1,521	0.751	0.061
	Less than once a week	3,699	0.011	0.007	4,391	0.000	0.000	4,246	0.005	0.005	1,924	0.000	0.000	3,202	0.040	0.015	4,218	0.000	0.000	3,444	0.020	0.012	1,521	0.201	0.056
	I do not assign mathematics homework	3,699	0.004	0.004	4,391	0.000	0.000	4,246	0.000	0.000	1,924	0.000	0.000	3,202	0.000	0.000	4,218	0.000	0.000	3,444	0.011	0.009	1,521	0.041	0.020
	Minutes of mathematics — More than 60 minutes	3,803	0.013	0.011	4,492	0.045	0.016	4,274	0.010	0.007	2,313	0.040	0.018	3,225	0.000	0.000	4,246	0.000	0.000	3,536	0.000	0.000	1,560	0.000	0.000
	31–60 minutes	3,803	0.174	0.029	4,492	0.400	0.036	4,274	0.279	0.036	2,313	0.590	0.044	3,225	0.002	0.002	4,246	0.042	0.014	3,536	0.232	0.034	1,560	0.129	0.052

Category	Variable	Response	N	%	SE	N	%	SE	N	%	SE	N	%	SE	N	%	SE	N	%	SE	N	%	SE	N	%	SE
	homework usually assigned by the teacher to an average student in the class	16–30 minutes	3,803	0.705	0.039	4,492	0.512	0.039	4,274	0.680	0.039	2,313	0.340	0.043	3,225	0.376	0.037	4,246	0.606	0.035	3,536	0.661	0.042	1,560	0.767	0.058
		15 minutes or less	3,803	0.104	0.024	4,492	0.043	0.017	4,274	0.031	0.010	2,313	0.030	0.015	3,225	0.622	0.037	4,246	0.352	0.036	3,536	0.092	0.026	1,560	0.065	0.025
		I do not assign mathematics homework	3,803	0.004	0.004	4,492	0.000	0.000	4,274	0.000	0.000	2,313	0.000	0.000	3,225	0.000	0.000	4,246	0.000	0.000	3,536	0.015	0.009	1,560	0.039	0.019
	Frequency correcting mathematics assignments and giving feedback to students	Always or almost always	3,724	0.934	0.017	4,406	0.922	0.015	4,223	0.919	0.021	2,313	0.971	0.015	3,132	0.785	0.036	4,140	0.664	0.033	3,493	0.934	0.022	1,509	0.811	0.042
		Sometimes	3,724	0.057	0.017	4,406	0.078	0.015	4,223	0.068	0.017	2,313	0.029	0.015	3,132	0.213	0.036	4,140	0.318	0.032	3,493	0.051	0.020	1,509	0.148	0.042
		Never or almost never	3,724	0.005	0.004	4,406	0.000	0.000	4,223	0.013	0.009	2,313	0.000	0.000	3,132	0.002	0.002	4,140	0.018	0.009	3,493	0.000	0.000	1,509	0.000	0.000
		I do not assign mathematics homework	3,724	0.004	0.004	4,406	0.000	0.000	4,223	0.000	0.000	2,313	0.000	0.000	3,132	0.000	0.000	4,140	0.000	0.000	3,493	0.015	0.009	1,509	0.041	0.020
	Frequency discussing the mathematics homework in class	Always or almost always	3,717	0.791	0.034	4,444	0.924	0.018	4,274	0.607	0.030	2,313	0.848	0.038	3,170	0.579	0.045	4,085	0.879	0.025	3,485	0.748	0.034	1,480	0.441	0.067
		Sometimes	3,717	0.191	0.031	4,444	0.076	0.018	4,274	0.388	0.030	2,313	0.152	0.038	3,170	0.411	0.045	4,085	0.117	0.025	3,485	0.227	0.033	1,480	0.497	0.068
		Never or almost never	3,717	0.014	0.011	4,444	0.000	0.000	4,274	0.005	0.005	2,313	0.000	0.000	3,170	0.010	0.010	4,085	0.004	0.004	3,485	0.010	0.007	1,480	0.020	0.015
		I do not assign mathematics homework	3,717	0.004	0.004	4,444	0.000	0.000	4,274	0.000	0.000	2,313	0.000	0.000	3,170	0.000	0.000	4,085	0.000	0.000	3,485	0.015	0.009	1,480	0.042	0.020
	Frequency monitoring whether or not the mathematics homework was completed	Always or almost always	3,745	0.975	0.012	4,428	0.982	0.009	4,224	0.990	0.007	2,313	0.985	0.010	3,171	0.925	0.023	4,013	0.975	0.012	3,466	0.941	0.019	1,543	0.895	0.028
		Sometimes	3,745	0.018	0.011	4,428	0.018	0.009	4,224	0.010	0.007	2,313	0.015	0.010	3,171	0.070	0.022	4,013	0.015	0.008	3,466	0.044	0.017	1,543	0.065	0.028
		Never or almost never	3,745	0.003	0.003	4,428	0.000	0.000	4,224	0.000	0.000	2,313	0.000	0.000	3,171	0.005	0.004	4,013	0.010	0.009	3,466	0.000	0.000	1,543	0.000	0.000
		I do not assign mathematics homework	3,745	0.004	0.004	4,428	0.000	0.000	4,224	0.000	0.000	2,313	0.000	0.000	3,171	0.000	0.000	4,013	0.000	0.000	3,466	0.015	0.010	1,543	0.040	0.020
Science	Frequency assigning science homework to the students in the class	Every day	3,699	0.005	0.004	4,391	0.020	0.012	4,246	0.088	0.020	1,924	0.025	0.018	3,202	0.000	0.000	4,218	0.002	0.002	3,444	0.108	0.024	1,521	0.000	0.000
		3 or 4 times a week	3,699	0.060	0.023	4,391	0.013	0.010	4,246	0.015	0.008	1,924	0.056	0.023	3,202	0.023	0.016	4,218	0.005	0.004	3,444	0.311	0.041	1,521	0.000	0.000
		1 or 2 times a week	3,699	0.535	0.051	4,391	0.392	0.042	4,246	0.875	0.025	1,924	0.615	0.047	3,202	0.503	0.043	4,218	0.509	0.037	3,444	0.438	0.043	1,521	0.029	0.015
		Less than once a week	3,699	0.290	0.041	4,391	0.519	0.039	4,246	0.015	0.011	1,924	0.281	0.046	3,202	0.363	0.043	4,218	0.462	0.037	3,444	0.097	0.022	1,521	0.546	0.065
		I do not assign mathematics homework	3,699	0.110	0.033	4,391	0.056	0.016	4,246	0.007	0.007	1,924	0.023	0.013	3,202	0.111	0.029	4,218	0.022	0.009	3,444	0.046	0.018	1,521	0.425	0.066
	Minutes of science homework usually assigned by the teacher to an average student in the class	More than 60 minutes	3,803	0.000	0.000	4,492	0.007	0.007	4,274	0.000	0.000	2,313	0.023	0.013	3,225	0.000	0.000	4,246	0.000	0.000	3,536	0.000	0.000	1,560	0.000	0.000
		31–60 minutes	3,803	0.118	0.026	4,492	0.100	0.022	4,274	0.197	0.030	2,313	0.421	0.045	3,225	0.028	0.010	4,246	0.009	0.008	3,536	0.131	0.028	1,560	0.086	0.030
		16–30 minutes	3,803	0.515	0.044	4,492	0.505	0.040	4,274	0.720	0.032	2,313	0.491	0.047	3,225	0.315	0.038	4,246	0.347	0.032	3,536	0.628	0.041	1,560	0.364	0.067
		15 minutes or less	3,803	0.260	0.039	4,492	0.317	0.032	4,274	0.076	0.017	2,313	0.045	0.021	3,225	0.546	0.044	4,246	0.622	0.033	3,536	0.196	0.031	1,560	0.111	0.041
		I do not assign mathematics homework	3,803	0.107	0.032	4,492	0.071	0.020	4,274	0.007	0.007	2,313	0.020	0.011	3,225	0.111	0.029	4,246	0.022	0.009	3,536	0.045	0.018	1,560	0.439	0.069
	Frequency correcting science assignments and giving feedback to students	Always or almost always	3,724	0.826	0.032	4,406	0.854	0.026	4,223	0.774	0.030	2,313	0.918	0.023	3,132	0.652	0.044	4,140	0.628	0.034	3,493	0.891	0.025	1,509	0.435	0.068
		Sometimes	3,724	0.086	0.021	4,406	0.078	0.019	4,223	0.211	0.027	2,313	0.062	0.022	3,132	0.224	0.038	4,140	0.322	0.034	3,493	0.063	0.020	1,509	0.128	0.041
		Never or almost never	3,724	0.002	0.002	4,406	0.000	0.000	4,223	0.008	0.006	2,313	0.000	0.000	3,132	0.010	0.006	4,140	0.027	0.011	3,493	0.000	0.000	1,509	0.025	0.019
		I do not assign mathematics homework	3,724	0.086	0.025	4,406	0.068	0.020	4,223	0.007	0.007	2,313	0.020	0.011	3,132	0.114	0.030	4,140	0.023	0.009	3,493	0.046	0.018	1,509	0.412	0.067
	Frequency discussing the science homework in class	Always or almost always	3,717	0.728	0.043	4,444	0.875	0.025	4,274	0.805	0.026	2,313	0.847	0.034	3,170	0.687	0.044	4,085	0.904	0.018	3,485	0.805	0.031	1,480	0.405	0.062
		Sometimes	3,717	0.182	0.042	4,444	0.053	0.017	4,274	0.184	0.024	2,313	0.123	0.032	3,170	0.201	0.039	4,085	0.073	0.018	3,485	0.145	0.026	1,480	0.158	0.050
		Never or almost never	3,717	0.004	0.004	4,444	0.000	0.000	4,274	0.004	0.004	2,313	0.010	0.010	3,170	0.000	0.000	4,085	0.000	0.000	3,485	0.004	0.004	1,480	0.018	0.013
		I do not assign mathematics homework	3,717	0.086	0.025	4,444	0.072	0.020	4,274	0.007	0.007	2,313	0.020	0.011	3,170	0.112	0.029	4,085	0.023	0.009	3,485	0.046	0.018	1,480	0.419	0.067
	Frequency monitoring whether or not the science homework was completed	Always or almost always	3,745	0.867	0.043	4,428	0.907	0.020	4,224	0.965	0.012	2,313	0.961	0.013	3,171	0.830	0.031	4,013	0.952	0.014	3,466	0.919	0.019	1,543	0.502	0.068
		Sometimes	3,745	0.047	0.038	4,428	0.026	0.009	4,224	0.023	0.009	2,313	0.019	0.011	3,171	0.058	0.018	4,013	0.021	0.009	3,466	0.035	0.017	1,543	0.052	0.026
		Never or almost never	3,745	0.000	0.000	4,428	0.000	0.000	4,224	0.005	0.005	2,313	0.000	0.000	3,171	0.000	0.000	4,013	0.004	0.003	3,466	0.000	0.000	1,543	0.025	0.019
		I do not assign mathematics homework	3,745	0.086	0.025	4,428	0.067	0.020	4,224	0.007	0.007	2,313	0.020	0.011	3,171	0.112	0.029	4,013	0.023	0.009	3,466	0.046	0.018	1,543	0.421	0.066

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. Reading-related variables have been calculated using PIRLS weights and mathematics and science-related variables have been calculated using TIMSS weights. "Sex of the student", "Highest level of education completed by the child's father (or stepfather or male guardian)" and "Highest level of education completed by the child's mother (or female guardian)" variables have been calculated using PIRLS weights, but using TIMSS weights does not change results. These statistics will be provided by authors upon request.
Source: Authors' own calculations.

Table A3. Effect of assigned homework time (categorical variable) on students' academic achievement

	Assigned homework time (Ref.: I do not assign homework)								Subject: Reading (Ref.: Science)		Subject: Mathematics (Ref.: Science)		Constant		Observations	R-squared
	15 minutes or less		16-30 minutes		31-60 minutes		More than 60 minutes									
Countries	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Australia	0.019	0.036	0.009	0.033	-0.012	0.054	-0.027	0.114	-0.012	0.027	0.001	0.033	0.005	0.054	10,407	0.843
Austria	0.032	0.037	0.065*	0.036	0.088	0.065	X	X	-0.006	0.034	-0.031	0.034	-0.047	0.044	11,781	0.810
Azerbaijan	-0.145	0.135	-0.077	0.129	-0.135	0.138	-0.006	0.122	-0.048	0.054	0.016	0.026	0.210	0.152	7,956	0.737
Croatia	-0.127	0.143	-0.148	0.136	-0.145	0.145	-0.236	0.144	0.000	0.032	0.006	0.027	0.146	0.140	13,254	0.790
Czech Republic	0.000	0.066	-0.008	0.058	-0.013	0.076	-0.235**	0.092	-0.014	0.028	-0.008	0.021	0.036	0.071	9,813	0.810
Finland	-0.125	0.109	-0.105	0.116	-0.046	0.142	X	X	-0.024	0.039	-0.008	0.037	0.108	0.129	11,850	0.775
Georgia	-0.162	0.119	-0.104	0.106	-0.068	0.114	0.009	0.118	-0.001	0.031	-0.008	0.039	0.119	0.122	8,727	0.826
Germany	-0.053	0.052	-0.025	0.052	-0.009	0.072	X	X	0.023	0.035	0.000	0.049	-0.004	0.069	5,688	0.812
Hungary	Ref.	Ref.	-0.007	0.020	-0.013	0.050	-0.100	0.132	0.007	0.028	0.006	0.029	-0.020	0.074	7,521	0.863
Iran, Islamic Rep. Of	-0.023	0.044	-0.006	0.036	-0.019	0.036	0.049	0.055	0.006	0.023	-0.002	0.018	-0.004	0.040	16,305	0.845
Ireland	-0.004	0.036	-0.004	0.059	0.031	0.088	-0.088	0.081	-0.007	0.037	0.004	0.036	0.019	0.043	12,939	0.824
Lithuania	0.049	0.070	0.097	0.069	0.125	0.088	0.183**	0.091	-0.021	0.026	-0.017	0.018	-0.063	0.080	13,206	0.831
Malta	0.011	0.027	-0.018	0.029	0.053	0.042	X	X	-0.010	0.024	0.011	0.018	-0.047	0.030	7,668	0.814
Northern Ireland	0.036	0.083	0.012	0.042	0.040	0.042	0.171	0.201	0.006	0.036	0.006	0.035	0.009	0.052	8,037	0.830
Norway	-0.011	0.054	-0.079*	0.042	-0.060	0.078	-0.299	0.280	0.068*	0.041	0.062*	0.032	0.015	0.059	4,233	0.790
Poland	-0.014	0.093	-0.012	0.099	-0.017	0.103	0.086	0.208	-0.007	0.023	0.003	0.023	0.015	0.102	14,442	0.830
Portugal	0.005	0.089	0.038	0.083	-0.029	0.097	0.003	0.151	-0.003	0.032	0.000	0.018	-0.017	0.107	11,409	0.806
Romania	-0.066	0.078	-0.077	0.081	-0.110	0.086	-0.107	0.083	0.018	0.037	0.015	0.027	0.088	0.064	13,476	0.847
Russian Federation	-0.101	0.098	-0.070	0.075	-0.049	0.069	-0.005	0.119	-0.020	0.031	-0.007	0.026	0.060	0.080	12,822	0.797
Singapore	-0.067	0.059	-0.045	0.060	-0.048	0.057	-0.101	0.127	-0.016	0.021	0.005	0.016	0.099	0.089	6,939	0.850
Slovak Republic	0.014	0.060	-0.014	0.061	-0.057	0.112	X	X	0.034	0.028	-0.001	0.026	-0.023	0.077	9,675	0.846
Slovenia	0.072	0.096	0.051	0.094	0.058	0.110	X	X	0.003	0.032	0.000	0.026	-0.054	0.092	12,738	0.836
Spain	-0.042	0.135	-0.062	0.131	-0.011	0.138	X	X	-0.050	0.045	-0.010	0.031	0.060	0.135	10,608	0.806
Sweden	-0.079	0.137	-0.016	0.063	-0.132**	0.053	X	X	-0.002	0.049	0.005	0.036	0.005	0.074	4,680	0.780

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. The "Assigned homework time" variable is measured in ten-minutes. Hungary does not have observations in the "I do not assign homework" category, so the category "15 minutes or less" has been used as reference category (indicated as "Ref."). "Coeff." stands for "Coefficient", "S.E." for "Standard error" and "X" means that there are not observations it that category.
Estimation method: Student fixed effects.
Dependent variable: PIRLS/TIMSS standardised five plausible values.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

Table A4. Effect of assigned homework time on students' academic achievement for students who like learning the three subjects in the same level

Countries	Assigned homework time		Subject: Reading (Ref.: Science)		Subject: Mathematics (Ref.: Science)		Constant		Observations	R-squared
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Australia	0.000	0.018	0.026	0.049	0.039	0.032	0.078	0.068	2,328	0.866
Austria	0.018	0.018	-0.022	0.044	0.004	0.059	-0.028	0.057	2,775	0.821
Azerbaijan	0.027	0.028	-0.064	0.069	-0.030	0.034	0.100	0.101	2,868	0.727
Croatia	-0.024	0.016	0.049	0.044	0.043	0.045	0.014	0.070	2,748	0.814
Czech Republic	0.003	0.028	-0.035	0.055	-0.033	0.036	0.058	0.071	2,334	0.809
Finland	0.036	0.039	0.034	0.057	0.044	0.039	-0.117	0.076	2,553	0.797
Georgia	0.021	0.015	0.023	0.047	-0.036	0.045	0.126*	0.071	3,339	0.835
Germany	0.002	0.026	0.093*	0.051	0.061	0.060	0.036	0.093	1,125	0.816
Hungary	-0.004	0.022	0.027	0.042	0.029	0.030	0.028	0.084	1,917	0.875
Iran, Islamic Rep. Of	-0.004	0.008	0.045	0.028	-0.009	0.028	0.040	0.049	6,165	0.853
Ireland	0.017	0.025	0.022	0.062	0.050	0.049	0.013	0.065	2,973	0.850
Lithuania	0.026*	0.015	0.015	0.043	0.011	0.027	-0.009	0.056	3,321	0.847
Malta	0.011	0.017	0.011	0.046	-0.054	0.040	-0.055	0.054	1,878	0.848
Northern Ireland	0.002	0.019	0.049	0.071	0.041	0.044	0.066	0.073	1,707	0.855
Norway	-0.040	0.034	0.105	0.089	0.058	0.068	0.134	0.096	894	0.817
Poland	-0.003	0.014	0.016	0.042	-0.017	0.038	0.023	0.057	3,447	0.855
Portugal	-0.022	0.021	0.004	0.040	0.024	0.025	0.115	0.091	4,209	0.822
Romania	-0.018	0.017	0.060	0.050	0.013	0.040	0.116*	0.065	4,812	0.857
Russian Federation	0.008	0.022	0.021	0.048	0.007	0.030	0.000	0.085	3,429	0.812
Singapore	-0.005	0.017	0.036	0.038	0.045	0.038	0.083	0.101	1,332	0.894
Slovak Republic	-0.002	0.025	0.004	0.043	0.028	0.031	0.026	0.072	2,313	0.857
Slovenia	-0.016	0.020	0.059	0.043	0.017	0.031	0.022	0.048	3,279	0.858
Spain	0.025	0.023	-0.016	0.060	-0.003	0.046	0.004	0.075	2,868	0.839
Sweden	0.006	0.033	-0.013	0.114	-0.010	0.064	0.062	0.095	939	0.761

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. The "Assigned homework time" variable is measured in ten-minutes. "Coeff." stands for "Coefficient" and "S.E." for "Standard error". The sample is that of students who like learning the three subjects in the same level – "like learning the subject", "somewhat like learning the subject" or "do not like learning the subject".
Estimation method: Student fixed effects.
Dependent variable: PIRLS/TIMSS standardised five plausible values.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

Table A5. Effect of assigned homework time on students' academic achievement for students who are confident in the same level in the three subjects

Countries	Assigned homework time		Subject: Reading (Ref.: Science)		Subject: Mathematics (Ref.: Science)		Constant		Observations	R-squared
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Australia	0.011	0.014	-0.026	0.038	0.038	0.030	0.129**	0.059	2,799	0.863
Austria	0.016	0.014	-0.004	0.038	0.044	0.045	0.192***	0.050	3,804	0.816
Azerbaijan	0.027	0.023	-0.129*	0.077	0.018	0.042	0.323***	0.107	2,619	0.739
Croatia	-0.001	0.013	-0.027	0.046	0.054	0.039	0.266***	0.059	3,840	0.818
Czech Republic	-0.002	0.020	-0.087**	0.042	-0.002	0.030	0.175***	0.059	2,388	0.828
Finland	0.067**	0.027	-0.083*	0.048	0.056*	0.030	0.056	0.084	3,198	0.808
Georgia	0.003	0.018	0.072	0.057	-0.004	0.039	0.155**	0.063	2,562	0.827
Germany	-0.008	0.023	0.013	0.044	0.056	0.048	0.243***	0.088	1,587	0.828
Hungary	0.004	0.015	0.003	0.045	0.026	0.034	0.194**	0.081	2,412	0.881
Iran, Islamic Rep. Of	-0.001	0.010	0.027	0.028	0.016	0.025	0.067	0.052	6,183	0.857
Ireland	-0.002	0.020	0.006	0.051	0.029	0.039	0.176***	0.052	4,089	0.840
Lithuania	0.030**	0.015	0.003	0.047	0.032	0.025	0.084	0.063	3,639	0.847
Malta	0.026*	0.014	-0.058*	0.033	-0.061**	0.028	0.166***	0.046	1,977	0.839
Northern Ireland	0.015	0.019	-0.020	0.061	-0.028	0.055	0.212***	0.060	2,127	0.838
Norway	-0.017	0.020	0.041	0.074	0.052	0.049	0.173*	0.099	1,398	0.815
Poland	-0.019	0.018	0.045*	0.026	-0.013	0.024	0.231***	0.048	4,548	0.850
Portugal	-0.003	0.023	-0.020	0.040	0.047	0.029	0.181*	0.093	3,642	0.806
Romania	-0.007	0.011	0.029	0.042	0.041	0.029	0.150**	0.066	5,085	0.862
Russian Federation	0.003	0.022	-0.012	0.060	0.036	0.027	0.102	0.082	3,378	0.809
Singapore	-0.007	0.015	-0.056	0.044	0.029	0.029	0.136	0.090	1,341	0.884
Slovak Republic	-0.027	0.021	0.022	0.044	0.045	0.027	0.219***	0.067	2,820	0.842
Slovenia	0.011	0.018	0.005	0.037	0.007	0.030	0.193***	0.042	4,227	0.852
Spain	0.026	0.023	-0.033	0.055	0.022	0.037	0.119	0.075	2,805	0.847
Sweden	-0.024	0.025	0.048	0.049	0.064	0.047	0.038	0.081	1,665	0.779

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. The "Assigned homework time" variable is measured in ten-minutes. "Coeff." stands for "Coefficient" and "S.E." for "Standard error". The sample is that of students who are confident in the same level in the three subjects – "confident", "somewhat confident" or "not confident".

Estimation method: Student fixed effects.

Dependent variable: PIRLS/TIMSS standardised five plausible values.

Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.

Source: Authors' own calculations.

Table A6. Effect of the interaction of frequency of homework with assigned homework time on students' academic achievement

	Interaction of frequency of homework with assigned homework time (Ref.: I do not assign homework)								Subject: Reading (Ref.: Science)		Subject: Mathematics (Ref.: Science)		Constant		Observations	R-squared
	Every day		3 or 4 times a week		1 or 2 times a week		Less than once a week									
Countries	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Australia	-0.007	0.022	-0.011	0.021	-0.001	0.009	0.000	0.013	0.005	0.037	0.011	0.028	0.014	0.046	9,711	0.842
Austria	0.019	0.020	0.027	0.019	0.004	0.020	0.018	0.018	0.001	0.039	-0.034	0.054	-0.035	0.048	11,442	0.811
Azerbaijan	0.006	0.020	0.029	0.030	0.039	0.025	0.027	0.035	-0.008	0.070	0.052	0.047	0.063	0.089	7,479	0.738
Croatia	-0.008	0.013	-0.008	0.011	-0.012	0.012	-0.008	0.024	-0.002	0.035	0.002	0.031	0.024	0.040	13,134	0.791
Czech Republic	-0.017	0.027	0.010	0.018	-0.005	0.016	-0.007	0.015	-0.017	0.032	-0.015	0.029	0.041	0.049	9,813	0.810
Finland	0.019	0.029	0.019	0.020	-0.001	0.018	0.004	0.056	-0.035	0.049	-0.029	0.047	-0.015	0.050	11,691	0.775
Georgia	0.023**	0.011	0.026**	0.011	0.029**	0.013	0.060**	0.030	-0.001	0.030	0.009	0.037	-0.065	0.059	8,382	0.826
Germany	0.036	0.025	0.002	0.023	-0.002	0.018	-0.018	0.025	0.000	0.037	-0.079	0.071	-0.022	0.058	5,628	0.813
Hungary	-0.015	0.014	-0.005	0.012	-0.009	0.015	Ref.	Ref.	0.016	0.040	0.010	0.042	-0.012	0.075	7,449	0.864
Iran, Islamic Rep. Of	0.001	0.011	0.001	0.008	0.002	0.008	0.003	0.013	0.004	0.023	-0.005	0.021	-0.009	0.043	15,687	0.842
Ireland	0.007	0.023	-0.017	0.022	0.007	0.028	0.006	0.021	0.000	0.043	0.011	0.038	-0.002	0.041	12,732	0.824
Lithuania	0.027**	0.011	0.015	0.016	0.017	0.015	0.014	0.016	-0.032	0.037	-0.016	0.033	-0.014	0.049	13,053	0.831
Malta	0.020*	0.012	0.009	0.016	0.010	0.014	-0.005	0.010	-0.034	0.031	-0.041	0.028	-0.042	0.029	6,915	0.814
Northern Ireland	-0.011	0.019	0.016	0.017	0.010	0.016	0.016	0.013	0.030	0.068	0.002	0.052	-0.001	0.048	7,776	0.831
Norway	-0.036	0.030	0.009	0.024	-0.020	0.018	-0.007	0.027	0.073	0.072	0.037	0.044	-0.001	0.061	4,182	0.791
Poland	0.005	0.012	0.000	0.014	-0.003	0.014	-0.002	0.012	-0.014	0.031	-0.005	0.029	0.006	0.039	14,442	0.830
Portugal	0.008	0.028	0.007	0.016	-0.012	0.018	-0.018	0.018	-0.034	0.034	-0.015	0.021	0.024	0.075	11,097	0.807
Romania	-0.015	0.014	-0.016	0.016	-0.016	0.013	-0.012	0.011	0.031	0.043	0.017	0.043	0.046	0.056	13,173	0.849
Russian Federation	0.022	0.016	0.009	0.014	0.000	0.014	0.078**	0.032	-0.058	0.039	-0.044	0.035	-0.015	0.065	12,738	0.798
Singapore	0.005	0.012	-0.003	0.013	-0.005	0.010	-0.003	0.013	-0.024	0.023	-0.011	0.031	0.062	0.070	5,772	0.851
Slovak Republic	-0.025	0.026	-0.017	0.022	-0.018	0.020	-0.003	0.019	0.045	0.032	0.009	0.025	-0.003	0.071	9,606	0.846
Slovenia	0.002	0.015	-0.006	0.013	-0.012	0.019	-0.011	0.023	-0.004	0.037	-0.013	0.031	0.022	0.045	12,654	0.836
Spain	-0.004	0.017	0.013	0.018	0.000	0.024	-0.011	0.029	-0.036	0.048	-0.009	0.034	-0.009	0.059	10,332	0.806
Sweden	0.029	0.056	-0.015	0.027	-0.006	0.022	-0.022	0.022	-0.016	0.074	-0.006	0.062	0.011	0.071	4,563	0.780

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. The "Assigned homework time" variable is measured in ten-minutes. Hungary does not have observations in the "I do not assign homework" category, so the category "Less than once a week" has been used as reference category (indicated as "Ref."). "Coeff." stands for "Coefficient" and "S.E." for "Standard error".

Estimation method: Student fixed effects.

Dependent variable: PIRLS/TIMSS standardised five plausible values.

Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.

Source: Authors' own calculations.

Table A7. Effect of the interaction of teachers correcting assignments and giving feedback with assigned homework time on students' academic achievement

	Interaction of correcting assignments and giving feedback with assigned homework time (Ref.: I do not assign homework)						Subject: Reading (Ref.: Science)		Subject: Mathematics (Ref.: Science)		Constant		Observations	R-squared
	Always or almost always		Sometimes		Never or almost never									
Countries	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Australia	-0.002	0.010	0.001	0.028	-0.036*	0.021	0.000	0.027	0.010	0.030	0.013	0.052	10,308	0.843
Austria	0.017	0.013	0.025	0.019	0.061	0.098	0.001	0.031	-0.018	0.034	-0.041	0.047	11,445	0.811
Azerbaijan	0.012	0.019	0.006	0.034	0.018	0.076	-0.041	0.059	0.000	0.030	0.087	0.089	7,599	0.740
Croatia	-0.007	0.010	-0.015	0.015	X	X	0.001	0.032	0.007	0.027	0.028	0.038	13,104	0.790
Czech Republic	-0.005	0.013	0.012	0.026	0.230**	0.102	-0.009	0.027	-0.001	0.022	0.031	0.049	9,705	0.810
Finland	0.007	0.024	0.023	0.020	0.017	0.030	-0.025	0.040	-0.010	0.039	-0.040	0.053	11,259	0.777
Georgia	0.024***	0.009	0.017	0.011	-0.012	0.037	0.005	0.031	-0.005	0.039	-0.022	0.057	8,214	0.828
Germany	0.028	0.017	-0.003	0.019	0.003	0.025	0.025	0.033	-0.003	0.048	-0.064	0.059	5,475	0.814
Hungary	-0.005	0.012	-0.011	0.013	Ref.	Ref.	0.006	0.029	0.008	0.030	-0.015	0.076	7,350	0.863
Iran, Islamic Rep. Of	0.001	0.007	-0.001	0.009	-0.167	0.185	0.005	0.022	-0.005	0.019	-0.011	0.039	16,287	0.845
Ireland	0.000	0.015	0.016	0.054	0.004	0.053	-0.008	0.034	0.004	0.031	0.017	0.039	12,753	0.824
Lithuania	0.021*	0.011	0.019	0.012	0.059	0.051	-0.018	0.028	-0.011	0.020	-0.020	0.045	12,786	0.831
Malta	0.011	0.009	-0.010	0.014	-0.038	0.041	-0.009	0.025	-0.003	0.019	-0.062**	0.028	7,491	0.815
Northern Ireland	0.007	0.009	0.028	0.021	-0.054	0.060	0.009	0.042	0.001	0.032	0.012	0.043	8,037	0.830
Norway	-0.014	0.017	-0.035*	0.020	-0.063	0.055	0.058	0.041	0.047	0.034	0.010	0.059	4,182	0.790
Poland	-0.002	0.011	0.017	0.017	0.182	0.271	-0.004	0.025	0.000	0.025	0.002	0.038	14,442	0.830
Portugal	-0.009	0.015	0.007	0.020	-0.031	0.076	0.000	0.032	0.007	0.017	0.021	0.066	11,172	0.807
Romania	-0.013	0.010	-0.019	0.022	X	X	0.030	0.040	0.015	0.026	0.036	0.056	13,218	0.848
Russian Federation	0.012	0.014	0.021	0.026	0.045	0.036	-0.024	0.032	-0.005	0.027	-0.046	0.070	12,669	0.797
Singapore	-0.005	0.008	-0.005	0.017	0.020	0.035	-0.025	0.024	0.006	0.015	0.069	0.065	6,939	0.850
Slovak Republic	-0.011	0.016	-0.037	0.031	-0.046	0.028	0.041	0.027	-0.001	0.022	0.012	0.073	9,396	0.846
Slovenia	-0.005	0.014	-0.005	0.014	0.008	0.035	0.000	0.033	-0.002	0.025	0.019	0.038	12,420	0.836
Spain	0.004	0.015	-0.016	0.050	-0.045	0.522	-0.046	0.045	-0.013	0.031	0.001	0.052	10,479	0.806
Sweden	-0.012	0.018	-0.032	0.029	-0.059*	0.031	0.006	0.057	0.012	0.038	0.003	0.067	4,527	0.780

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. The "Assigned homework time" variable is measured in ten-minutes. Hungary does not have observations in the "I do not assign homework" category, so the category "Never or almost never" has been used as reference category (indicated as "Ref."). "Coeff." stands for "Coefficient", "S.E." for "Standard error" and "X" means that there are not observations it that category.
Estimation method: Student fixed effects.
Dependent variable: PIRLS/TIMSS standardised five plausible values.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

Table A8. Effect of the interaction of discussing the homework in class with assigned homework time on students' academic achievement

	Interaction of discussing the homework in class with assigned homework time (Ref.: I do not assign homework)						Subject: Reading (Ref.: Science)		Subject: Mathematics (Ref.: Science)		Constant		Observations	R-squared
	Always or almost always		Sometimes		Never or almost never									
Countries	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Australia	0.003	0.010	-0.026	0.024	-0.052**	0.022	0.006	0.026	0.012	0.030	0.014	0.052	10,254	0.843
Austria	0.014	0.013	0.026*	0.014	0.024	0.039	-0.001	0.033	-0.029	0.035	-0.034	0.049	11,682	0.811
Azerbaijan	0.021	0.020	0.041	0.025	-0.082	0.062	-0.047	0.060	0.012	0.026	0.077	0.099	7,521	0.739
Croatia	-0.008	0.011	-0.009	0.012	-0.167	0.147	0.006	0.032	0.008	0.028	0.027	0.037	13,020	0.790
Czech Republic	-0.004	0.016	-0.002	0.015	0.233**	0.100	-0.014	0.030	-0.005	0.024	0.037	0.051	9,546	0.810
Finland	0.010	0.021	0.039*	0.023	0.022	0.069	-0.026	0.037	-0.014	0.036	-0.030	0.055	11,823	0.776
Georgia	0.024**	0.010	0.018	0.011	0.071	0.090	-0.002	0.031	-0.012	0.038	-0.041	0.060	8,475	0.827
Germany	0.004	0.018	0.022	0.025	-0.019	0.091	0.016	0.034	-0.001	0.046	-0.047	0.059	5,667	0.812
Hungary	-0.007	0.011	Ref.	Ref.	X	X	0.009	0.028	0.007	0.030	-0.008	0.076	7,434	0.862
Iran, Islamic Rep. Of	-0.004	0.009	0.005	0.007	0.012	0.027	0.003	0.022	-0.004	0.019	-0.011	0.039	16,167	0.845
Ireland	0.005	0.016	-0.012	0.036	0.016	0.059	-0.008	0.033	0.001	0.031	0.016	0.039	12,795	0.824
Lithuania	0.021*	0.011	0.022	0.015	X	X	-0.020	0.026	-0.012	0.018	-0.024	0.045	12,855	0.832
Malta	0.010	0.009	-0.002	0.016	-0.018	0.029	-0.016	0.027	-0.006	0.018	-0.063**	0.028	7,491	0.815
Northern Ireland	0.008	0.010	0.001	0.017	0.005	0.067	0.010	0.040	0.005	0.032	0.009	0.044	7,875	0.830
Norway	-0.021	0.017	-0.016	0.018	-0.170***	0.051	0.057	0.041	0.054	0.033	0.006	0.060	4,182	0.791
Poland	0.004	0.010	-0.011	0.016	0.178	0.119	-0.003	0.025	0.006	0.024	-0.001	0.039	14,319	0.830
Portugal	-0.010	0.017	0.005	0.016	-0.037	0.033	-0.003	0.033	0.004	0.018	0.020	0.067	11,151	0.807
Romania	-0.012	0.009	-0.015	0.019	X	X	0.021	0.039	0.010	0.026	0.049	0.055	13,332	0.846
Russian Federation	0.011	0.014	0.011	0.016	0.077	0.050	-0.018	0.031	-0.007	0.026	-0.037	0.066	12,822	0.797
Singapore	-0.007	0.009	0.004	0.014	0.016	0.034	-0.024	0.024	0.005	0.015	0.069	0.065	6,939	0.850
Slovak Republic	-0.014	0.021	-0.021	0.023	0.061	0.193	0.039	0.028	0.005	0.022	-0.008	0.073	9,510	0.846
Slovenia	-0.002	0.013	-0.019	0.013	-0.081	0.077	0.003	0.030	-0.001	0.023	0.016	0.039	12,255	0.837
Spain	0.001	0.014	0.008	0.022	-0.002	0.053	-0.051	0.044	-0.011	0.031	0.001	0.050	10,455	0.806
Sweden	-0.017	0.017	-0.014	0.022	-0.058	0.062	0.002	0.057	0.017	0.038	-0.001	0.067	4,440	0.781

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. The "Assigned homework time" variable is measured in ten-minutes. Hungary does not have observations in the "I do not assign homework" and "Never or almost never" categories, so the category "Sometimes" has been used as reference category (indicated as "Ref."). "Coeff." stands for "Coefficient", "S.E." for "Standard error" and "X" means that there are not observations it that category.
Estimation method: Student fixed effects.
Dependent variable: PIRLS/TIMSS standardised five plausible values.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

Table A9. Effect of the interaction of monitoring whether or not the homework was completed with assigned homework time on students' academic achievement

| | Interaction of monitoring whether or not the homework was completed with assigned homework time (Ref.: I do not assign homework) | | | | | | Subject: Reading (Ref.: Science) | | Subject: Mathematics (Ref.: Science) | | Constant | | Observations | R-squared |
| | Always or almost always | | Sometimes | | Never or almost never | | | | | | | | | |
Countries	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Australia	-0.004	0.010	-0.044	0.041	0.068	0.062	-0.003	0.027	0.012	0.030	0.017	0.054	10,284	0.843
Austria	0.019	0.013	-0.027	0.033	0.059	0.063	0.003	0.031	-0.024	0.034	-0.042	0.048	11,541	0.811
Azerbaijan	0.010	0.019	0.034	0.032	X	X	-0.031	0.062	0.008	0.026	0.096	0.089	7,428	0.737
Croatia	-0.009	0.010	-0.016	0.019	X	X	0.007	0.032	0.008	0.028	0.025	0.037	13,095	0.790
Czech Republic	-0.006	0.013	-0.198	0.237	0.211***	0.073	-0.018	0.028	-0.004	0.021	0.042	0.048	9,435	0.811
Finland	0.019	0.019	0.040	0.034	0.465**	0.206	-0.027	0.041	-0.009	0.038	-0.039	0.056	11,676	0.776
Georgia	0.026***	0.010	0.027	0.020	0.023	0.078	0.011	0.031	-0.008	0.040	-0.050	0.062	8,172	0.829
Germany	0.007	0.017	0.005	0.027	-0.105	0.120	0.011	0.034	-0.002	0.047	-0.042	0.058	5,598	0.812
Hungary	-0.006	0.011	Ref.	Ref.	X	X	0.006	0.028	0.007	0.030	-0.009	0.076	7,377	0.863
Iran, Islamic Rep. Of	0.000	0.007	0.000	0.010	0.005	0.106	0.005	0.022	-0.004	0.019	-0.014	0.039	16,167	0.845
Ireland	0.001	0.017	0.000	0.029	0.136*	0.078	-0.006	0.033	0.003	0.032	0.015	0.038	12,834	0.824
Lithuania	0.022*	0.011	0.014	0.019	0.027	0.021	-0.020	0.027	-0.011	0.019	-0.020	0.046	12,711	0.832
Malta	0.010	0.009	0.016	0.024	0.069*	0.036	-0.027	0.027	-0.003	0.019	-0.067**	0.028	7,491	0.815
Northern Ireland	0.007	0.010	0.016	0.023	-0.016	0.188	0.009	0.042	0.005	0.032	0.011	0.044	7,953	0.830
Norway	-0.016	0.015	-0.044*	0.025	-0.069	0.083	0.055	0.041	0.047	0.033	0.007	0.060	4,182	0.790
Poland	0.001	0.011	-0.073**	0.033	X	X	-0.004	0.025	0.002	0.025	0.001	0.039	14,319	0.830
Portugal	-0.008	0.016	-0.021	0.078	0.045	0.063	-0.002	0.033	0.004	0.018	0.022	0.066	11,235	0.807
Romania	-0.012	0.010	-0.027	0.024	X	X	0.020	0.040	0.010	0.026	0.051	0.055	13,284	0.847
Russian Federation	0.011	0.014	0.046*	0.026	0.044	0.055	-0.017	0.030	-0.006	0.026	-0.040	0.065	12,672	0.797
Singapore	-0.005	0.009	-0.004	0.022	0.016	0.044	-0.023	0.023	0.006	0.015	0.069	0.065	6,939	0.850
Slovak Republic	-0.016	0.018	-0.059	0.039	-0.044	0.061	0.037	0.028	0.003	0.023	0.000	0.072	9,513	0.846
Slovenia	-0.004	0.013	0.015	0.053	0.013	0.031	-0.003	0.032	-0.003	0.024	0.017	0.039	12,039	0.837
Spain	0.003	0.016	-0.007	0.048	-0.255	0.427	-0.048	0.045	-0.011	0.031	0.000	0.053	10,398	0.806
Sweden	-0.014	0.018	-0.034	0.033	-0.075**	0.034	-0.004	0.057	0.014	0.038	0.004	0.066	4,629	0.779

Notes: PIRLS/TIMSS recommended practices have been applied, using both PIRLS and TIMSS Jackknife and student weights. The "Assigned homework time" variable is measured in ten-minutes. Hungary does not have observations in the "I do not assign homework" and "Never or almost never" categories, so the category "Sometimes" has been used as reference category (indicated as "Ref."). "Coeff." stands for "Coefficient", "S.E." for "Standard error" and "X" means that there are not observations it that category.
Estimation method: Student fixed effects.
Dependent variable: PIRLS/TIMSS standardised five plausible values.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.