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Decomposition of differences in PISA results in middle income countries

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DECOMPOSITION OF DIFFERENCES IN PISA RESULTS IN MIDDLE INCOME COUNTRIES[1]

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BACKGROUND PAPER FOR THE 2013 EDUCATION FOR ALL GLOBAL MONITORING REPORT

Abstract

Our objective is to analyse the role of teacher and school quality to explain differences in students' educational outcomes. With this aim, we use PISA microdata for 10 middle income and 2 high income countries and we apply decomposition methods in order to identify the role of these factors for different groups of students. Our results show that school and teacher quality and better practices matter even in different institutional settings. From a policy perspective, this evidence supports actions addressed at improving both factors in order to reduce cross-country differences but also between students at the top and bottom distribution in terms of socio-economic characteristics.

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Decomposition of differences in PISA results in middle income countries

1. Introduction

Despite the large number of studies that draw on Programme for International Student Assessment (PISA) microdata in their analyses of the determinants of educational outcomes, relatively little attention has been paid to the role of teacher quality and its interaction with other classroom and school level factors (Escardibul and Calero, 2012).

Our objective is to analyse to which extent differences in educational outcomes could be improved through a reform of teacher training and better motivation but taking also into account other individual, school and institutional characteristics of the educational systems under analysis. With this aim, we analyse data from the PISA surveys to analyse educational outcomes in Science and Reading. The reason to focus on Science in 2006 and Reading in 2009 is that for these subjects and years, additional information from the standard PISA questionnaire is available on teaching practices and students' attitudes and perception of teachers. In order to take into account the different institutional settings, the analysis is carried out for a wide set of middle income countries from the five following regions: Arab States (Jordan and Tunisia), Central Asia (Azerbaijan and Kyrgyzstan) Central and Eastern Europe (Russian Federation and Turkey); East Asia (Indonesia and Thailand) and Latin America (Brazil and Mexico). We also include two high income countries from Western Europe (the Netherlands and United Kingdom) in the analysis to compare the possible differences in educational outcomes between middle and high income countries. In order to analyse the factors behind differences between students in terms of educational outcomes, we separate students in two different groups according to their PISA economic, social and cultural status index (ESCS). In particular, we, first, analyse the gap in scores between the top and bottom quartile of students according to their ESCS and, second, we focus in the gap in the probability of these two groups of students to score above the PISA proficiency level 2. Next, we apply decomposition methods based on the estimation of educational production functions and models for the probability to achieve the previously mentioned minimum international benchmarks. In both cases, explanatory variables are related to the characteristics of the students, their families and the schools they attend putting special attention to the quality of teachers and schools.

The rest of the paper is structured as follows. Section 2 briefly summarises the previous academic works of interest for the study. Then, section 3 describes the methodological approach, the data sources and the variable definition. Section 4 describes the results obtained and, last, in Section 5 we summarize the main findings and propose some policy recommendations.

2. Review of the literature

In the various studies conducted to date in order to analyse cross-country differences among students in terms of educational outcomes numerous factors have been identified and, according to their nature, they can be categorised into three groups: individual characteristics, family background and characteristics of the schools (see, for instance, Hanushek and Woessmann, 2011a and 2011b).

The first group is made up of individual characteristic, among which, variables related to the student's nationality and main language stand out. It has been reported that the educational outcomes of immigrants are worse than those of native students (Meunier 2011, Chiswick and DebBurman 2004) and it is argued that this effect is related to the different home environments of each of the groups under analysis (Ammermueller, 2007a and Entorf and Lauk, 2008). In the case of languages, there is evidence that immigrants improve their academic outcomes when they speak the official language of the country in their home domain (Entorf and Minoiu, 2005).

The second group of variables refers to the family background. Coleman et al. (1966) was one of the earliest studies to show the impact of family variables on students' educational attainment. A number of studies, including Haveman and Wolfe (1995) and Feinstein and Symons (1999), claim that variables of this type have the greatest impact on educational performance. It is found that students whose parents have a high educational level obtain better outcomes than students whose parents have a lower level of education (Häkkinen et al. 2003, Woßmann 2003). In addition, the families' socio-economic level is also related to a student's academic performance – the outcomes improving the higher the parents' social and economic level. The genetic transmission of cognitive skills is one of the most frequently presented arguments for explaining the better performance of those students whose parents have a high level of education. Moreover, the presence of a good cultural environment and a stable family environment also contribute to enhance students' academic outcomes. In fact, there is usually a positive correlation between the parents' level of education and the family's socio-economic and cultural levels.

Finally, the third group of variables is related with different characteristics of the school attended by the students including, for example, school location, the type of school – public or private, the teacher-student ratio and school size. The consensus among academic authors analysing the influence of school characteristics is not so broad that in the two previous groups of factors. Studies such as Coleman and Hoffer (1987), Hanushek (1986), Stevans and Sessions (2000), Vandernberghe and Robin (2004) and Opdenakker and Van Damme (2006) among others, find that students attain better outcomes in private than in public schools. Yet, other studies including, for example, Noell (1982), Sander (1996), Fertig (2003), Somers et al. (2004) and Smith and Naylor (2005), report no effect of school type on student outcomes. Likewise, the effect of school size on student outcomes is unclear. While Barnett et al. (2002) and Howely (2003) find a positive relation between school size and educational attainment, Hanushek and Luque (2003) do not observe any significant impact of this variable in the majority of countries analysed. Results regarding the impact of the number of students per teacher are similarly inconclusive. Arum (2000) and Krueger (2003) show that students perform better in small classes, while Hanushek (2003) and Rivkin et al. (2005) fail to find a statistically significant effect of this variable on students' educational outcomes. Regarding teacher's quality and its impact on students' performance, Dolton and Marcerano-Gutierrez (2011) consider the determinants of teachers' salaries across countries and examine the relationship between teacher's remuneration and educational performance of students. Their results analysing panel data on 39 countries suggest that recruiting higher ability individuals into teaching and permitting scope for quicker salary advancement will have a positive effect on pupil outcomes. A similar result is obtained by Woessmann (2011). Boarini and Lüdemann (2009) analyse the impact of school accountability and school autonomy as well as that of spending for the quality of learning outcomes. Their results show that a high number of teachers per student is not associated with better educational outcomes, while teachers' wages seem to be positively related to students' results. Moreover, they find evidence about the role of some accountability policies at school and national level to increase student achievement, but no influence of school autonomy on students' test scores. Some recent empirical evidence also suggests the relevance of the teacher-student relationship. In particular, Lee (2012) finds that there is an association between students' perceptions of the school social environment and their outcomes. Last, it is worth mentioning that several studies have also highlighted the relevance of peers on educational outcomes (see, for instance, Hanushek et al., 2003).

3. Methodological approach

The data source drawn on in this study is the Programme for International Student Assessment (PISA), coordinated by the OECD, which aims to assess students on reaching the end of compulsory education, at the age of 15, in the subject areas of Mathematics, Science and Reading. PISA also provides information about the students themselves, their family background and the school as a learning environment. It is a triennial survey that currently provides data for four waves: 2000, 2003, 2006 and 2009. Taking into account that the 2006 and 2009 waves include information about student perceptions of teachers of Science and Reading, respectively, we analyse these data for a wide set of middle income countries and two high income countries. In particular, we will analyse two countries for each of the six following regions: Arab States (Jordan and Tunisia), Central Asia (Azerbaijan and Kyrgyzstan) Central and Eastern Europe (Russian Federation and Turkey); East Asia (Indonesia and Thailand); Latin America (Brazil and Mexico) and Western Europe (the Netherlands and United Kingdom).

As mentioned above, the main objective of PISA is to assess student attainment on reaching the end of compulsory education in the subject areas of mathematics, science and reading. To this end, the survey provides five plausible values for each subject area. Plausible values are not the students' actual test scores and should not, therefore, be treated as such; rather, they are random numbers drawn from the distribution of scores that could be reasonably assigned to each individual. This methodology was developed by Mislevy and Sheehan (1987, 1989) and is based on Rubin's theory for imputing missing or lost values

(1987). The idea is that each individual responds to a limited number of test questions, and, for this reason, it is necessary to estimate their behaviour as if they had answered all the questions on the test. To do this, their results are predicted using the responses to the questions they have actually answered and other variables obtained from the context questionnaire. Instead of predicting a single score, a distribution of values is generated for each individual with their associated probabilities and five plausible values are obtained randomly for each individual. In this way, the bias introduced when estimating the outcomes from a small number of test questions is avoided. Plausible values contain random error variance components and are not optimal as individual test scores. Thus, while unsuitable for the diagnosis of subjects they are well suited to the consistent estimation of population parameters. In this analysis, we use these values to conduct our proposed empirical analysis; however, in the descriptive statistics shown below the mean values are used. Sampling weights are used throughout the different parts of our empirical analysis.

Thus, the first step in determining whether the differences observed in the educational outcomes of students are related to individual factors or to characteristics of the family or school environment, we specify and estimate an educational production function which includes various controls at the individual, teacher and school levels. Specifically, the educational production function for each of the subject areas used in this study is based on the following expression:

$$RTest_i = \alpha + \beta \cdot Z_i + e_i \quad (1)$$

where $RTest_i$ refers to the five plausible values of the test results in each subject area (Sience in 2006 and Reading in 2009) for student i, Z_i is a vector of control variables related to the characteristics of the individuals, their family backgrounds and teacher and school environment, while e_i is a random error term. Given the nature of the endogenous variable (described in detail above), in order to estimate this model we need a method that will allow us to make multiple estimations of the dependent variable[2], which refers to the five plausible values of the educational outcomes in each subject area. Additionally, and due to the complex sample design used in PISA, a replication procedure has to be applied to calculate the variance of the estimators. For data of this type, the OECD (2009) recommends the Fay-modified balanced repeated replication (BRR) method (Fay, 1989), which improves the accuracy of the variance estimator without modifying the coefficients. This was the procedure adopted in this study. As regards the other variables of interest, we include the following variables provided in the survey (see Annex for more detail). Regarding individual characteristics we consider gender, age, nationality (native and first and second generation immigrants), type of family structure (nuclear, single parent and mixed race, only for 2009), a index related with the student' interest in learning science (only 2006) and a index of attitude towards school (only for 2009). As for variables related to teacher quality, we include some indices built from students' perceptions about teachers which differ between 2006 and 2009. In particular,

[2] To do so we employed the Stata module for performing estimations with plausible values. http://ideas.repec.org/c/boc/bocode/s456951.html

indicators for 2009 are teacher-student relation, disciplinary climate, teachers' stimulation and motivation of students' reading engagement, and those for 2006 are more focused in science: interaction between students and teacher in science, hands-on activities in science class, student investigations in science class and learning applications of science. Finally, we include variables related to the school including its location in urban or rural areas, school size, the number of students per teacher, whether the school is public or private, and also indices variables as ability grouping between classes, computer availability, school's educational resources, extra-curricular activities offered by school, school principal's leadership (not for 2006), school responsibility for curriculum and assessment, school responsibility for resource allocation, computers connected to the internet, academic selectivity.

In a second step, and based on the results of the estimation of the educational production function, we also explore the factors behind differences in educational outcomes between different groups of students by applying the Oaxaca-Blinder methodology. This method has been widely used to analyse employment discrimination on grounds of wages, gender, race or other worker characteristics. As it is well known, the technique allows us to decompose the difference between two groups in the mean level for a given variable into a part that is explained by group differences in the observed characteristic and a part caused by differences in the outcomes associated with these characteristics. These techniques have been rarely used in this context, although some exceptions include Ramos et al. (2012), Baird (2012), Burger (2011), Zhang and Lee (2011) and Ammermueller (2007b). As previously mentioned, we separate students in two different groups according to their PISA economic, social and cultural status index (ESCS). So, based on the estimates of the educational production function, we apply the Oaxaca-Blinder method in order to explain the gap in scores between the top and bottom quartile of students according to their ESCS. According to this methodology, the difference in the educational performance of both groups can be expressed as:

$$\overline{RTest}_T - \overline{RTest}_B = \left(\bar{Z}_T - \bar{Z}_B\right) \cdot \beta_T + \bar{Z}_T \cdot (\beta_T - \beta_B) + (\bar{e}_T - \bar{e}_B) \tag{2}$$

where the subindices *T* and *B* correspond to top quartile and bottom quartile students in terms of ESCS, respectively. Equation (2) enables us to quantify the extent to which the cause of the differences between these two groups of students is related to differences observed in individual factors, the school and teaching environment, or to the influence of unobserved factors. More specifically, the first term on the right-hand side of the equation corresponds to that part of the differential in educational performance attributable to the group differences in the observed characteristics, coinciding with the "explained" component of the Oaxaca-Blinder decomposition, while the second and third terms correspond to the difference in coefficients and differences in unobservable skills and capture, basically, the discriminatory or "unexplained" component of this decomposition.

Last, a different way of analysing educational outcomes from the PISA survey is to look whether students achieve or not the minimum required knowledge in each of the considered subject. This is known as PISA Proficiency Level 2 and for the 2006 survey the minimum score to achieve in Science is 409,5 while the value for Reading in the 2009 survey is 407. Using these values as thresholds, we build a binary variable (above and below these thresholds) and look at the factors contributing to explain the differences among the top and bottom quartile of students in terms of their ESCS. As now, we want to explain differences in terms of a binary variable and not a continuous one (scores), we cannot use a regression model framework but discrete choice models. Taking this into account, we estimate probit models with a similar specification to the ones used for the educational production function. Next, we decompose the differences in the probability of achieving the threshold applying Yun's (2004) methodology. This methodology is identical to the Oaxaca-Blinder decomposition, but it can be used for binary variables as the one used here. As before, the gap in the probability is decomposed into two components: differences in observable characteristics (the "explained" components) and differences in coefficients (the "unexplained" one). The method also proposes a detailed decomposition to understand the unique contribution of each predictor to each component of the difference.

4. Results

4.a. Descriptive statistics on students' score gaps and on the gap in the proportion of students to achieve a minimum benchmark

Figure 1 shows the distribution of one of our two educational outcomes of interest: students' scores on Science in 2006 and Reading in 2009 for the six geographic regions analysed in this study. From this figure, it is clear that there are important differences among these regions in terms of educational performance, both in Science and Reading. These differences are not only related to the central values but also to the skewness and symmetry of the distributions. While for high-income countries, the modal values are substantially higher and the distribution is relatively symmetric, in middle-income countries the situation is quite different: distributions are usually skewed and with modal values clearly lower than in the high-income ones.

Table A.2 in the Annex provides some summary statistics for the 12 considered countries on this measure of educational performance (scores) and on our second measure of interest, the proportion of students that have achieved PISA proficiency level 2 (understood as the minimum required benchmark in our cross-country perspective). As for average scores, we see that the UK and the Netherlands have the highest levels in both groups of students. It is worth noting that the average score in both Science and Reading for the top quartile of ESCS distribution of students in countries as Brazil, Indonesia, Azerbaijan, Kyrgyzstan, Tunisia and Jordan are below the average score for the bottom quartile in the two high income countries we also consider. A similar situation is observed when analysing the difference in the percentage of students achieving proficiency level 2 or more between that groups of students.

In Table A.2, the information about our two measures of educational performance is complemented by some descriptive statistics on potential explanatory variables related to the individual, its parental background, school characteristics and other aspects related to teacher quality and teacher practices. When looking at country differences, a similar picture emerges:

differences between high and middle-income countries are, in most cases, of a very relevant magnitude. One clear conclusion from the literature that we have summarised earlier is that these differences are explained in a very important proportion by socio-economic differences between families, so it is quite clear that we should control for these variables when looking at the potential effects of school and teacher characteristics. In order to do so, we have decided to focus on the potential explanatory factors of differences in educational outcomes between students in the top and bottom quartile according to the PISA index of Socio-Economic Status (ESCS). This will allow us to assess if part of the difference which is usually associated to the socio-economic status could perhaps be explained by different teaching practices or teaching quality between the schools these different students attend.

Figure 2 depicts the differences in average score and in the percentage of students achieving proficiency level 2 or more between students at the top and the bottom of the ESCS distribution for the 12 considered countries. The size of the gap varies considerably between countries. For instance, in Azerbaijan the difference in the average score for Science in 2006 among the two groups is not statistically significant and in Indonesia is around 50 points, while in the Netherlands, Brazil or the United Kingdom the difference is above 90 points. In relative terms, the gap in scores for Science is above the 20% in a notable number of countries: Jordania, Kirgizstan, Turkey, Thailand, Brazil, Mexico, and the Great Britain. For Reading, differences between students are slightly lower but also quite heterogeneous among countries. The two countries with lower differences are (again) Azerbaijan and Indonesia and the countries with higher differences are Brazil, Great Britain and Kirgizstan, with differences above the 20%. If we focus on the gap in the share of students above the proficiency level 2 between top and bottom students according to ESCS, we can see that the difference in both Science and Reading is around 30 percentage points, although in Russia, the Great Britain or in the Netherlands it is clearly smaller. The countries where differences are higher are Brazil, Mexico, Thailand and Jordan. In the next sections, we try to identify which are the main explanatory factors of these differences.

4.b. Factors explaining the gap in mean scores

Table 1 shows the results of estimating by Ordinary Least Squares the educational production function for each of the 12 considered countries for Science in 2006 and Reading in 2009. These results have been obtained working with the full sample and the only intention to look at these results is to provide a quick look at the relevance of the different variables considered before we move to the analysis of the gap between top and bottom students in terms of ESCS.

Looking at the results for both subjects, a relatively similar picture emerges, but with some notable exceptions in relation to previous literature. Regarding individual variables, gender is relevant in most cases, but with an opposite sign depending on the chosen subject: girls clearly outperform boys in Reading but boys seem to be slightly better in Science. Age is positive and significant for some countries while immigration, the use of a different language or family types different to the nuclear model have a negative effect on educational outcomes. Finally, we find that students' motivation has a positive and significant effect in most countries. Moving to school characteristics, we find that rural schools have a negative and significant effect in some countries. The results for other usual controls such as private or public schools, the school size or the student ratio are not so clear. Our evidence shows no positive effects of the introduction of computers in schools connected or not to the internet. Regarding the rest of characteristics of the schools, no significant effect is found in nearly all cases. Separating students in terms of their abilities, extra activities or additional autonomy of the schools seem to be not relevant to explain students' educational outcomes in these countries. However, a different picture is found when we look at the last block of variables related to teacher practices and teacher quality. In particular, when looking at the results for Science in 2006, we found a positive effect of a higher interaction between students and teacher and those activities oriented to show the applicability of science in real life. However, more practices or more experiments do not seem to have positive effects. In fact, they seem to have a negative effect. A potential explanation is that in order to do these activities, perhaps the number of class hours dedicated to theory had to be lower. Moreover, PISA tests do not put too much emphasis of applications in relation to theory. The results for Reading in 2009 show that disciplinary climate has a positive and significant effect on educational outcomes in most countries. The effort of teachers in stimulating and motivating students in Reading lessons also has a positive and significant effect. However, results are not conclusive regarding teacher-student relations on students' outcomes.

The results of the Oaxaca-Blinder decomposition are shown in table 2 and figure 3. As we can see in the table, the characteristics between the two considered groups of students explain around half of the difference among them both in Science 2006 and Reading 2009 but results are quite heterogeneous among countries.

In particular, and in relation to Science 2006, in Tunisia, Azerbaijan, Kirgizstan, Turkey, Indonesia, Thailand, Brazil, Mexico and the Netherlands differences in characteristics account for more than half the raw difference in scores between students in the top and bottom parts of the distribution according to the ESCS. In Jordan, Russia and Great Britain, differences in characteristics are relevant, but only explain about one third of the observed difference. For Reading 2009, the share explained by differences in characteristics is lower, although for some countries such as Azerbaijan, Indonesia, Thailand, Brazil and Mexico the contribution is still above the 50%. As in nearly all cases, the sign of the explained component is negative, observed characteristics contribute to increase the gap in scores between both groups of students. This means that if students with lower ESCS were identical in the observed characteristics to the students with higher ESCS, a significant part of the observed gap in the scores will disappear.

When we decompose the "explained component" in terms of individual, school and teachers characteristics, we find that individual characteristics have lower explanatory power than school and teacher quality. School factors are the more relevant ones both for Science and Reading, but variables related to teacher quality seem to be more relevant for Science than for Reading. In table 3 we show the results of the detailed composition that permits us to identify most relevant factors behind the three groups of variables. Regarding individual variables, interest in science is the most influential variable for 2006 data. For instance, in the Netherlands and the Great Britain around ten points of the observed gap could be reduced if students at the bottom of the ESCS distribution had the same interest in Science than students at the upper quartile. For Jordan and Turkey the reduction will be around five points while for Azerbaijan, Indonesia and Mexico will be lower (between one and two points). Moving to 2009 data, individual characteristics are less relevant to explain the gap in reading scores. The most influential variables are gender and the family type. Attitude at school is also relevant for some countries: the elimination of differences in attitude towards school between the two groups of students in Turkey and Mexico would reduce the gap in more than 2 points. Moving to school characteristics, the most relevant variables within this group are school size, school educational resources, activities to promote science and extracurricular activities. School size is clearly the most influential variable within this group, particularly for Reading scores in 2009. If differences in this variable between the two groups disappeared, the reduction of the gap will be around 10 points in Tunisia, Russia, Thailand and the Netherlands. Regarding variables related to teacher quality, the most relevant one when looking at Science scores in 2006 is teaching applications in Science while for Reading scores in 2009 it is stimulus to read. In both cases, if both group of students received the same stimulus from teachers, the gap will close in around 2 percentage points.

Last, it is worth mentioning that the rest of the gap, which is usually labelled as the "unexplained" part is associated to the different effect of the considered variables on the educational outcomes. The analysis of the detailed decomposition is not shown here but is available from the authors on request. The results from this analysis show that between 80% and 90% of the differential effect of the explanatory variables is associated to individual characteristics while school characteristics and teacher quality only have a minor role. This result is crucial as it shows that there are no differences on the "returns" to educational resources between students at the top and bottom of the ESCS distribution.

4.c. Factors explaining the gap in the proportion of students to achieve minimum benchmark

Table 4 shows the results of estimating a probit model to explain the probability of students to achieve a minimum benchmark in Science in 2006 and Reading in 2009. As in the previous section, these results have been obtained working with the full sample and the only intention to look at these results is to provide a quick look at the relevance of the different variables considered before we move to the analysis of the gap between top and bottom students in terms of achieving a minimum benchmark.

Results are very similar to the ones already explained for scores in Science and Reading. Regarding individual variables, gender is relevant in most cases, but with an opposite sign depending on the chosen subject: as before, girls clearly outperform boys in Reading but boys seem to be slightly better in Science. Age is positive and significant for some countries while immigration, the use of a different language or family types different to the nuclear model has a negative effect. Students' motivation also has a positive effect on the probability of students to achieve the minimum benchmark in both subjects. Moving to school characteristics, the evidence related to the relevance of some school characteristics and teacher practices is less ambiguous than in the OLS estimations for the score: the student to teacher ratio and being in a rural school have a negative and significant effect in most cases, whereas private schools and school size have mainly a positive effect. As for teacher quality variables, a higher interaction between students and teacher, activities oriented to show the applicability of science in real life, disciplinary climate and the effort of teachers in stimulating and motivating students in reading lessons have a positive and significant effect. However, a similar result is found in relation to more practices or more experiments, which do not seem to have positive effects.

The results of the Yun decomposition are shown in table 5. As we can see in the table, the characteristics between the two considered groups of students explain nearly all the difference among them in several countries. The contribution of observed characteristics is, however, lower than for scores although for some countries is still above the 60% of the gap. When looking at the contribution of individual, school and teacher quality characteristics, schools are again the most relevant factor although some variables related to teacher are also statistically significant. In particular, it is worth mentioning the frequency of scientific investigations in 2006 and stimulus to read in 2009, although their contribution to close the gap is below 1 percentage point in most countries.

5. Final remarks

Our objective was to analyse the role of teacher and school quality to explain differences in students' educational outcomes. With this aim, we have used applied decomposition methods for 10 middle income and 2 high income countries in order to identify the main factors behind differences in educational outcomes among students at the top and bottom distribution of socio-economic characteristics. The obtained results have shown that school and teacher quality and better practices matter even in different institutional settings and using different measures of educational outcomes. Table 7 summarises our main results on the impact of the different explanatory variables. We have found that variables related to interest in Science, positive attitude at school, school size and better educational resources, more activities to promote science and extracurricular activities together with teaching applications in Science and a higher stimulus to read are factor that increase educational outcomes but also help to close the gap between more favoured and less favoured students in terms of socio-economic characteristics. From a policy perspective, this evidence supports actions addressed at improving both factors, schools and teacher quality, in order to reduce cross-country differences but also between students at the top and bottom distribution in terms of socio-economic characteristics.

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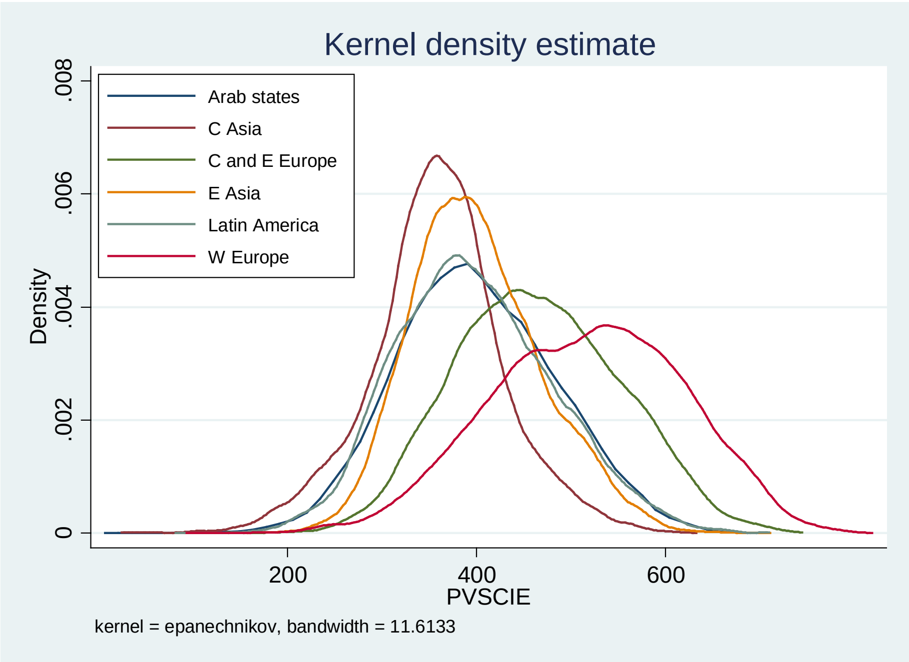
7. Tables and figures

Figure 1. Distribution of students’ scores in Science in 2006 and Reading in 2009

Distribution of students’ scores in Science in 2006



Distribution of students’ scores in Reading in 2009

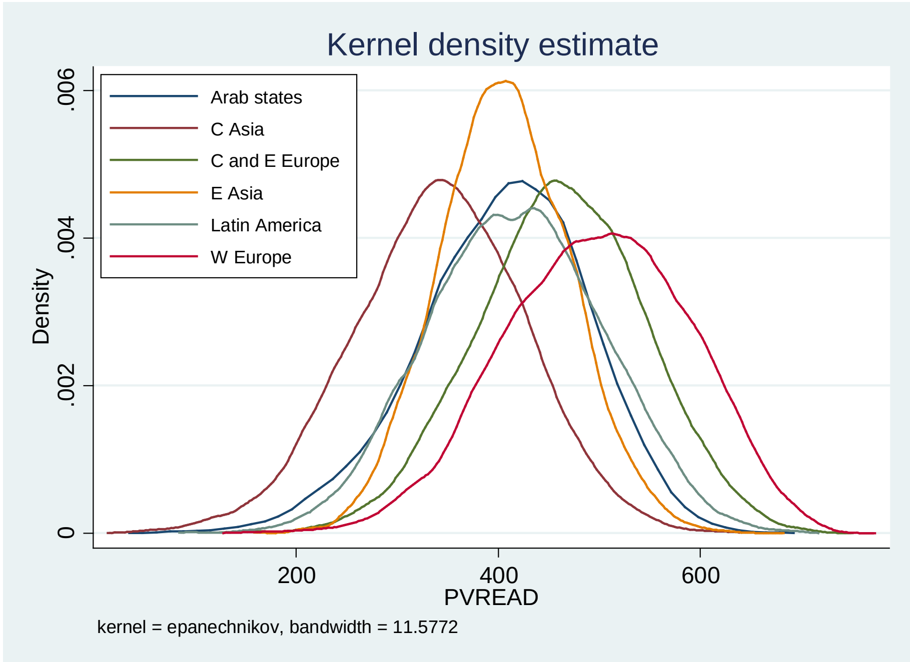
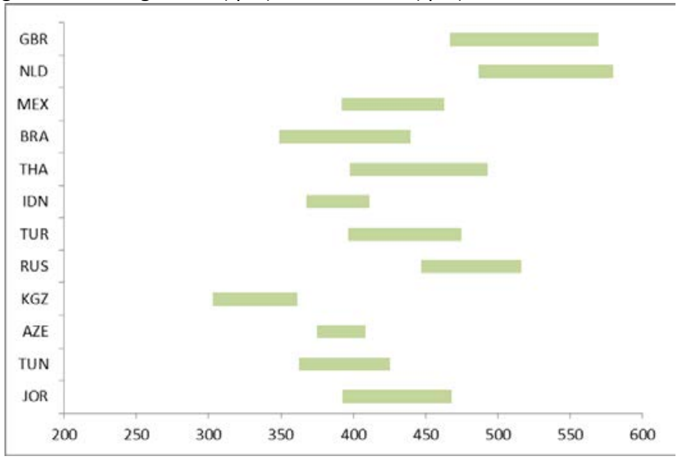
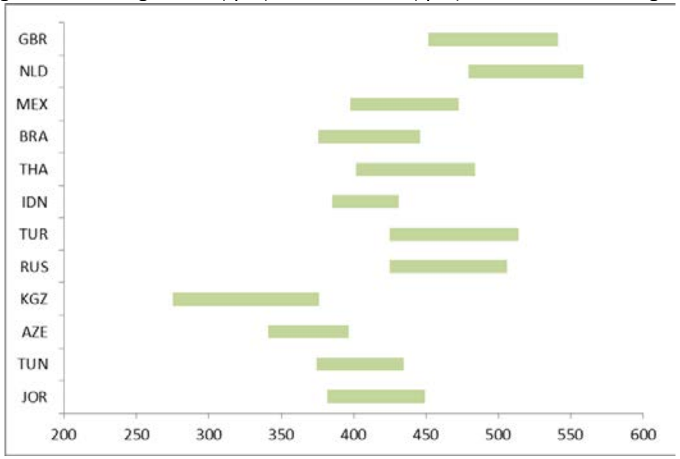


Figure 2. Differences in educational outcomes in Science in 2006 and Reading in 2009 between high ESCS (q75) and low ESCS (q25) students

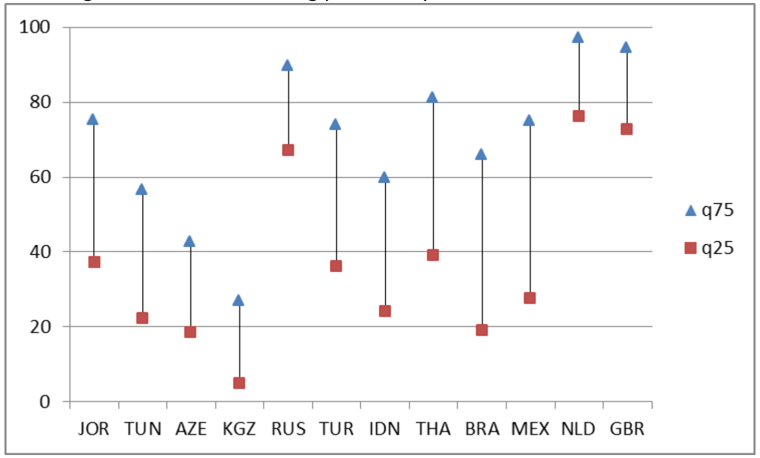
Average score for high ESCS (q75) and low ESCS (q25) students in Science in 2006



Average score for high ESCS (q75) and low ESCS (q25) students in Reading in 2009



Difference between high ESCS (q75) and low ESCS (q25) students in the percentage of students achieving proficiency level 2 or more in Science in 2006



Difference between high ESCS (q75) and low ESCS (q25) students in the percentage of students achieving proficiency level 2 or more in Reading in 2009

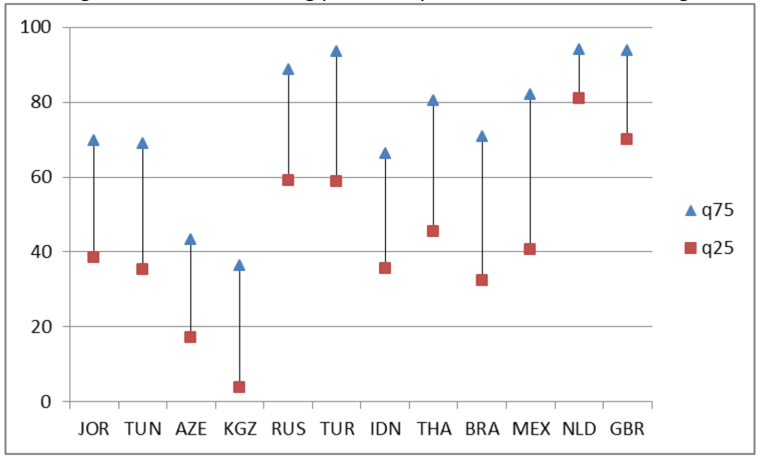
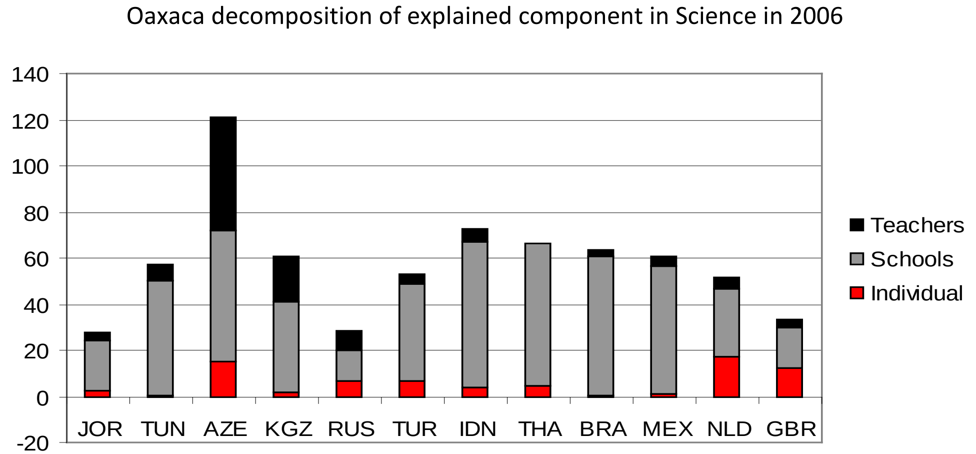
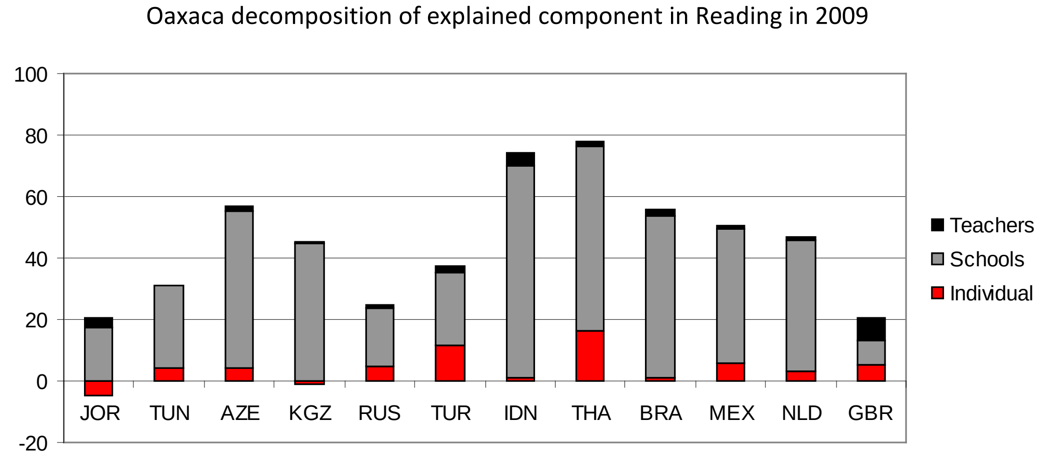
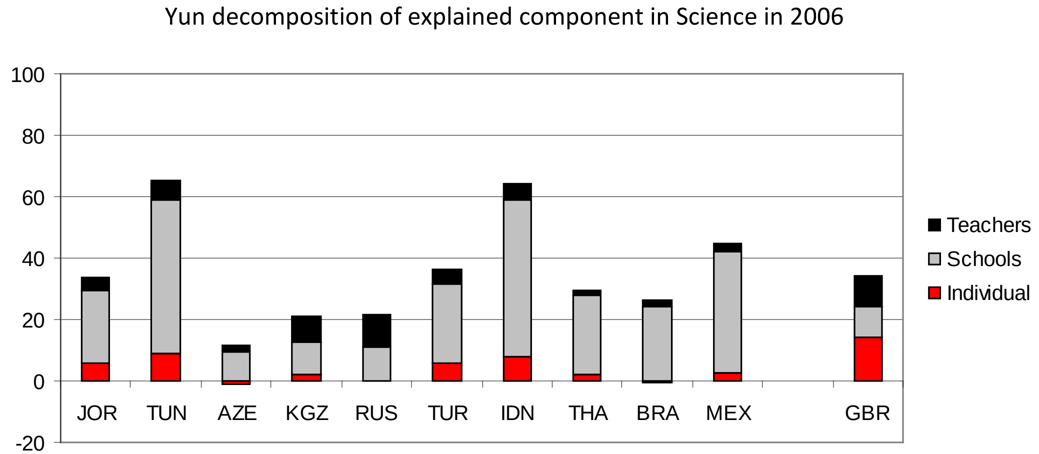
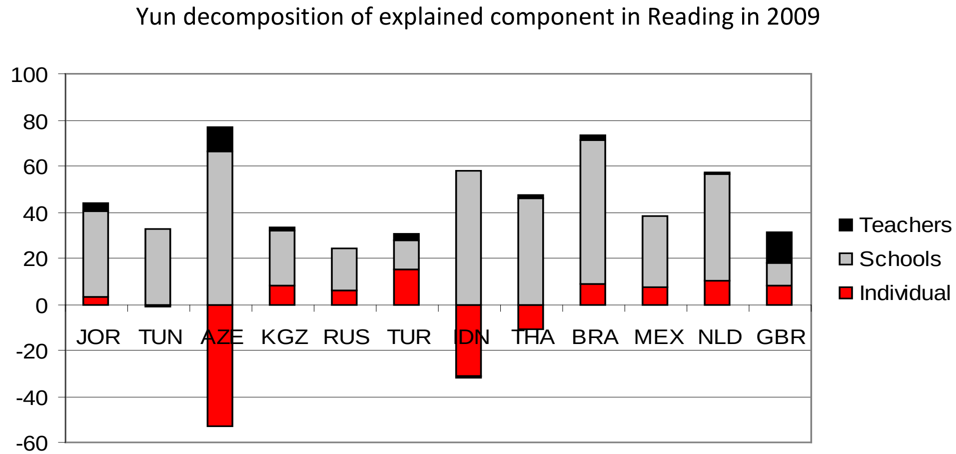


Figure 3: Decomposition of explained component between high ESCS (q75) and low ESCS (q25) students in scores for Science in 2006 and Reading in 2009









*Note: The Netherlands is not included in this figure because the difference between both groups of students is not statistically significant

Table 1. OLS estimates of the educational production function for scores in Science for the PISA 2006 dataset and Reading for the PISA 2009 datasets (1/2)

Science 2006	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Female	18.42***	-6.598**	2.61	-3.656	-11.53***	5.091	-13.02***	5.633*	-15.21***	-12.00***	-12.34***	-9.052***
Age	5.366	-2.618	11.07***	9.627*	15.12***	13.12***	2.897	19.94***	15.53***	0.82	30.91***	12.34**
Immig1	6.633	-39.90**	-4.918	11.25	-14.41*	17.09	-81.86***	50.49*	-77.23***	-59.84***	-31.43**	-20.15*
Immig2	9.384**	-22.11*	-8.768	31.40**	-13.45**	11.18	-79.50***	-79.06***	-27.57***	-42.50***	-48.39***	-21.35***
Language	2.164	-6.766	-1.88	-18.34	-51.92***	-11.27	-14.16*	-23.49**	15.77	25.73	-26.11***	-19.38*
Intscie	17.96***	13.98***	7.476***	1.558	12.99***	16.22***	15.07***	17.32***	5.505***	8.084***	22.64***	29.72***
rural	-14.20**	-17.55**	6.262	-38.72***	-28.38***	-19.83	-5.892	-22.94***	6.171	-17.94***	2.596	15.47***
Private	46.22***	-211.6***	78.00*	55.10*	0	14.14	-3.145	-15.46*	62.43***	6.715	-3.877	56.41***
Schsize	0.0229**	0.0282***	-0.000803	0.00481	0.0265***	-0.00505	0.0528***	0.0142***	0.0101**	0.00977**	0.0163**	0.0169***
Stratio	-1.103	-2.01	-0.183	1.397	-2.888***	0.0596	-1.069**	-2.374***	-0.440***	-0.328**	3.109**	1.066
iratcomp	51.13	2,699***	-134.1	-94.5	-50.11	-243.5**	129.7	42.28	47.53	65.28**	-211.1***	-36.94*
compweb	-0.872	5.373	-20.36	133.6*	17.37**	35.00***	24.88	3.76	14.60**	14.41**	4.557	5.565
grouped1	-10.13	-3.995	25.29	2.022	-6.782	-4.515	-15.41**	-7.994	-13.09**	-8.822*	-26.68***	-30.72
grouped2	-12.17	-26.04*	22.23	11.77*	-9.617	-11.71	-16.53	-9.933	-2.027	-5.01	-26.10***	12.71
scmatedu	4.224*	-5.977	-0.948	0.646	6.214*	3.346	2.139	9.183***	11.69***	4.065**	7.360**	2.684
sciprom	1.864	4.474*	7.064	4.133	1.358	12.17***	10.42***	7.031	6.957	10.39***	12.14**	-0.548
respcurr	-7.840*	-12.11	-3.051	1.052	-2.706	-0.669	-1.355	5.314	4.666	5.94	-1.871	-6.027*
Respres	-0.814	60.14***	10.7	-1.116	3.127	35.37	3.935	-1.945	5.213	12.37***	0.219	2.813
selec1	4.732	4.84	14.07	-11.37	-2.209	-2.162	4.052	-2.388	-4.297	7.423	43.29**	1.345
selec2	13.61**	13.44	-13.33	5.051	-10.03	-5.408	11.88	6.661	49.18*	25.49***	58.03***	16.1
selec3	22.35**	2.386	35.79**	-30.53**	-4.081	76.04***	8.386	-8.187	33.64**	17.95***	68.90***	74.83***
scintact	2.641	-0.236	8.321***	6.493**	1.013	8.759***	8.415***	-7.054***	4.345*	3.714***	-17.09***	-4.099*
scapply	13.88***	9.942***	9.383***	4.697**	15.28***	7.653***	-2.255	11.39***	7.835***	10.26***	19.91***	9.468***
schands	-15.87***	-5.678***	-9.693***	-10.25***	-8.150***	-10.39***	-2.307	1.247	-9.497***	-2.602*	-1.232	4.740*
scinvest	-17.59***	-17.43***	-16.11***	-20.79***	-24.58***	-16.14***	-15.94***	-11.05***	-16.90***	-20.11***	-16.07***	-26.25***
Constant	326.2***	443.8***	193.2***	211.4**	301.0***	240.9***	350.8***	135.6*	156.4**	419.3***	-7.521	277.7***

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 1. OLS estimates of the educational production function for scores in Science for the PISA 2006 dataset and Reading for the PISA 2009 datasets (2/2)

Reading 2009	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Female	36.28***	23.46***	19.15***	43.30***	33.25***	27.75***	32.02***	27.42***	20.44***	14.63***	18.82***	21.65***
age	-0.117	6.873	4.524	1.260	17.33***	5.425	2.818	7.063*	13.42**	4.013	8.917	15.05***
immig1	-7.571	-56.34	-10.44	-1.097	-11.89*	0.900	-68.25***	0	-101.5***	-59.53***	-30.11***	-15.24
immig2	7.327	-52.40*	-6.894	53.82***	-13.08**	0.862	0	0	-67.33**	-60.79***	-32.65***	3.276
family1	-26.13***	-13.49*	-6.565	5.709	-5.395*	-3.729	-15.41***	-9.554***	-8.058**	-8.834***	-8.742*	-11.99***
family2	-41.40***	-49.01***	-34.23***	-10.55**	-27.52***	-40.10***	-23.39***	-26.06***	-43.22***	-24.34***	-34.77**	-73.29***
language	-25.28**	-0.779	18.88***	13.69**	-36.06***	-28.51***	1.049	-4.800	-5.407	-30.91***	-15.62*	-39.21***
atschl	9.293***	8.226***	9.731***	13.87***	3.731*	-5.749***	10.06***	9.788***	0.831	16.29***	5.038**	4.969***
rural	-12.18	-19.68*	-7.360	-39.12***	-18.87***	-34.40***	-10.02*	-13.95***	-6.093	-20.05***	-23.26***	9.006
private	22.36**	-105.4	48.21	70.51**	-18.25	231.6**	4.025	-13.70*	71.02***	18.65**	-8.104	56.84***
schsize	0.0234**	0.0644***	0.0249**	0.0295*	0.0556***	-0.0181***	0.0244**	0.0147***	0.00567	0.00858***	0.0390***	0.0136*
stratio	-1.498*	-9.518***	-0.167	0.525	-2.584***	-1.138***	-0.419	-1.284***	-0.512***	-0.0382	2.899*	2.119*
iratcomp	-5.913	70.23	28.65	48.83*	16.19	-56.52***	22.06	12.47	-5.262	-1.170	-1.283	-1.022
compweb	-0.834	27.79**	16.01	-12.81	3.784	-17.25	29.74***	-5.849	8.660	4.288	-82.56	12.12
grouped1	-1.864	9.666	-23.02	19.64*	-12.53**	-4.033	-17.63**	21.71***	-12.56*	-9.781	-17.06	-48.18***
grouped2	-7.716	10.82	-17.20	7.429	1.166	0.0288	-0.969	14.30***	5.046	-0.741	-36.37***	-49.15***
scmatedu	-0.375	-2.723	0.830	9.229	5.145	2.703	5.368*	4.301	3.125	8.131***	-7.766	-0.334
excuract	8.637***	-4.222	-0.760	2.895	-3.329	9.748**	6.093***	2.910	7.354**	4.857**	28.78***	1.071
ldrshp	0.515	-4.401	-1.358	0.250	1.939	-1.820	-3.031	4.228*	3.213	-3.172	-8.701	1.273
respcurr	-8.619	29.56	0.493	-2.758	-0.986	4.465	2.725	4.857*	0.611	4.205	17.68***	1.561
respres	-3.145	2.883	-1.157	1.651	-2.821	-83.18*	-3.409	-4.836*	8.408	3.765	-5.292	-1.410
selec1	-3.143	1.013	7.768	-1.529	10.17	6.756	16.36*	1.981	9.282	-1.327	19.33	-11.93
selec2	13.27	16.79	2.631	-12.27	15.84**	29.65***	6.073	6.323	10.87	18.43***	31.37*	11.97
studrel	4.044***	1.215	-4.885***	-3.467	8.864***	3.269***	-5.653***	-2.168	3.669**	-2.648***	0.270	8.570***
disclima	5.339***	-0.0125	10.36***	12.19***	5.402***	7.702***	1.938	5.029***	7.616***	4.283***	1.269	11.09***
stim1	19.94***	11.38***	5.468	-1.731	21.14***	22.73***	-2.318	14.24***	5.679*	12.17***	-4.147	23.18***
motiv7	3.234	0.608	15.84***	4.241	9.023*	0.473	15.70***	10.09***	12.49***	10.96***	20.70***	8.766**
Constant	383.9***	369.8***	261.8***	272.7***	151.8*	358.4***	324.4***	281.0***	200.0**	352.9***	352.8**	218.7***

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 2. Oaxaca-Blinder decomposition between high ESCS (q75) and low ESCS (q25) students in scores for Science in 2006 and Reading in 2009

	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Science 2006												
ESCS25	392.9	369.7	398.0	307.6	447.4	396.1	376.6	397.4	364.8	382.6	492.6	470.2
ESCS75	471.4	425.9	412.5	376.0	519.6	478.4	430.2	480.2	457.4	471.1	585.2	576.7
Difference	-78.43***	-56.20***	-14.48	-68.33***	-72.26***	-82.25***	-53.57***	-82.81***	-92.63***	-88.48***	-92.59***	-106.4***
Unexplained	-56.70***	-24.25***	3.002	-27.06***	-51.78***	-38.88***	-14.61***	-27.71***	-34.12***	-34.47***	-44.62***	-70.79***
Explained	-21.73***	-31.95***	-17.48**	-41.27***	-20.47***	-43.38***	-38.96***	-55.10***	-58.52***	-54.01***	-47.97***	-35.62***
Individual	-2.191	-0.317	-2.144	-1.357	-4.730***	-5.316***	-2.128**	-3.945***	-0.463	-0.929	-16.04***	-13.16***
Schools	-16.99***	-27.95***	-8.305	-26.54***	-9.896***	-35.05***	-33.60***	-51.15***	-55.45***	-49.21***	-27.22***	-18.87***
Teachers	-2.554**	-3.684***	-7.034***	-13.37***	-5.849***	-3.012**	-3.230*	0.000956	-2.600	-3.872***	-4.705***	-3.591***
Reading 2009												
ESCS25	396.5	374.8	358.3	291.3	432.3	439.3	397.7	407.3	400.5	405.2	481.5	458.2
ESCS75	455.0	445.0	403.9	392.6	507.2	516.2	438.8	474.5	485.6	482.1	557.6	547.7
Difference	-58.54***	-70.21***	-45.63***	-101.3***	-74.90***	-76.85***	-41.08***	-67.19***	-85.19***	-76.94***	-76.15***	-89.54***
Unexplained	-49.29***	-48.58***	-19.64***	-56.10***	-56.52***	-48.30***	-10.68*	-14.68**	-37.73***	-38.06***	-40.44***	-71.39***
Explained	-9.259	-21.62**	-25.99***	-45.19***	-18.38***	-28.55***	-30.41***	-52.51***	-47.46***	-38.87***	-35.71***	-18.14***
Individual	2.654	-2.793*	-1.892	0.823	-3.566	-9.094***	-0.443	-10.87***	-1.084	-4.571***	-2.263	-4.828
Schools	-10.32*	-18.96**	-23.44***	-45.31***	-14.07**	-17.88***	-28.33***	-40.56***	-44.79***	-33.57***	-32.68***	-6.962***
Teachers	-1.590	0.133	-0.656	-0.707	-0.744	-1.583*	-1.635**	-1.080*	-1.590	-0.734	-0.764	-6.355***

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 3. Detailed Oaxaca-Blinder decomposition between high ESCS (q75) and low ESCS (q25) students in scores for Science in 2006 and Reading in 2009 (1/2)

Science 2006	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
ESCS25	392.9	369.7	398.0	307.6	447.4	396.1	376.6	397.4	364.8	382.6	492.6	470.2
ESCS75	471.4	425.9	412.5	376.0	519.6	478.4	430.2	480.2	457.4	471.1	585.2	576.7
Difference	-78.43***	-56.20***	-14.48	-68.33***	-72.26***	-82.25***	-53.57***	-82.81***	-92.63***	-88.48***	-92.59***	-106.4***
Explained	-21.73***	-31.95***	-17.48**	-41.27***	-20.47***	-43.38***	-38.96***	-55.10***	-58.52***	-54.01***	-47.97***	-35.62***
Female	0.842	0.0318	-0.169	-0.331	-0.111	-0.64	-0.263	-0.1	-0.62	-0.0465	-0.276	-0.148
Age	0.0808	-0.0516	-0.00521	-0.112	-0.452	-0.766*	0.6	-1.431**	0.164	-0.0967	0.0355	-0.0336
Immig1	1.709***	-0.0881	0.00796	-0.0538	-0.0437	-0.0187	-0.179	-0.0382	-0.0262	-1.143	-0.995	-0.0149
Immig2	-0.299	-0.0466	0.0374	-0.970**	-0.124	0.11	0	0.123	-0.687	-0.317	-3.373	-0.367
Language	0.342	1.188	-0.434	-0.0304	-4.340**	0.498	-0.175	-1.357	-0.0522	-0.0433	-1.507	-0.747
Intscie	-4.866***	-1.351	-1.581**	0.14	0.34	-4.498***	-2.110***	-1.142	0.758	0.717*	-9.926***	-11.85***
rural	-3.559	-4.236	-0.753	-13.47***	-5.891*	-0.165	-5.255	-10.94**	1.894	-9.576*	-0.0951	-1.311
Private	-10.47***	2.06	-0.861	-2.71	0	0.907	0.452	1.762	-19.92***	2.63	-1.105	-4.696*
Schsize	-2.063	-2.972	-0.659	-3.392	-2.139	-0.342	-9.891**	-18.81***	-0.469	-5.210*	-2.069	0.129
Stratio	0.289	-1.49	-0.0922	0.818	2.395	-0.822	-1.005	-5.271	-1.44	0.0541	-2.325	1.241
iratcomp	0.309	-18.62***	-2.046	-0.00833	0.0868	-0.388	-3.054	0.334	0.732	-3.254	-7.290**	-1.052
compweb	-0.959	-0.00974	0.00653	-2.563	-0.4	-1.073	-2.03	-0.489	-6.003*	-4.185	-0.0349	0.035
grouped1	-0.813	-0.00362	-0.0281	-0.128	-0.095	-0.0842	1.415	-2.6	-0.0783	-0.503	-0.752	-0.756
grouped2	0.169	-0.529	-0.0748	-1.352	-1.274	-0.629	0.143	2.958	-0.566	-0.0487	-1.947	-0.825
scmatedu	-0.595	0.195	-0.546	1.073	-1.552	-2.153	-2.323	-15.68**	-18.34***	-8.066***	-0.124	-0.798
sciprom	-0.733	-1.164	-1.534	-0.0249	-0.473	-13.26***	-8.775**	-2.502	-1.375	-5.864***	-6.759*	0.136
respcurr	2.772	0.1	-0.102	-0.301	0.0996	0.226	-0.424	-1.583	-3.651*	-2.572**	-0.0849	0.598
Respres	0.681	-2.065	0.532	0.361	-0.078	-0.95	0.423	1.503	-0.782	-7.132**	-1.368	0.024
selec1	0.933	-0.245	0.701	-1.239	-0.626	-1.663	-0.561	0.781	0.372	0.739	0.794	-0.0158
selec2	-0.706	1.645	0.231	-0.357	0.563	0.176	-1.205	-0.283	-2.367	-4.566**	1.655	-1.118
selec3	-2.241	-0.615	-3.079	-3.249	-0.512	-14.83**	-1.508	-0.331	-3.464	-1.654	-5.72	-10.46***
scintact	-0.306	0.177	-0.153	1.679	-0.11	-0.192	-1.204	0.672	0.942	-0.192	-0.646	0.228
scapply	-1.541**	-0.374	-0.293	0.494	0.173	-0.129	-0.161	-0.314	-3.605***	-1.573*	-5.381***	-0.947
schands	-0.654	0.221	-1.049	-1.434	-0.82	-0.949	-0.313	-0.754	2.306*	0.672	0.673	-0.596
scinvest	-0.0534	-3.708***	-5.540***	-14.11***	-5.092***	-1.741*	-1.552	0.397	-2.243	-2.779**	0.648	-2.276***

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 3. Detailed Oaxaca-Blinder decomposition between high ESCS (q75) and low ESCS (q25) students in scores for Science in 2006 and Reading in 2009 (2/2)

Reading 2009	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
ESCS25	396.5	374.8	358.3	291.3	432.3	439.3	397.7	407.3	400.5	405.2	481.5	458.2
ESCS75	455	445	403.9	392.6	507.2	516.2	438.8	474.5	485.6	482.1	557.6	547.7
Difference	-58.54***	-70.21***	-45.63***	-101.3***	-74.90***	-76.85***	-41.08***	-67.19***	-85.19***	-76.94***	-76.15***	-89.54***
Explained	-9.259	-21.62**	-25.99***	-45.19***	-18.38***	-28.55***	-30.41***	-52.51***	-47.46***	-38.87***	-35.71***	-18.14***
Female	2.340	0.454	0.00846	0.693	1.267	-2.035**	2.285*	2.786**	1.438**	1.323**	0.891	-0.110
age	-0.0738	-0.156	0.0723	0.000863	0.0773	-0.00102	0.00231	-0.00445	-0.0320	-0.113	-0.131	0.0872
immig1	0.219	0.0756	0.0416	-0.0186	-0.316	-0.0210	0.119	0	-0.00526	-0.0932	0.829	-0.316
immig2	-0.645	0.0165	0.140	-0.177	-1.167*	0.0785	0	0	-0.461	-0.811*	-3.210	-0.160
family1	-0.836	-0.125	-0.0446	0.140	0.819	0.0849	-0.240	0.00156	-0.0558	-0.215	-1.243	-1.554
family2	-0.925	-3.178***	0.395	-0.685	-0.638	-3.937***	-1.373*	-5.275***	-1.941**	-1.184***	-0.254	-1.832*
language	2.902**	0.0970	-2.203*	1.249	-3.623	-1.104	-0.803	-8.411**	0.0139	-0.663	0.998	-0.976
atschl	-0.329	0.0225	-0.302	-0.380	0.0149	-2.160**	-0.433	0.0328	-0.0407	-2.815***	-0.145	0.0322
rural	-2.335	-1.634	-9.634	-16.16***	-6.687	-3.183	-5.478*	-6.972	2.455	-8.722***	-1.363	-0.0501
private	-4.291*	1.226	0.0405	-5.105	-0.000122	-6.120	0.0379	3.398*	-27.05**	-4.654*	0.170	-2.374
schsize	-1.405	-13.17***	-9.967	-12.29	-12.14***	-1.718	-4.334	-28.39***	-1.519	-4.627***	-9.391***	-1.139
stratio	0.825	-1.167	-0.310	0.358	4.629**	-2.287*	0.990	-1.154	-3.008	0.0445	-13.87*	0.0257
iratcomp	0.615	-1.630	-2.117	-2.874	0.441	-2.049	-2.115	-0.0379	0.418	-0.0473	0.00773	0.346
compweb	1.112	-4.275	-2.740	3.627	-0.0845	0.0230	-9.853**	-0.837	-1.253	-0.438	0.333	-0.0165
grouped1	0.513	-0.750	3.109	-0.708	-0.560	0.0284	-1.507	-2.620*	0.167	-0.0823	-1.257	-0.614
grouped2	-0.832	0.707	-1.612	-0.0136	-0.216	0.155	-0.356	-0.752	-0.228	0.786	-1.698	0.198
scmatedu	-1.077	0.157	-0.0433	-3.209	-1.011	-0.0216	-1.570	-1.087	-5.304	-10.73***	2.304	-0.000231
excuract	-5.461**	1.740	-0.163	-0.643	3.181**	-3.190	-3.567	-0.643	-6.666**	-2.802*	-8.794**	0.375
ldrshp	0.114	-0.936	0.0739	-4.842	0.293	0.761	0.328	-2.271	-0.943	3.335	0.118	-0.233
respcurr	3.568**	0.530	0.0528	-1.148	0.714	0.119	-0.691	0.699	-2.557	-1.492	-0.167	-0.437
respres	4.360	0.647	-0.140	-1.825	0.412	5.497	0.194	0.324	1.548	1.042	0.187	-0.272
selec1	-1.695	0.000248	0.00915	0.0237	-0.200	0.866	0.484	-0.214	-1.107	-0.164	0.733	-0.913
selec2	-4.335	-0.406	0.00377	-0.497	-2.842	-6.756**	-0.892	-0.00514	0.265	-5.018*	0	-1.857
studrel	0.196	0.280	-0.190	-0.0282	-0.576	0.212	-0.453	-0.0528	0.124	-0.153	-0.154	-2.457***
disclima	0.337	0.224	-0.668	-0.972	-0.0263	-0.353	-0.107	0.274	-0.532	0.462**	-0.114	-1.533
stim1	-2.097**	-0.407	0.167	0.317	-0.254	-1.425**	-0.186	-1.392***	-0.336	-1.015***	0.297	-1.923*
motiv7	-0.0250	0.0369	0.0343	-0.0229	0.113	-0.0170	-0.889*	0.0911	-0.846	-0.0275	-0.793	-0.441

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 4. Marginal effects of a probit model for Proficiency level 2 in Science for the PISA 2006 dataset and in Reading for the PISA 2009 datasets (1/2)

Science 2006	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Female	0.0979***	-0.0600***	0.0118	-0.0277***	-0.0354***	0.0458**	-0.0847***	0.0485***	-0.0950***	-0.0708***	-0.0182***	-0.00672
Age	0.0203	-0.0238	0.0889**	0.0218	0.0226	0.0610*	0.0463	0.0933***	0.0892**	-0.00384	0.0188*	0.0334**
Immig1	0.0666*		-0.0254	0.0414	-0.0433	0.103				-0.437***	-0.00605	-0.0455
Immig2	0.0390	-0.227	-0.137	0.132***	-0.0397	0.0302		-0.402***	-0.198***	-0.362***	-0.0504***	-0.0268
Language	0.00527	-0.0505	-0.0218	-0.0613*	-0.198***	-0.197***	-0.0810	-0.136*	0.112	-0.0693	-0.0826***	-0.0188
Intscie	0.102***	0.104***	0.0684***	0.00626	0.0554***	0.0975***	0.122***	0.120***	0.0232**	0.0593***	0.0191***	0.0451***
rural	-0.107***	-0.113***	0.0551*	-0.101***	-0.0726***	-0.144***	-0.0104	-0.147***	0.00898	-0.0999***	0.00908	0.0319***
Private	0.226***	-0.354***	0.585***	0.575***		0.185***	-0.0375	-0.118***	0.333***	0.0278	-0.00290	0.107***
Schsize	0.000115***	0.000171***	-2.04e-05	9.01e-06	0.000157***	-2.63e-05	0.000416***	9.06e-05***	4.46e-05***	0.000114***	1.15e-05	5.12e-05***
Stratio	-0.00505***	-0.0154***	0.000646	0.00423***	-0.0111***	0.00496***	-0.0122***	-0.0141***	-0.00200***	-0.00268***	0.00591***	0.00274
iratcomp	0.318	15.42***	-0.716	-0.344	-0.453*	-1.364***	0.646***	0.523***	0.491*	0.569***	-0.220***	-0.0722**
compweb	-0.0124	0.0659**	-0.181***	0.336***	0.0832***	0.242***	0.242***	-0.00758	0.0543*	0.0773***	0.0188	0.0626*
grouped1	-0.0651**	-0.0475*	0.210***	0.0364**	-0.0457**	0.0282	-0.149***	-0.0667**	-0.0412*	-0.0864***	-0.0550***	-0.345***
grouped2	-0.0562**	-0.187***	0.179***	0.0540***	-0.0321*	-0.0224	-0.162***	-0.0766**	0.0213	-0.0659***	-0.0822***	-0.0755*
scmatedu	0.0291***	-0.0177	-0.0327*	-0.00150	0.0256***	0.00689	0.0117	0.0420***	0.0626***	0.0201***	0.00790**	0.0168***
sciprom	0.0175*	0.0448***	0.0741***	0.0187**	-0.0112	0.0541***	0.0721***	0.0278*	0.0400**	0.0702***	0.0101***	-0.00268
respcurr	-0.0453*	-0.0953	-0.0156	0.000613	-0.0209**	-0.0314*	-0.0208**	0.0376***	0.0319**	0.0390***	0.00794*	-0.0111**
Respres	-0.00439	0.310***	0.0428	-0.0299***	0.0107	0.300***	0.0412***	-0.00478	0.0411*	0.0919***	-0.00215	0.00412
selec1	0.0151	0.0357	0.103***	-0.0458***	-0.0266*	-0.0150	0.0979**	-0.00366	-0.0370	0.0636***	0.0269**	0.00681
selec2	0.0417	0.0866**	-0.224***	0.00908	-0.0492*	-0.0612*	0.142***	0.0427	0.225***	0.167***	0.0549***	0.0341**
selec3	0.100***	-0.0159	0.293***	-0.0868***	-0.0635**	0.355***	0.149***	-0.0566*	0.190***	0.145***	0.110***	0.0850***
scintact	0.0223*	-0.0110	0.0629***	0.00986	0.0282***	0.0912***	0.0748***	-0.0512***	0.0201	0.0333***	-0.00989**	-0.00809
scapply	0.0803***	0.0722***	0.0656***	0.0246***	0.0313***	0.0523***	-0.0118	0.101***	0.0475***	0.0595***	0.0139***	0.0205***
schands	-0.0976***	-0.0428**	-0.0607***	-0.0154**	-0.0271**	-0.0831***	-0.0146	-0.000867	-0.0628***	-0.0139	-0.00777**	0.0253***
scinvest	-0.104***	-0.104***	-0.140***	-0.0731***	-0.0905***	-0.115***	-0.133***	-0.0862***	-0.0881***	-0.142***	-0.0245***	-0.0708***

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 4. Marginal effects of a probit model for Proficiency level 2 in Science for the PISA 2006 dataset and in Reading for the PISA 2009 datasets (2/2)

Reading 2009	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Female	0.227***	0.123***	0.101***	0.123***	0.127***	0.124***	0.288***	0.206***	0.145***	0.0780***	0.0363***	0.0631***
Age	-0.00683	0.0325	0.0154	0.0334	0.0462*	0.0180	0.00889	0.0673**	0.0388	0.00973	0.00951	0.0327*
immig1	-0.0267		-0.109	0.0768	-0.0679**	-0.0267			-0.588***	-0.498***	-0.138***	-0.0155
immig2	0.0509*	-0.202	-0.108*	0.257***	-0.0475*	0.0256			-0.312	-0.378***	-0.0536**	0.00425
family1	-0.132***	-0.0789**	-0.0238	0.0116	-0.0371**	-0.0679***	-0.132***	-0.0559**	-0.0599***	-0.0485***	-0.0225	-0.0306**
family2	-0.245***	-0.312***	-0.179**	-0.0420	-0.111***	-0.212***	-0.232***	-0.200***	-0.272***	-0.151***	-0.0833	-0.320***
Language	-0.0856	0.0302	0.141***	0.0211	-0.168***	-0.0465	0.0306	-0.0170	0.0339	-0.150***	-0.0550*	-0.121***
Atschl	0.0568***	0.0390***	0.0653***	0.0313***	0.0253***	-0.0142**	0.0995***	0.0884***	0.0137	0.0987***	0.0165**	0.0202***
Rural	-0.0717***	-0.117***	-0.0432	-0.173***	-0.0559***	-0.1000***	-0.0732***	-0.0902***	-0.0621**	-0.0654***	0.00716	0.0236**
Private	0.157***	-0.468***	0.340**	0.183**	-0.180		0.0103	-0.0962***	0.265***	0.0987***	-0.0310***	0.108***
Schsize	7.94e-05**	0.000438***	0.000135***	0.000108***	0.000206***	-4.80e-05***	0.000219***	9.19e-05***	1.33e-05	0.000106***	6.52e-05***	3.16e-05*
stratio	-0.00785***	-0.0649***	0.000367	0.00298	-0.00874***	-0.00329***	-0.00486**	-0.00696***	-0.00361***	-7.55e-06	-0.000643	0.00328
iratcomp	-0.120***	0.191	0.115**	0.235***	0.0454	-0.242***	0.0983	0.0414	-0.0331	0.0287	0.0123	-0.00117
compweb	-0.00184	0.184***	0.101***	-0.0206	-0.0287	-0.104***	0.245***	-0.0419	0.0342	0.0253*	0.0506	-0.0758
grouped1	-0.0235	-0.0306	-0.0960**	0.0839***	-0.0522***	0.00415	-0.157***	0.109***	-0.0654***	-0.00872	-0.0851***	-0.502***
grouped2	-0.0217	-0.249	-0.0358	0.0573***	-0.0149	0.0156	-0.0150	0.0885***	0.0227	0.000605	-0.125***	-0.139***
scmatedu	-0.00361	-0.0210*	0.0175	0.0207**	0.0309***	0.00946	0.0609***	0.0226**	0.00269	0.0361***	-0.0179***	0.000506
excuract	0.0363***	-0.0217**	-0.00942	0.0109	-0.00156	0.0201***	0.0446***	0.0254***	0.0472***	0.0191***	0.0475***	0.00129
ldrshp	0.0118	-0.0231**	0.00265	0.0261***	0.0145*	-0.00214	-0.0259**	0.0236**	0.0137	-0.00653	-0.0157**	0.00717
respcurr	-0.0324	0.212**	-0.00919	-0.0185**	0.00471	0.0145	0.0188*	0.0219**	-0.00868	0.00857	0.0132	0.00368
respres	-0.0615**	0.0509	-0.00141	0.0213	-0.0137	-0.162**	-0.0110	-0.0265**	0.0568*	0.0276***	-0.000142	-0.00150
selec1	0.00211	0.0164	0.0522	-0.0274	0.0186	0.0239	0.0700*	-0.0516	0.0583***	-0.0132	0.0212	-0.0515***
selec2	0.0831***	0.0899***	-0.0170	-0.0754***	0.0769***	0.0702***	0.0363	-0.0123	0.0729***	0.0818***	0.0509	0.0176
studrel	0.0130	0.0140	-0.0341***	0.00160	0.0260***	0.0190***	-0.0519***	-0.0175	0.0203**	-0.0110**	-0.0245***	0.00969
disclima	0.0173*	-0.0134	0.0719***	0.0357***	0.0229***	0.0217***	0.0181	0.0301**	0.0479***	0.0201***	-0.000985	0.0317***
stim1	0.112***	0.0888***	0.0406*	-0.0125	0.104***	0.0765***	-0.0189	0.0916***	0.0298	0.0654***	0.00293	0.0595***
motiv7	0.0272	0.0200	0.0939***	0.00517	0.0609***	-0.00306	0.134***	0.117***	0.0658***	0.0599***	0.0388***	0.0327***

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 5. Yun decomposition: differences in the probability of having Proficiency level 2 between high ESCS (q75) and low ESCS (q25) students

	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Science 2006												
Difference escs75-escs25	-0.371***	-0.305***	-0.229***	-0.234***	-0.230***	-0.371***	-0.335***	-0.419***	-0.471***	-0.444***	0.0130	-0.232***
Diff. In coefficients	-0.247***	-0.107***	-0.204***	-0.185***	-0.180***	-0.237***	-0.120***	-0.296***	-0.351***	-0.244***	0.0363	-0.152***
Diff. In characteristics	-0.124***	-0.198***	-0.0241	-0.0492***	-0.0497***	-0.135***	-0.215***	-0.123***	-0.120***	-0.200***	-0.0233	-0.0797***
Individual	-0.021	-0.028	0.003	-0.005	0.000	-0.022	-0.027	-0.008	0.003	-0.011	-0.033	-0.033
Schools	-0.088	-0.152	-0.022	-0.025	-0.026	-0.095	-0.171	-0.110	-0.114	-0.176	-0.262	-0.023
Teachers	-0.015	-0.018	-0.005	-0.019	-0.024	-0.017	-0.018	-0.005	-0.008	-0.013	0.272	-0.024
Reading 2009												
Difference escs75-escs25	-0.314***	-0.343***	-0.285***	-0.372***	-0.263***	-0.255***	-0.267***	-0.331***	-0.485***	-0.358***	-0.0846***	-0.204***
Diff. In coefficients	-0.175***	-0.233***	-0.217***	-0.249***	-0.199***	-0.177***	-0.198***	-0.210***	-0.129***	-0.220***	-0.0366***	-0.140***
Diff. In characteristics	-0.139***	-0.110***	-0.0679**	-0.123***	-0.0640***	-0.0779***	-0.0683**	-0.121***	-0.357***	-0.137***	-0.0480***	-0.0644***
Individual	-0.011	0.003	0.151	-0.031	-0.016	-0.038	0.084	0.035	-0.043	-0.027	-0.0085	-0.016
Schools	-0.116	-0.112	-0.190	-0.087	-0.047	-0.033	-0.154	-0.151	-0.304	-0.110	-0.0393	-0.020
Teachers	-0.010	-0.001	-0.029	-0.005	-0.001	-0.007	0.002	-0.005	-0.009	0.0001	-0.0004	-0.028

Table 6. Detailed Yun decomposition: differences in the probability of having Proficiency level 2 between high ESCS (q75) and low ESCS (q25) students (1/2)

Science 2006	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Difference escs75-escs25	-0.371***	-0.305***	-0.229***	-0.234***	-0.230***	-0.371***	-0.335***	-0.419***	-0.471***	-0.444***	0.0130	-0.232***
Diff. In coefficients	-0.247***	-0.107***	-0.204***	-0.185***	-0.180***	-0.237***	-0.120***	-0.296***	-0.351***	-0.244***	0.0363	-0.152***
Diff. In characteristics	-0.124***	-0.198***	-0.0241	-0.0492***	-0.0497***	-0.135***	-0.215***	-0.123***	-0.120***	-0.200***	-0.0233	-0.0797***
Female	0.00786***	-0.00381*	0.000349	-0.00155**	-0.00101	-0.00216	-0.00325***	0.000121	-0.00524***	-0.00162**		-0.000949*
Age	0.024	-0.0262	-0.00226	0.0165	-0.000156	-0.0178	0.0243	0.000504	-0.0692***	-0.0135	0.319	-0.0319**
immig1	-0.00595		0.00053		-0.000253					-0.0177***	-0.0517	
immig2	-0.00103		0.00197		-0.000162					-0.00181***	-0.0137	
language	0.00165	-0.0221**	0.00325**	-3.99E-06	-0.00579*		-0.00285***			0.000266	0.0062	
intscie	-0.0159***	-0.00513***	-0.00565**	0.00268*	0.00154***	-0.0217***	-0.0124***	-0.00645***	0.00146	0.00892***	-0.037	-0.0278***
rural	-0.0226***	-0.0310***	0.0396**	-0.0214**	-0.0164*	-0.0136*	0.0276	-0.0407***	0.0210**	-0.0243*	0.0455	-0.0115***
Private	-0.0383***						0.00155	0.0125*		0.0315	0.00988	
schsize	-0.00269	-0.0264***	-0.0158	-0.00733	-0.0136	0.00111	-0.107***	-0.0449	-0.0109***	-0.0566***	0.0779	-0.00193
stratio	0.000153	-0.0123	5.89E-07	0.000762	0.00429***	0.0101**	-0.0349***	-0.00265	-0.00523	-0.00136	-0.0443	-0.00121
iratcomp	-0.00779**	-0.0467***	-0.00891	0.00345	-0.000692	0.000431	-0.00395	-0.0111**	-0.0358*	-0.0102	-0.0505	-0.00157
compweb	0.00176	0.000433			-0.00356	-0.00650**	-0.0227**	-0.00213	0.00766	0.00186	0.0233	-0.00224
grouped1	-0.00256	0.00142*	-0.00537*	-0.00102	0.00630*	-0.000134	0.00685***	0.00269	0.000161	-0.00400*	0.0128	
grouped2	-0.000193	-0.00327	0.000548***	-0.00274	-0.0021	0.000967	0.00358***	-0.00376	0.00386	0.00085	0.0268	
scmatedu	-0.0135	-0.000945	0.0113**	0.00273	-0.00664	0.0011	0.00179	-0.0187	-0.0343	-0.00985	0.00387	-0.00792
sciprom	-0.00211	-0.00867**	-0.0423***	-0.00592*	-0.000713	-0.0145	-0.0395***	-0.00306	-0.00934*	-0.0212**	-0.118	0.00308
respcurr	-0.00108	0.00164	0.000424***	-0.00154	-0.000373	0.00259	-0.00278	0.00141	-0.0193***	-0.0137*	-0.0104	0.00139
respres	0.00901	-0.0341**	0.00619***	0.00788*	-7.89E-05	-7.49E-05	0.00697	-0.00795	-0.0108	-0.0591***	-0.0607	-0.000867*
selec1	-0.00279	-2.39E-05	-0.00659***		0.00332	-0.00285	0.0167**	-0.00168	-0.0008	0.00222	0.0459	
selec2	0.000329	0.00723**	0.00118		-0.00147	0.000792	-0.00708**	0.000507	-0.0128*	-0.00375	0.0502	
selec3	-0.00558	0.000376	-0.00179***		0.00573***	-0.0746***	-0.0180**	0.00952**	-0.00785*	-0.00842***	-0.274	
scintact	-0.000911	-0.000998	0.000198	-0.00305	0.00166**	-0.00140***	-0.0203***	0.00463*	-2.89E-05	-0.000417	0.0227	0.000142
scapply	-0.00696***	-0.000523**	0.000232	0.00493***	0.000498	-0.000828	0.000151	-0.0148***	-0.0156**	-0.00391**	0.232	0.00153
schands	-0.00444***	1.25E-05	-0.00245	-0.00635***	-0.00217	-0.00764***	0.0116**	0.0029	0.0171**	0.00482	0.0112	-0.00804**
scinvest	-0.00298***	-0.0168***	-0.00322	-0.0150**	-0.0239***	-0.00759***	-0.00899***	0.00184**	-0.00986***	-0.0133***	0.0059	-0.0176***
Constant	-0.0316	0.0294	0.00441**	-0.0223	0.0061	0.0197	-0.0323	-0.00213	0.0761***	0.0146	-0.256	0.0277*

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 6. Detailed Yun decomposition: differences in the probability of having Proficiency level 2 between high ESCS (q75) and low ESCS (q25) students (2/2)

Reading 2009	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Difference escs75-escs25	-0.314***	-0.343***	-0.285***	-0.372***	-0.263***	-0.255***	-0.267***	-0.331***	-0.485***	-0.358***	-0.0846***	-0.204***
Diff. In coefficients	-0.175***	-0.233***	-0.217***	-0.249***	-0.199***	-0.177***	-0.198***	-0.210***	-0.129***	-0.220***	-0.0366***	-0.140***
Diff. In characteristics	-0.139***	-0.110***	-0.0679**	-0.123***	-0.0640***	-0.0779***	-0.0683**	-0.121***	-0.357***	-0.137***	-0.0480***	-0.0644***
Female	0.00626***	0.000904**	-0.00594	0.000735	0.00528***	-0.0146***	0.0125***	0.0171***	-0.00269***	0.00501***	0.00109	-0.00128***
age	-0.0238	0.00127	0.122	0.0241	0.00523	-0.0197	0.0193	-0.000916	-0.188	-0.00720	-0.00639	-0.0245**
immig1	0.00586**			0.000356	-0.00233					-0.00342***		
immig2	-0.00149			-0.00125	0.000710					-0.00222***		
family1	0.000925			0.000170	-0.00372		-0.00292***	3.58e-06	0.00124	-0.000764		
family2	-0.00120			0.000505	-0.00102		-0.00908***	-0.0155***	-0.0106***	-0.00271**		
language	-0.0203***		0.0437	-0.0226*	-0.0143***	-0.00580	0.0897***	0.0328**		-0.00419***	-0.0094***	-0.00394
atschl	-0.00189***	0.000482***	-0.00961	-0.00237***	-0.00043***	0.00195	-0.00169***	0.00136***	-0.00377***	-0.0216***	-0.00162	-0.0135**
rural	0.00166	-0.0400***	0.118	-0.0290	-0.0219*	-0.00623	-0.0199	-0.0489**	-0.00580	-0.0250***	-7.62e-05	-0.000737
private	-0.0195***		-0.00503	-0.0241	-4.87e-05		-0.00180	0.00190	-0.0432	0.0900***	-0.00438*	
schsize	-0.00716	-0.0793***	-0.136	-0.0340**	-0.00632	-0.00110	-0.0415**	-0.0830***	-0.0206**	-0.0726***	-0.0123**	-0.00875*
stratio	0.00281	-0.00136***	-0.00582	0.00479	0.00234	-0.00757***	-0.0229***	-0.00334**	-0.000876***	-9.54e-05	-0.00193	0.000932
iratcomp	0.00550*	0.00986**	-0.0166	-0.000694	0.000794	-0.00555**	-0.000279	-9.85e-06	0.00405	0.00173***	0.000233	0.000771
compweb	0.000260		-0.156	0.00926	-0.000119	0.00726**	-0.0532***	0.00155	-0.00335	-0.0126	0.00147	-0.00374
grouped1	0.000391		0.0196	0.000806	-0.00104	-0.000671	-0.00737***	-0.0104**	8.50e-05	-2.27e-05	-0.00447*	
grouped2	0.00106		-0.00524	-3.69e-05	0.00609	0.000967	0.0123**	-0.00621**	-0.0117*	-0.00321**	-0.00351**	
scmatedu	0.00890**	-0.000831	0.0245	-0.0143*	-0.0118**	0.000489	-0.0217	-0.0182	-0.0110	-0.00147	0.00142	0.000221
excuract	-0.00125	-0.00161	-8.39e-05	-0.00178	-0.00390	-0.00337	0.00196	0.0118	0.00201	-0.00374	-0.0142**	0.000132
ldrshp	-0.00374**	-0.00365	0.00817	-0.000640	-0.000290	-0.000828	0.000146	-0.00780**	-0.00809	-0.00459	-0.000628	0.000900
respcurr	-0.00605*	0.00246	-0.00880	-0.00156	0.00123	0.00372*	0.00152	0.00193	0.0232***	0.00630	6.17e-05	-0.00462*
respres	-0.0919***	0.00424	-0.00393	0.00966	6.19e-05	0.0111	-0.00192**	0.00577***	-0.219***	-0.0722***	-0.000157	-0.00177
selec1	0.00449	-3.10e-05	-0.0113	-0.00712*	6.26e-05	0.00291	0.000126	0.00356	-0.00597	-0.000769	0.000182	-0.00373**
selec2	-0.0114	-0.00139	-0.0115	0.00167	-0.0116*	-0.0341***	0.000804	2.99e-05	-0.00412	-0.0122*	-0.000982	0.000517
studrel	-0.00522*	-0.00307**	-0.00264	0.000365	-0.000191	0.00335	-0.000894	-0.000670	-3.90e-06	0.000691	0.00167***	-0.000560
disclima	0.000533	0.00251	-0.0167	-0.00241**	1.30e-05***	-0.00199**	0.00471***	0.00267**	-0.00270***	0.00272**	0.000113	-0.0176***
stim1	-0.00610***	-0.00108	-0.00118	-0.00214	-0.00260***	-0.00830**	0.00177	-0.00763***	-0.000381	-0.00205	-0.000758	-0.00644
motiv7	0.000555	0.000273	-0.00859	-0.000432	0.00167**	-0.000430	-0.00375**	0.000753*	-0.00581	-0.00128**	-0.00138	-0.00375
Constant	0.0225	0.000209	0.00105	-0.0307*	-0.00580	0.0136	-0.0241	0.000260	0.161	0.0104	0.00782	0.0270**

Note: * Significant at the 10%.level. ** Significant at the 5% level. *** Significant at the 1% level.

Table 7. Summary results on the impact of individual, school and teacher variables on educational outcomes and on differences among top ESCS and bottom ESCS students

		Effect on the gap between top ESCS and bottom ESCS students		
		Reduce the gap in some countries	Increase the gap in some countries	Not significant in most countries or inconclusive results
Effect on educational outcomes	**Positive and significant in most countries**	Interest in Science Attitude at school School size School educational resources Activities to promote science Extracurricular activities Teaching Applications in Science Stimulus to read	Female (Reading)	Age Computers connected to the web Grouping students by ability Selectivity in students' admittance Disciplinary climate Reading motivation
	Negative and significant in most countries	Rural Family type Frequency of students investigation in Science		Female (Science) Immigrant status Foreign language Student-teacher ratio
	Not significant in most countries or inconclusive results	Private school Computers per student		Teacher's responsibility Interactive teaching in Science School Principal's leadership

8. Annex

Table A.1. Variable definition (1/3)

Variable	Definition
Educational outcomes	
Score	To facilitate the interpretation of the scores assigned to students in the Programme for International Student Assessment (PISA), the PISA mean score for reading and scientific literacy performance across OECD countries was set at 500 and the standard deviation at 100, with the data weighted so that each OECD country contributed equal.ly
Proficiency level 2	Science: At this level, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving. Reading: Some tasks at this level require the reader to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognising the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text.
Individual variables:	
Female	Dummy variable: 1 if female, 0 if male
Age	Age of student
Immigrant 1st gen. Immigrant 2nd gen.	Dummy variable: 1 if first-generation students (those born outside the country of assessment and whose parents were also born in another country), 0 if native students. Dummy variable: 1 if second-generation students (those born in the country of assessment but whose parents were born in another country), 0 if native students
Language	Dummy variable: 1 if language at home is a different language than the language of assessment, 0 if language at home is the same as the language of assessment
Family1 Family 2 (only 2009)	Dummy variable: 1 if single-parent family, 0 if two-parent family Dummy variable: 1 if other type of family, 0 if two-parent family
Intscie (only 2006)	The index of general interest in science learning was derived from eight items (ST21Q01-08) using students' responses. Positive scores indicate higher levels of interest in learning science.
Atschl (only 2009)	The index of attitude towards school was derived from students' level of agreement with the statements in ST33. Higher values on this index indicate perception of a more positive school climate.
School variables:	
Rural	Dummy variable: 1 if school localization is in a community with less than 15000 people, 0 if the community has more than 15000 people
Private	Dummy variable: 1 if private school, 0 if public school
Schsize	Number of girls and boys at a school
Stratio	Student-teacher ratio was obtained by dividing the school size by the total number of teachers.
Iratcomp	The index of computer availability was derived from dividing the number of computers available for educational purposes available to students in the modal grade for 15-year-olds by the number of students in the modal grade for 15-year-olds
Compweb	The index of computers connected to the Internet was derived from dividing the number of computers for educational purposes available to students in the modal grade for 15-year-olds that are connected to the web by the number of computers for educational purposes available to students in the modal grade for 15-year-olds

Table A.1. Variable definition (2/3)

Variable	Definition
Grouped1 Grouped2	Dummy variable: 1 if schools that group students by ability in all subjects, 0 if schools that do not group students by ability in any subjects Dummy variable: 1 if schools that group students by ability for some, but not all, subjects, 0 if schools that do not group students by ability in any subjects
Scmatedu	The index on the school's educational resources was derived from seven items (2006: SC14Q07-Q13, 2009: SC11Q07-Q13) measuring school principals' perceptions of potential factors hindering instruction at their school. Higher values on this index indicate better quality of educational resources.
Sciprom (only 2006)	School principals are asked to report what activities to promote students' learning of science occur at their school (SC20Q01-Q05). Positive scores indicate higher levels of school activities in this area.
Excuract (only 2009)	The index of extra-curricular activities was derived from school principals' reports on whether their schools offered the following activities to students in the national modal grade for 15-year-olds in the academic year of the PISA assessment (SC13Q01-Q14). Higher values on the index indicate higher levels of extra-curricular school activities.
Ldrshp (only 2009)	The index of school principal's leadership was derived from school principals' responses about the frequency with which they were involved in the following school affairs in the previous school year (SC26). Higher values on this index indicate greater involvement of school principals in school affairs.
Respcurr	School principals were asked to report whether "principals", "teachers", "school governing board", "regional or local education authority", or "national education authority" has a considerable responsibility for some tasks (2006: SC11Q07, SC11Q10, SC11Q11, SC11Q12, 2009: SC24Q07, SC24Q10, SC24Q11, SC24Q12. Positive values on this index indicate relatively more responsibility for schools than local, regional or national education authority
Respres	School principals were asked to report whether "principals", "teachers", "school governing board", "regional or local education authority" or "national education authority" has a considerable responsibility for some tasks (2006: SC11Q01-Q06, 2009: SC24Q01-Q06). Positive values on this index indicate relatively more responsibility for schools than local, regional or national education authority.
Selec1 Selec2 Selec3 (only 2006)	Dummy variable: 1 if schools considering at least one of these factors (SC19Q02-Q03) for student admittance, 0 if schools where none of these factors is considered for student admittance Dummy variable: 1 if schools giving high priority to at least one of these factors (SC19Q02-Q03), 0 if schools where none of these factors is considered for student admittance Dummy variable: 1 if schools where at least one of these factors (SC19Q02-Q03) is a pre-requisite for student admittance, 0 if schools where none of these factors is considered for student admittance
Selec1 Selec2 (only 2009)	Dummy variable: 1 if schools where at least one of these two factors (SC19Q02-Q03) is "always" considered for student admittance, 0 if schools where these two factors are "never" considered for student admittance Dummy variable: 1 if schools considering at least one of these two factors (SC19Q02-Q03) "sometimes" but neither factor "always", 0 if schools where these two factors are "never" considered for student admittance

Table A.1. Variable definition (3/3)

Variable	Definition
Teacher variables:	
Scintact (only 2006)	Four items (ST34Q01, ST34Q05, ST34Q09, ST34Q13) measuring student's reports on the frequency of interactive teaching in science lessons. Positive scores on this index indicate higher frequencies of interactive science teaching.
Schands (only 2006)	Four items (ST34Q02, ST34Q03, ST34Q06, ST34Q14) measuring students' reports on the frequency of hands-on activities in science lessons. Positive scores on this index indicate higher frequencies of this type of science teaching.
Scinvest (only 2006)	Three items (ST34Q08, ST34Q11, ST34Q16) measuring students' reports on the frequency of student investigations in science lessons. Positive scores on this index indicate perceived higher frequencies of this type of science teaching.
Scapply (only 2006)	Four items (ST34Q07, ST34Q12, ST34Q15, ST34Q17) measuring students' reports on the frequency of teaching in science lessons with a focus on applications. Positive scores on this index indicate higher frequencies of this type of science teaching.
Studrel (only 2009)	The index of teacher-student relations was derived from students' level of agreement with the statements ST34. Higher values on this index indicate positive teacher-student relations.
Disclima (only 2009)	The index of disciplinary climate was derived from students' reports on how often the followings happened in their lessons of the language of instruction (ST36). Higher values on this index indicate a better disciplinary climate.
Stim1 (only 2009)	Dummy variable: 1 if student answered "in most lessons" or "in all lessons" to the item Q37_a "the teacher asks students to explain the meaning of a text", 0 if student answered "Never or hardly ever" or "in some lessons".
Motiv7 (only 2009)	Dummy variable: 1 if student answered "in most lessons" or "in all lessons" to the item Q38_g "the teacher gives students the chance to ask questions about the reading assignment", 0 if student answered "Never or hardly ever" or "in some lessons".

Table A.2. Unweighted descriptive statistics of variables from PISA 2006 dataset (1/2)

PISA 2006	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Score Science	427.1	384.2	385.3	326.3	481.5	427.6	384.8	429.7	385.3	422.6	530.8	514.3
Prof. level	0.584	0.35	0.28	0.131	0.794	0.542	0.318	0.566	0.355	0.558	0.89	0.838
Female	0.546	0.528	0.482	0.537	0.517	0.463	0.503	0.579	0.542	0.542	0.487	0.504
Age	15.85	15.88	15.87	15.79	15.82	15.9	15.76	15.68	15.78	15.72	15.72	15.7
Natives	0.804	0.992	0.974	0.976	0.906	0.988	0.997	0.997	0.973	0.984	0.889	0.951
Immig1	0.0748	0.00307	0.0109	0.00826	0.0518	0.0054	0.00258	0.000334	0.00254	0.0111	0.0338	0.0219
Immig2	0.121	0.00526	0.0155	0.0158	0.042	0.00707	0.000573	0.00301	0.0241	0.00472	0.0771	0.0267
Language	0.0311	0.0479	0.0209	0.011	0.0803	0.0273	0.0173	0.0134	0.00349	0.00198	0.0562	0.0215
intscie	0.649	0.771	0.623	0.88	0.27	0.264	0.572	0.769	0.564	0.762	-0.332	-0.0377
Rural	0.307	0.285	0.611	0.688	0.291	0.111	0.656	0.395	0.23	0.252	0.175	0.361
Private	0.141	0.0134	0.0176	0.0106	0	0.021	0.327	0.126	0.159	0.121	0.68	0.0498
Schsize	749.9	1,013	933.8	876.5	683.6	1,020	639.1	1,732	1,150	912.3	1,059	1,018
Stratio	18.57	15.71	10.12	17.02	13.63	18.65	18.78	22.43	32.62	29.39	16.04	15.04
iratcomp	0.0527	0.0154	0.00903	0.0114	0.0331	0.0489	0.028	0.0759	0.0199	0.0741	0.143	0.262
compweb	0.456	0.581	0.126	0.0204	0.23	0.77	0.0861	0.703	0.591	0.513	0.907	0.955
grouped1	0.319	0.761	0.143	0.15	0.389	0.195	0.654	0.511	0.423	0.289	0.49	0.0916
grouped2	0.562	0.0361	0.809	0.528	0.387	0.204	0.115	0.418	0.0967	0.407	0.305	0.82
scmatedu	-0.742	-0.685	-1.367	-2.235	-1.164	-0.78	-1.565	-0.52	-1.016	-0.788	0.285	0.262
sciprom	0.905	0.344	0.276	0.766	1.162	-0.13	-0.0549	1.382	0.253	0.135	-0.436	0.394
respcurr	-1.228	-1.357	-0.731	-0.905	-0.513	-0.962	0.301	0.823	0.35	-0.783	0.719	0.505
Respres	-0.922	-0.98	-0.4	-0.552	-0.0673	-0.991	-0.128	0.236	-0.452	-0.262	0.666	0.502
selec1	0.392	0.373	0.579	0.515	0.445	0.411	0.214	0.323	0.243	0.332	0.0861	0.18
selec2	0.174	0.114	0.0326	0.095	0.0806	0.102	0.386	0.284	0.0394	0.19	0.332	0.0666
selec3	0.142	0.194	0.199	0.201	0.0983	0.21	0.309	0.28	0.0948	0.241	0.571	0.142
scintact	0.754	0.693	0.754	0.899	0.438	0.449	0.553	0.055	0.146	0.375	-0.261	0.0525
schands	0.525	0.645	0.534	0.804	0.583	0.0414	0.414	0.638	-0.24	0.506	0.0891	0.422
scapply	0.637	0.554	0.649	0.723	0.512	0.097	0.159	0.626	0.266	0.38	-0.259	0.0493
scinvest	1.018	0.941	1.233	1.283	0.554	0.797	0.799	0.964	0.525	0.744	-0.164	-0.0909
Observations	6,509	4,640	5,184	5,904	5,799	4,942	10,647	6,192	9,295	30,971	4,871	13,152

Table A.2. Unweighted descriptive statistics of variables from PISA 2006 dataset (2/2)

PISA 2006	JOR		TUN		AZE		KGZ		RUS		TUR		IDN		THA		BRA		MEX		NLD		GBR	
	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25
Score Science	467.8	392.2	425.6	362.5	408.6	375.1	361.2	302.6	516.0	447.0	474.8	396.3	411.1	367.5	492.9	397.7	439.8	348.7	462.9	392.1	579.6	486.7	569.6	466.5
Prof. level	0.76	0.40	0.57	0.22	0.46	0.21	0.26	0.05	0.90	0.66	0.75	0.37	0.49	0.20	0.85	0.40	0.61	0.18	0.77	0.38	0.97	0.79	0.95	0.72
Female	0.55	0.54	0.50	0.54	0.49	0.47	0.53	0.55	0.49	0.56	0.50	0.38	0.49	0.52	0.57	0.58	0.50	0.58	0.53	0.57	0.49	0.51	0.50	0.51
Age	15.85	15.86	15.88	15.88	15.87	15.86	15.80	15.79	15.82	15.81	15.92	15.89	15.76	15.77	15.71	15.66	15.77	15.78	15.72	15.73	15.73	15.72	15.71	15.70
Natives	0.76	0.86	0.99	0.99	0.96	0.98	0.97	0.98	0.91	0.90	0.98	1.00	1.00	1.00	1.00	0.99	0.98	0.97	0.99	0.97	0.95	0.77	0.96	0.94
Immig1	0.11	0.04	0.00	0.00	0.01	0.01	0.01	0.01	0.05	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.06	0.02	0.02
Immig2	0.14	0.10	0.00	0.00	0.02	0.01	0.02	0.01	0.04	0.06	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.00	0.01	0.03	0.18	0.02	0.04
Language	0.05	0.02	0.11	0.01	0.01	0.03	0.01	0.01	0.04	0.11	0.01	0.06	0.01	0.02	0.01	0.03	0.00	0.00	0.00	0.00	0.03	0.11	0.02	0.03
intscie	0.75	0.52	0.86	0.76	0.72	0.47	0.85	0.89	0.24	0.23	0.40	0.21	0.63	0.51	0.74	0.78	0.52	0.61	0.72	0.84	-0.11	-0.51	0.15	-0.22
Rural	0.21	0.44	0.14	0.42	0.38	0.80	0.48	0.85	0.18	0.42	0.06	0.18	0.47	0.82	0.16	0.63	0.12	0.38	0.11	0.46	0.12	0.21	0.37	0.34
Private	0.23	0.09	0.02	0.00	0.05	0.00	0.04	0.00	0.00	0.00	0.04	0.01	0.30	0.34	0.13	0.09	0.46	0.01	0.29	0.03	0.64	0.71	0.12	0.01
Schsize	806.9	696.4	1123.0	940.4	1243.0	634.5	1029.0	731.9	764.7	587.9	1037.0	910.2	740.9	561.2	2264.0	1213.0	1186.0	1045.0	1029.0	687.7	1151.0	960.3	1053.0	968.8
Stratio	18.40	18.21	15.13	16.22	10.17	10.13	17.62	16.14	13.37	13.56	17.49	18.93	18.27	19.35	20.01	23.29	29.25	34.69	27.96	29.74	17.29	14.68	14.86	15.06
iratcomp	0.06	0.05	0.02	0.01	0.01	0.00	0.02	0.01	0.03	0.03	0.05	0.05	0.03	0.02	0.08	0.07	0.04	0.01	0.10	0.07	0.12	0.16	0.25	0.27
compweb	0.52	0.40	0.60	0.57	0.17	0.08	0.05	0.00	0.28	0.18	0.78	0.76	0.16	0.05	0.79	0.62	0.73	0.47	0.61	0.43	0.90	0.91	0.96	0.95
grouped1	0.30	0.33	0.75	0.79	0.14	0.12	0.20	0.13	0.47	0.33	0.16	0.22	0.69	0.60	0.44	0.58	0.37	0.47	0.25	0.32	0.48	0.50	0.07	0.11
grouped2	0.57	0.58	0.02	0.05	0.82	0.82	0.52	0.49	0.34	0.44	0.20	0.19	0.12	0.13	0.49	0.35	0.16	0.07	0.44	0.41	0.26	0.36	0.86	0.79
scmatedu	-0.56	-0.92	-0.61	-0.75	-1.14	-1.53	-1.97	-2.45	-1.03	-1.29	-0.70	-0.83	-1.24	-1.79	0.07	-1.03	-0.17	-1.55	-0.35	-1.12	0.30	0.28	0.41	0.14
sciprom	1.05	0.83	0.49	0.25	0.53	0.11	0.88	0.69	1.21	1.10	0.24	-0.40	0.26	-0.27	1.48	1.33	0.39	0.15	0.35	-0.07	-0.14	-0.65	0.47	0.31
respcurr	-1.14	-1.27	-1.35	-1.36	-0.68	-0.76	-0.97	-0.85	-0.52	-0.49	-0.92	-0.99	0.22	0.35	0.97	0.75	0.52	0.26	-0.65	-0.85	0.67	0.76	0.55	0.48
Respres	-0.85	-0.96	-0.97	-1.01	-0.41	-0.38	-0.46	-0.61	-0.05	-0.05	-0.99	-1.00	-0.17	-0.06	0.50	0.07	-0.35	-0.52	0.01	-0.45	0.69	0.60	0.57	0.47
selec1	0.34	0.42	0.40	0.38	0.58	0.56	0.46	0.54	0.48	0.41	0.34	0.44	0.14	0.26	0.25	0.35	0.28	0.21	0.29	0.37	0.06	0.09	0.14	0.22
selec2	0.20	0.15	0.09	0.13	0.03	0.03	0.14	0.07	0.07	0.09	0.09	0.09	0.44	0.32	0.30	0.26	0.06	0.03	0.25	0.14	0.33	0.32	0.08	0.06
selec3	0.19	0.12	0.22	0.21	0.27	0.20	0.19	0.24	0.11	0.07	0.33	0.14	0.36	0.29	0.33	0.26	0.12	0.08	0.29	0.21	0.61	0.57	0.23	0.08
scintact	0.76	0.72	0.64	0.70	0.77	0.72	0.84	0.95	0.41	0.45	0.45	0.42	0.67	0.43	0.05	-0.01	0.21	0.06	0.40	0.36	-0.31	-0.26	0.07	0.06
schands	0.48	0.57	0.63	0.64	0.47	0.53	0.76	0.84	0.51	0.61	0.01	0.05	0.53	0.29	0.67	0.54	-0.16	-0.32	0.59	0.45	0.19	-0.01	0.48	0.38
scapply	0.68	0.57	0.55	0.54	0.64	0.62	0.69	0.75	0.51	0.49	0.11	0.06	0.20	0.12	0.65	0.54	0.36	0.18	0.46	0.34	-0.13	-0.42	0.14	-0.01
scinvest	1.00	1.04	0.84	1.02	1.12	1.29	1.02	1.48	0.44	0.63	0.72	0.80	0.77	0.77	0.92	0.91	0.44	0.55	0.68	0.80	-0.15	-0.18	-0.14	-0.05
Observations	1622	1627	1150	1158	1281	1289	1470	1471	1445	1448	1233	1234	2657	2664	1538	1543	2300	2302	7713	7725	1172	1210	3201	3204

Table A.3. Unweighted descriptive statistics of variables from PISA 2009 dataset (1/2)

PISA 2009	JOR	TUN	AZE	KGZ	RUS	TUR	IDN	THA	BRA	MEX	NLD	GBR
Score Reading	412.9	398.7	363.7	318.5	462.1	465.7	402.4	428.9	404.2	432	516.8	492.7
Prof. level	0.564	0.476	0.277	0.176	0.742	0.774	0.47	0.6	0.467	0.641	0.892	0.818
Female	0.519	0.524	0.479	0.522	0.506	0.489	0.507	0.569	0.548	0.524	0.507	0.502
Age	15.85	15.88	15.8	15.79	15.8	15.82	15.76	15.7	15.87	15.72	15.71	15.71
Natives	0.842	0.997	0.972	0.981	0.883	0.995	0.997	1	0.992	0.986	0.883	0.937
Immig1	0.0395	0.00162	0.00723	0.0071	0.0485	0.00123	0.00276	0	0.00263	0.00892	0.0303	0.0336
Immig2	0.118	0.00162	0.0206	0.0123	0.068	0.00391	0	0	0.00531	0.00506	0.0865	0.0299
Language	0.0328	0.00141	0.0769	0.2	0.0789	0.0417	0.633	0.409	0.00701	0.024	0.0617	0.0645
Family1	0.101	0.0731	0.0688	0.226	0.26	0.076	0.0754	0.182	0.246	0.201	0.144	0.217
Family2	0.0366	0.0824	0.019	0.124	0.0362	0.0604	0.216	0.175	0.132	0.0592	0.00412	0.0159
Two-parent fam.	0.863	0.845	0.912	0.65	0.704	0.864	0.709	0.642	0.623	0.74	0.852	0.767
rural	0.259	0.366	0.487	0.672	0.311	0.117	0.646	0.353	0.197	0.312	0.169	0.373
private	0.138	0.0224	0.0185	0.0237	0.00226	0.00681	0.462	0.129	0.117	0.106	0.603	0.0371
schsize	706.6	892.4	713.4	826	566.4	935.7	552.6	1,772	1,063	847.4	1,015	993.9
stratio	17.68	13.27	8.685	17.18	12.59	18.6	16.84	22.24	31.05	34.14	16.08	14.49
iratcomp	0.406	0.0729	0.318	0.178	0.441	0.215	0.145	0.422	0.13	0.287	0.577	0.907
compweb	0.757	0.71	0.174	0.0392	0.69	0.94	0.443	0.897	0.832	0.721	0.992	0.988
grouped1	0.465	0.0373	0.229	0.203	0.369	0.279	0.201	0.213	0.242	0.155	0.43	0.0785
grouped2	0.355	0.00425	0.691	0.527	0.417	0.35	0.206	0.49	0.208	0.522	0.334	0.861
scmatedu	-0.252	-0.486	-0.55	-1.744	-0.623	-1.317	-1.221	-0.331	-0.789	-0.761	0.27	0.37
excuract	0.688	0.306	0.91	0.747	0.747	0.378	-0.151	0.994	-0.486	-0.0352	-0.273	0.96
ldrshp	1.989	0.439	0.851	0.348	0.519	0.298	0.37	0.639	1.052	0.351	-0.452	1.028
respcurr	-1.191	-1.292	-0.668	-0.278	-0.37	-1.041	0.194	0.8	-0.511	-0.882	1.052	0.635
respres	-0.642	-0.701	-0.516	-0.423	-0.0675	-0.738	0.0989	0.285	-0.525	-0.351	1.318	0.316
selec1	0.481	0.516	0.253	0.235	0.413	0.416	0.168	0.215	0.28	0.236	0.11	0.193
selec2	0.337	0.208	0.675	0.612	0.248	0.429	0.7	0.702	0.135	0.465	0.885	0.241
studrel	0.216	0.0102	0.521	0.25	0.0543	0.438	0.126	0.103	0.222	0.173	-0.121	0.132
disclima	0.217	-0.18	0.54	0.357	0.407	0.043	0.259	0.312	-0.173	0.14	-0.278	0.0707
stim1	0.625	0.613	0.512	0.695	0.832	0.712	0.435	0.39	0.384	0.416	0.348	0.629
motiv7	0.661	0.651	0.761	0.822	0.863	0.661	0.812	0.751	0.732	0.732	0.7	0.741
Observations	6,486	4,955	4,691	4,986	5,308	4,996	5,136	6,225	20,127	38,250	4,760	12,179

Table A.3. Unweighed descriptive statistics of variables from PISA 2009 dataset (2/2)

PISA 2009	JOR		TUN		AZE		KGZ		RUS		TUR		IDN		THA		BRA		MEX		NLD		GBR	
	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25	q75	q25
Score Reading	449.4	381.8	434.2	374.4	396.4	340.9	376	275	505.9	425.1	513.9	425.1	431.3	385.3	484	401.5	445.8	375.3	472.2	397.6	558.9	479.5	541.1	451.4
Prof. level	0.73	0.41	0.66	0.34	0.44	0.18	0.39	0.04	0.89	0.59	0.93	0.61	0.66	0.35	0.85	0.46	0.65	0.32	0.83	0.46	0.96	0.83	0.93	0.70
Female	0.51	0.54	0.51	0.54	0.44	0.52	0.54	0.52	0.50	0.52	0.50	0.44	0.47	0.52	0.54	0.61	0.50	0.62	0.50	0.56	0.50	0.52	0.48	0.52
Age	15.84	15.86	15.87	15.90	15.78	15.81	15.80	15.79	15.80	15.81	15.82	15.81	15.75	15.77	15.71	15.70	15.86	15.87	15.73	15.72	15.70	15.71	15.72	15.70
Natives	0.79	0.90	1.00	1.00	0.97	0.98	0.98	0.98	0.91	0.86	0.99	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.98	0.96	0.75	0.94	0.92
Immig1	0.07	0.02	0.00	0.00	0.01	0.01	0.01	0.01	0.04	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.06	0.03	0.05
Immig2	0.15	0.08	0.00	0.00	0.02	0.02	0.01	0.01	0.05	0.09	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.03	0.20	0.03	0.04
Language	0.05	0.02	0.00	0.00	0.13	0.05	0.32	0.09	0.04	0.14	0.01	0.11	0.38	0.82	0.16	0.67	0.01	0.01	0.01	0.06	0.03	0.13	0.06	0.08
Family1	0.08	0.13	0.07	0.07	0.05	0.08	0.22	0.21	0.20	0.31	0.07	0.08	0.07	0.08	0.16	0.18	0.24	0.24	0.19	0.21	0.10	0.19	0.11	0.33
Family2	0.02	0.04	0.05	0.11	0.02	0.02	0.10	0.15	0.02	0.05	0.02	0.11	0.16	0.24	0.08	0.21	0.10	0.15	0.04	0.08	0.00	0.01	0.00	0.03
Two-parent fam.	0.90	0.83	0.87	0.82	0.93	0.90	0.68	0.65	0.77	0.64	0.91	0.82	0.77	0.68	0.76	0.61	0.66	0.60	0.78	0.71	0.89	0.80	0.88	0.65
rural	0.17	0.37	0.19	0.57	0.23	0.75	0.43	0.87	0.16	0.48	0.07	0.21	0.46	0.79	0.11	0.61	0.11	0.33	0.13	0.57	0.13	0.19	0.38	0.34
private	0.23	0.09	0.03	0.01	0.05	0.00	0.07	0.00	0.00	0.00	0.03	0.00	0.41	0.50	0.12	0.10	0.33	0.02	0.27	0.02	0.57	0.64	0.10	0.00
schsize	749.8	658.5	1029.0	768.0	904.2	511.4	987.3	668.7	688.5	443.7	824.9	906.8	707.3	454.4	2448.0	1204.0	1081.0	952.4	1024.0	555.4	1170.0	863.7	1030.0	930.6
stratio	17.50	17.36	13.04	13.23	9.10	8.39	17.83	16.06	12.96	11.84	16.63	19.78	16.41	17.34	20.86	22.40	28.71	32.29	34.25	31.35	17.41	15.08	14.28	14.40
iratcomp	0.45	0.39	0.09	0.06	0.38	0.29	0.21	0.16	0.47	0.43	0.21	0.23	0.17	0.12	0.45	0.42	0.20	0.10	0.32	0.30	0.55	0.61	0.89	0.93
compweb	0.80	0.73	0.80	0.57	0.29	0.08	0.06	0.02	0.75	0.65	0.94	0.95	0.58	0.31	0.93	0.86	0.87	0.79	0.83	0.58	0.99	0.99	0.99	0.99
grouped1	0.48	0.45	0.07	0.02	0.27	0.19	0.23	0.15	0.34	0.40	0.28	0.29	0.17	0.20	0.29	0.17	0.23	0.26	0.16	0.15	0.42	0.44	0.06	0.08
grouped2	0.33	0.38	0.01	0.00	0.67	0.71	0.56	0.52	0.46	0.37	0.32	0.36	0.25	0.19	0.56	0.48	0.22	0.19	0.52	0.56	0.31	0.34	0.88	0.86
scmatedu	-0.04	-0.38	-0.41	-0.63	-0.32	-0.66	-1.55	-1.87	-0.45	-0.75	-1.32	-1.36	-0.79	-1.51	0.19	-0.70	-0.34	-1.07	-0.25	-1.17	0.29	0.25	0.36	0.40
excuract	0.90	0.60	0.43	0.15	0.96	0.85	0.91	0.66	0.89	0.60	0.62	0.13	0.20	-0.40	1.35	0.77	-0.19	-0.74	0.23	-0.29	-0.10	-0.41	1.05	0.87
ldrshp	2.04	2.00	0.35	0.54	0.96	0.83	0.55	0.20	0.59	0.44	0.42	0.22	0.43	0.32	0.72	0.55	1.31	0.88	0.54	0.20	-0.46	-0.41	1.01	1.07
respcurr	-1.08	-1.25	-1.29	-1.30	-0.73	-0.60	-0.35	-0.18	-0.38	-0.33	-1.02	-1.05	0.22	0.11	0.86	0.79	-0.26	-0.61	-0.74	-0.97	1.07	1.10	0.66	0.60
respres	-0.46	-0.73	-0.70	-0.72	-0.48	-0.53	-0.23	-0.54	-0.04	-0.09	-0.69	-0.75	0.02	0.11	0.56	0.11	-0.03	-0.75	0.02	-0.59	1.32	1.36	0.44	0.20
selec1	0.43	0.52	0.53	0.50	0.25	0.27	0.28	0.19	0.44	0.40	0.34	0.41	0.14	0.20	0.26	0.16	0.30	0.26	0.22	0.25	0.07	0.13	0.17	0.22
selec2	0.44	0.28	0.21	0.21	0.70	0.67	0.58	0.69	0.32	0.20	0.56	0.33	0.76	0.65	0.69	0.73	0.15	0.13	0.58	0.35	0.93	0.87	0.32	0.18
studrel	0.36	0.08	0.05	-0.05	0.50	0.55	0.22	0.30	0.11	0.04	0.38	0.46	0.07	0.14	0.04	0.11	0.22	0.28	0.17	0.18	-0.07	-0.09	0.27	0.01
disclima	0.21	0.25	-0.33	-0.08	0.59	0.52	0.43	0.34	0.42	0.39	0.08	0.02	0.20	0.34	0.27	0.36	-0.17	-0.14	0.11	0.21	-0.28	-0.26	0.25	-0.08
stim1	0.68	0.56	0.65	0.60	0.52	0.53	0.70	0.70	0.85	0.81	0.75	0.66	0.47	0.40	0.44	0.35	0.41	0.37	0.47	0.37	0.39	0.33	0.71	0.55
motiv7	0.68	0.65	0.65	0.66	0.77	0.78	0.83	0.82	0.86	0.86	0.66	0.65	0.82	0.78	0.77	0.74	0.76	0.72	0.74	0.73	0.75	0.67	0.79	0.70
Observations	1,605	1,606	1,231	1,236	1,160	1,161	1,239	1,240	1,283	1,323	1,239	1,242	1,280	1,295	1,551	1,556	4,978	5,011	9,516	9,527	1,175	1,179	2,984	2,985