"The determinants of students' achievement: a difference between OECD and not OECD countries"

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Abstract

This paper investigates on the determinants of school performance measured by the average value of students' tests score (math, reading and science) at school level. PISA data from 2000 to 2012 are used in order to explore this relationship. A multivariate regression is assessed considering the different channels (funds, computers connected to internet, parental education, student teacher ratio, number of girls and ownership) and controlling for time and country fixed effects. The analysis is done both allowing for the total sample and grouping for OECD countries and NO-OECD countries. The most important results show that, considering the all sample and the only OECD countries, school performances are positively driven by the student fees, presence of girls and computers; also the mother's education plays an important role, while the father's one is notable only at high level, otherwise is negative. Moreover, differently from that the improvement of the student achievement in NO-OECD countries is encouraged from charity funds, the presence of girls, and the parent's education level.

***Keywords**: Test Scores; School Performance; Multivariate Regression*

***JEL:** C01; I21; I28*

1. Introduction

For many years researchers have showed interest in understanding the determinants of students' achievements because schooling is recognized as an important channel through which individuals accumulate human capital.

The main idea of the theory of human capital is that each person's education is an investment in her human capital which allows her to contribute to her society in a productive way. As any investment, the investment in human capital requires initial costs, in terms of direct spending and the opportunity costs of students' time, which are taken on in the hope that the investment will create future benefits in terms of higher productivity, higher wages, lower risk of unemployment, and so on (Woessmann and Schuetz , 2006).

Strong evidence indicates that quality of human capital is very important for individual success and for nations as a whole. Until recently, however, it has been difficult to look at quality across nations in a consistent manner (Hanushek, and Luque 2003).

Considering policies that might be used to promote higher quality schools within countries Hanushek, and Luque (2003) underline the particular emphasis is the power of resource policies such as improving teacher education or reducing class sizes.

Given that identifying the factors behind students' performances as well as understanding what contributes to the divergence in the achievement scores among countries is crucial considering the importance of improving the efficiency and equity of the educational systems.

Education production function studies attempt to determine the relationship of specific measured teacher or school characteristics (such as teacher experience, teacher education, class size, per pupil expenditures, etc.) with student achievement. However, because parents choose neighborhoods in which to live (and their associated schools) according to tastes and resources (Tiebout, 1956), student and family backgrounds are confounded with naturally occurring school resource characteristics.

There is some controversy about the interpretation of the findings of research on education production functions. For example Coleman et al. (1966) demonstrated that a large proportion of the variance in student achievement was explained by student background factors and that relatively little additional variance was explained by school characteristics. Moreover the schools influence the student academic outcomes also in Goldstein (1997), Konstantopoulos and Borman (2011), Konstantopoulos and Hedges (2008).

Some other studies recognize that this variation is due to factors as human or financial resources (Card and Krueger 1996) and that has links to social and economic outcomes (Hanushek 1986).

Although explanations for differences in school quality vary, implicit in many recent educational reforms is the recognition that school context matters (see Carlson and Cowen, 2015). School accountability systems (Booher-Jennings 2005; Dee and Jacob 2011; Jennings and Sohn 2014) charter schooling (Buddin and Zimmer 2005) and private school vouchers (Rouse 1998; Wolf et al. 2013), are intended to improve student outcomes by changing the schooling experience.

Given that and adding evidence to the literature on this point considering both the OECD and NON-OECD countries, this paper, using PISA data from 2000 to 2012, which are based on standardized tests taken by a representative sample of 15 years of students, aims at identifying the main determinants (students characteristics, family background, school funding and resources) playing an important role in explaining students' performances measured by the average value of students' tests score (math, reading and science).

Results show that, especially when OECD countries are taken into account, school performances are positively driven by the government resources, student fees, presence of girls and computers; also the mother's education plays an important role, while the father's one is notable only at high level, otherwise is negative. When non-OECD countries are, instead, considered, the improvement of the student achievement is driven by the presence of girls, and by the parent's education level. As to the student teacher ratio it negatively affects the outcomes in the most of the estimations performed.

The rest of the paper is structured as follows: Section 2 summarizes the relevant literature; Section 3 informs about the data; Section 4 describes the methodology and the estimation strategy; Section 5 and 6 respectively present the result and the robustness check. Finally Section 7 concludes.

2. Students' achievement determinants: a brief overview of the literature

The literature based on the analysis of the determinants of Test Score is very rich and explore different channels that affect the student achievements.

Many works are related to the estimation of education production function, and student background, school inputs, and institutional structures of the education system affect the achievement in any case.

For example Fuchs and Woessmann (2007) perform an analysis at level of the individual student. They use the PISA student-level achievement database to estimate international education production functions. The results indicate that student characteristics, family backgrounds, home inputs, resources, teachers, and institutions are all significantly related to math, science, and reading achievement.

Considering as determinants of test score the above input (student characteristics, family backgrounds, student's citizen, home inputs, resources, teacher), but in a separate way the following evidence is noted.

The strong association between students' socioeconomic background and their educational achievement is confirmed in several studies estimated both between than within countries, so both at the country level (Lee and Barro, 2001) and at the student level (Woessmann, 2003b).

As to the analysis between countries in each case, these studies make use of the cross-country structure of the data to compare the size of the association of the specific background measure with student achievement across countries. In general, the studies find that educational achievement differs substantially by student and family background within the separate countries, but also that there is substantial variation in the influence of families across countries.

Ciccone and García-Fontes (2009) using a counterfactual analysis in order to estimate the effect of educational attainment of parents on students' performance, conclude that in Spain there is a sizable increase in PISA scores relative to the rest of Europe when parental schooling is accounted for. But Spain's performance is rather poor to start out with and only rises to somewhat above average when accounting for parental education levels. In Catalonia accounting for parental education levels leads to small improvements in the PISA score compared to other Spanish regions and to Flanders, Lombardy, and Denmark.

Later Martins and Veiga (2010), using PISA 2003 data, investigate on the effects of socioeconomic-related inequalities in students' math achievement for 15 EU countries and find that there is socioeconomic-related inequality in mathematics achievement, favoring the higher socioeconomic groups in each country and there are important differences among countries.

The socio-economic background plays an important role also for determining learning outcomes and explaining the territorial differences in Quintano et al. (2009) using PISA 2006.

As to the analysis within countries, Checchi (2004) use PISA data in order to estimate the effect of family background and school level peer effects on students' performance in Italy. He found that there are significant regional disparities in student performance, even after controlling for the type of school attended. Meanwhile, considering both the geographical location than the average socio-economic status (SES) of students attending the schools among the main determinants of the students' achievement (as measured by the Invalsi test) in Mathematics in the year 2008/09 in Italian schools'. Agasisti and Vittadini in (2012) show that students attending schools in Northern Italy out perform their counterparts in the South[1].

In 2015 also Gianbona and Porcu analyze the 2009 OECD-PISA survey to examine individual background characteristics influencing the reading achievement of Italian 15 years-old students using the quantile regression (QR) approach. Results indicate that some family background predictors (parental education, computer availability at home, and availability of a desk for homework at home), the school program attended and, the region of student residence play important but differing role for low and high performing readers. For example, parental education shows a positive effect on student reading, academic (general) programs perform better than vocational or technical, and Northern regions perform better than Center-Southern ones, with differentiated effects along the distribution of students' reading scores.

When moving from family to school determinants of educational achievement, the topic most intensively researched are the inputs available in schools (Hanushek, 2006). Moreover measures of school inputs include expenditure per student, class size, availability of instructional material, and teacher characteristics. The studies reveal that in general, the cross country association of student achievement with resources tends to be much weaker than with socio-economic backgrounds.

Taking into account the spending inequality Card and Payne (1998), using a micro sample of Scholastic Aptitude Test (SAT) score, measure this effect on the test score between children with different family backgrounds and find evidence that the equalization of spending across districts leads to a narrowing of test score outcomes across family background groups.

The literature also offers evidence about the effects of financial reforms on student outcomes for which there is no consensus. The negative conclusions may be depends by the confounding factors, such as family income, that might be correlated with both district expenditures and student performance (Hanushek, 1986). Even when student academic potential and socioeconomic status are taken into account, certain types of expenditures play an important role in explaining differences in student achievement between schools.

A positive link is also evidenced. Eide and Showalter (1999) use a quantile regression to suggest that some measures of school performance may have positive effects at points in the conditional distribution of test score gains other than the mean. In essence, these findings suggest that the marginal dollar allocated towards per pupil district expenditures raises test score gains at the bottom of the conditional distribution. The way in which the additional per pupil expenditure is spent and how the additional time in school is used will obviously determine how effective these policies are in improving test score performance in the relevant points of the conditional distribution.

[1] This paper employs the new Italian data concerning the national final examination at the end of the lower secondary education (third year of the lower secondary schools, when the regular students are 13 years old) in the year 2008/09 (the first national examination was carried out in 2007/08). This final examination has been conducted through a standardized test identical for all the students involved in the exam. About 560,000 students in 6,000 schools have compiled the test (Invalsi, 2009). This study analyses a representative sample of students and schools that participated to this test.

The claim that "throwing more money at public schools will do little or nothing to improve them" was also rejected by Mackenzie (2006) who concluded that there is a positive relationship between funding and student performance.

In 2007, Chaudhary analyzes the effects of Michigan school finance reform on educational inputs and outputs. First he wants to explore the impact of *Proposal A* on education inputs, and second use the foundation allowance as an instrument to measure the causal effect of increased spending on 4th and 7th grade math scores. The results indicate that following *Proposal A* Michigan school districts increased operating expenditures by 5.8%. The increase in spending was used to increase teacher salaries and reduce class size. The instrumental variable (IV) results focus on Michigan school districts and find positive effects of increased spending on 4th grade math scores but no statistically significant effects on 7th grade scores.

As above clarified the literature that examines the determinants of test score is very rich, some papers investigate also on the role of class size and of student teacher ratio. Angrist and Levy (1999) show that reducing class size in Israel induces significant and substantial increases in test score for fourth and fifth graders, although not for third graders. Similarly, Hoxby (2000) does not find a significant class size effect.

Fewer studies still have examined the impact of class size on student performance in high education. Bandiera et al. (2010) find a significant negative, but highly non-linear effect of class size on student tests results. They conclude that changes in class size have a significant impact on student performance but only at the very top and bottom of the class size distribution. Furthermore, they find that students at the top of the grade distribution are most negatively affected by class size, particularly in large class sections.

Many other works attempted to evaluate the relationship between the student teacher ratio, class size and test score (Hanushek, 1986, 2002; Brunello and Checchi, 2005).

Brunello and Checchi (2005) studied as the combined reduction in student teacher ratio and increasing in parental education have had a significant impact on educational attainment and on the labor market return. They show that lower pupil teacher ratio is positively correlated with higher student attainment but that the overall improvement of parental education has had an even stronger impact on attainment; their results suggested also that the positive effects on school attainment and on return to education has been particularly significant for the individual born in regions and charts with poorer family background.

As to the teacher quality that is related to teachers' academic backgrounds, preparation programs, and number of years teaching experience this significantly affects their students' achievement (Akiba et al., 2007). Moreover the findings of both qualitative and quantitative analysis in Darlin-Hammond (2000) indicate that policy investments in the quality of teachers may be related to improvements in student performance. A study of mathematics teachers in New York City found that students who were taught by fully certified teachers with strong academic backgrounds and two or more years of teaching experience benefited the most. Students' achievement was impaired when taught by teachers with little to no experience who held temporary or alternative licensure (Boyd et al., 2009).

Beese and Liang (2010) use the PISA 2006 data to investigate how school resources indicators (such as teacher qualifications, school facilities, and school type) as well as student level variables (such as socioeconomic status and family resources) affect the literacy in science in United States, Canada and Finland. Findings indicate school funding practices, teacher quality, school type, and family socioeconomic status impact student science achievement and have an effect on international school rankings.

3. Sample Selection

3.1 Data

The data were collected from PISA database[2] because it has a large time extension and it is rich of information about school, student and parent status. In this paper we focus our attention on five waves come from 2000 to 2012 period, produced every 3 years, i.e. 2000-2003-2006-2009-2012. Given that our analysis is basically focused on the school level, we add other information about student and parent status taking into account the relative questionnaire[3].

The sample of school is based on the European context, in particular OECD and no OECD countries. Basically, the number of OECD countries is 34, while the number of no OECD countries is 46. Tables 1 and 2 describe the sample used in the analysis by geographical location, emphasizing the importance on countries based on different school regime and the variables used, respectively.

[Tables 1 and 2 around here]

4. Empirical Design and variables

In order to analyse how different channels or determinants influence school performance making attention to the European context, we specify the following simultaneously equation model or multivariate regression:

$$PERFORMANCE_{i,j,t} \tag{1}$$
$$= a_i FUNDS_{i,j,t} + b_1 COMPUTER_{i,j,t} + c_i EDUCATION_{i,j,t} + d_1 SIZE_{i,j,t}$$
$$+ e_1 GENDER_{i,j,t} + f_i COMMUNITY_{i,j,t} + g_1 OWNERSHIP_{i,j,t} + COUNTRY_j$$
$$+ TIME_t + \varepsilon_{i,j,t}$$

where PERFORMANCE is the school performance, i.e. test score of student averaged by school (i=[math, science and reading]); this variable is used as proxy in order to measure the school achievement; in other words, this variable serves to know if the manager has been able to allocate resources in order to achieve the optimal final output; FUNDS is the financial funding obtained by each school taken in percentage (i=[government, student fees, charitable, other]) (other is used as benchmark); this variable is an important driver allowing to know which type of funds influences more on the

[2] The Program for International Student Assessment (PISA) is a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students. Since the year 2000, the OECD carried out the Program for International Student Assessment (PISA). It is administered every three years to provide comparisons of students' achievement among the participating countries. PISA collects information on all three areas of competencies (mathematics, reading and science) in terms of test scores, with a focus on one of the three competencies every three years. In particular this dataset allows the researcher to investigate both on the relationships which above both on role played by the geographic differences and the social background.

[3] The dataset consists in a repeated cross section. We do not follow the same students over the years; on the contrary, every year a new cohort of first-year students enters our data-set. But, on the other hand, we can talk of panel if our unit of analysis is the school, since we follow their every years. More precisely, we have data over the academic years 1997/2000 (year 2000), 2001/2003 (year 2003), 2004/2006 (year 2006), 2007/2009 (year 2009) and 2009/2012 (year 2012). The dataset gathers information about the students' basic demographics (gender, age), educational background and pre-enrolment characteristics (type of high school attended, score gained on the high school final exams), households' financial conditions (family's self-declared income), and general information about the university careers and performances (exams passed and credits acquired).

school performance. It is linked to the ability of manager to allocate in the optimal way the resources in order to contribute to the success of the school in term of performance; we expect to find a positive relationship between funds and school performance; in other words, more funds allow school to sustain more costs and then to have more resources making available to students (in terms of tools) to increase the probability to overcome the test; $COMPUTER$ is the number of computers connected to the internet; this variable control for the technology arises in the school; we expect to find this variable can have a positive influences on school performance; a high level of technology allows students to have more information in order to practice and then overcome the test; $EDUCATION$ is the set of dummies describing the parents (both father and mother) qualification taken in percentage for school (1=ISCED level 1 only or not go to school; 2=ISCED level 2 only; 3=ISCED level 3B or 3C; 4=ISCED level 3A; 5=ISCED level 5B; 6=ISCED 5A, 6) (group 1 is used as benchmark); we expect to find a positive relationship between education and school performance because more educated parents, in most cases, helps student to give their best and therefore most likely to achieve best results aimed at passing the test with the probability to reach a high score; $SIZE$ is the school dimension proxied by student to teacher ratio; we expect to find a negative relationship between school size and achievements; as suggested in literature, the higher is the class size, the lower is the concentration of the students, having an adverse effect on their performance (Hanushek, 1986, 2002, Brunello and Checchi, 2005); $GENDER$ is the number of girls enrolled in the school; as suggested in literature, the girls have more probability to overcome the test score than man; for these reason we expect to find a positive association between the number of girls and school performance; $COMMUNITY$ is the set of dummies describing the community in which school is located [1=village (> 3.000 people); 2=small town (3.000 < people < 15.000); 3=town (15.000 < people < 100.000); 4=city (100.000 < people < 1.000.000); 5=large city (< 1.000.000 people)] (group 1 is used as benchmark); $OWNERSHIP$ is the set of dummies denoting the typology of school (private is used as benchmark group); we expect to find that small community can have a positive impact on school performance because manager can better manage resources in order to reach high school performance.

We also control for two dimensions: the country in which school operates and timing of our sample. In particular, COUNTRY is the set of country dummies in which school operate in order to control for different policy implication and regime application and TIME is the set of time dummies included in the model in order to capture any possible unobservable shocks. Finally ε are the disturbance terms. Subscripts i, j and t refer to the unit of analysis (school), area where the school is located and time periods (years), respectively. As benchmark, we use the multivariate regression in order to estimate the equation (1). Unlike to other techniques, multivariate regression allows to take into account simultaneously a high number of dependent variables (in our case math, science and reading test score of student averaged by school) with respect to other estimators. In fact, the aim of multivariate o multiple regression, where the term was first used by Pearson (1908), is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable. For this reason, we think this estimator is appropriate for our analysis.

For robustness checks, we also use quantile and multilevel regression in order to estimate the relationship between school performance and its determinants (for more information on these two procedures see Appendix). We run the regression separating the channels described in equation (1) on the entire sample (ALL SAMPLE), grouping only for OECD countries (ONLY OECD) and grouping only for NO-OECD countries (ONLY NO-OECD). This exercise helps to understand how the different channels affect school performance in different context. Table 3 describes the statistics for all variables used in the analysis.

[Table 3 around here]

5. Empirical Evidence

This section is devoted to the result's presentation of the multivariate regression model. The most important conclusions show that considering both the all sample that the only OECD countries the good school performances are positively driven by the student fees, the presence of girls and the number of computers connected to internet; also the mother's education plays an important role, while the father's one is notable only at high level, otherwise is negative. The student teacher ratio negatively affects the outcomes but these results are not robust to the inclusions of all the variables. Moreover, differently from that, the improvement of the student achievement in NO-OECD countries is encouraged from benefaction, the presence of girls, and the parent's education level. The student teacher ratio and the public school affect the test's performance negatively and significantly.

5.1 Multivariate Regression. The Results

Table 4 shows the results on the effect of determinants on math scores at school level for the ALL SAMPLE (columns 1,4,7,10,13), for only OECD (columns 2,5,8,11,14) and for only NO-OECD (columns 3,6,9,12,15) countries. According to the results related to ALL SAMPLE, i.e. when all countries of our sample are considered all together, we find that the government expenditure, the student fees, the presence of girls and the number of computers connected to internet significantly and positively affect the math test score, while the impact of public schools is negative (column 1); these findings are robust to the inclusion of father's and mother's education level (column 4), in particular, the mother's education significantly and positively affects the math test score; the father education is important only at high education level; no effects of government expenditure is evidenced.

[Table 4 around here]

Adding the student teacher ratio to the benchmark model (column 10), a negatively relationship is noted. Finally, considering the last model that includes all the variables together (column 13), the results are consistent with the previously estimation, except for student teacher ratio and the public school for which the signs are not statistically significant.

As to the science test score (Table 5-column 1), the student's fees, the number of computers connected to internet and the number of girls, positively affect the test score, differently by the public schools that negatively impacts. This negative evidence, such as the significantly and positive value of students fees and number of girls, is robust to the inclusion of father's and mother's educations (column 4) that present the same characteristics of before. Adding the student teacher ratio (column 10), that is negative correlated, to the benchmark model, there are not challenges in the results. Finally, including the all variables together (column 13), all funds considered seem to be important driven of school performance; the other independent variables show the results which before, differently by student teacher ratio for which there is no significance.

[Table 5 around here]

As to the effects on reading test score (Table 6-column 1), the student fees, the number of computer connected to internet and girl's presence, are important determinants, differently from the public school; these signs are consistent to the inclusion of parents' education level (column 4), with the father's education level that as before is relevant only at high level, otherwise is negative.

[Table 6 around here]

The empirical findings do not change when we add to the benchmark model the student teacher ratio (column 10) that is negatively related to the outcomes. The overall results are robust to the inclusion of all the variables (column 13), except for computer connected to Internet and the student teacher ratio which coefficients are not statistical significant.
Now, in order to capture how different context in which school operates affects the estimation, we separate the sample, considering only OECD countries and only NO-OECD countries, alternatively (for more details on the composition of the sample see Table 1 and 2). This exercise might be useful to the policy makers and regulators in order to understand how the different channels affect school performance in different environment. In particular, they could decide to give more resources in order to improve the educational levels in NO-OECD countries. This should help to increase the teacher's number, reducing the class size and improving the school performance.
Considering the same test scores in only OECD countries as to the math score (Table 4-column 2), the positive results are subject to the student's fees, the number of computer connected to internet and the girls' presence, the negative are driven by the public school. When we include the mother's and father's education (column 5), the test score appears to be positive for the presence of girls and negative for public school. The impact of parents' education has the same significance of before. Considering the student teacher ratio (column 11) for which the impact is negative and significant, a similarity with previous estimations is evidenced.
Finally, when we take into account the all variables (column 14), student's fees, girls, mother's education and father's high level of education positively and significant impact upon school performance, while the effect of student teacher ratio disappears. As to the science and reading test scores (columns 2, 5, 11 and 14 of Tables 5 and 6), the student's fees and the number of girls are positive determinants of test scores, while the sign of public school is negative. The parents' education offerings the evidence presented before. Differently, no evidence is evidenced for the student teacher ratio.
Moreover, considering only NO-OECD countries, as to the math score (Table 4-column 3), only the number of girls is an important factor, while the public school shows negative and significant evidence. Adding the parents' education (columns 6) that, differently from the previously findings, is a notable factor in improving the test score in all the cases, also the value of charity (funds) appears to positively drive the outcomes.
Adding the student teacher ratio (column 12), that is negative correlated, the sign related to the charity funds appears to be positive. Finally considering the last model (column 15), the percentage of funding does not affect the outcome in neither of cases and the other variables present the characteristics which before.
As to the science test score (Table 5-column 3), the charity funds and the number of girls are important factors. Adding separately the parental education (column 6), positively related, and student teacher ratio (column 12), negatively related, the results present the same signs as before, moreover nothing changes considering all the variables (column 15). It is important to note that in all the cases considering the NO-OECD countries the number of computers connected to internet does not significantly improve the test score.
Concerning the reading tests score (Table 6-column 3), the charity funds are not a significant determinants; the others variables have the above characteristics and only in the model in which we adding the student teacher ratio to the

benchmark (column 12), the students fees significantly improve the reading test score. Finally all the outcomes decrease in presence of public schools and increase with the number of girls.
In order to provide a clear perspective, we sum up our findings. First, we focus considering the ALL SAMPLE and isolating the channels as follow:

- Fees for student is the main fund component that most impact on the school performance; therefore, the school redistributes this resources providing more services in order to improve its performance (e.g. provides more tools that allow the student to pass the tests and to ensure greater school performance);
- The presence of computer connected to the internet improves school performance. In this way, students can practice to pass the tests;
- The presence of women contributes more to raise school performance; perhaps because they commit more and get higher scores which enables the school to increase its performance with respect to man;
- Public schools get lower performance compared to private ones;
- There is an exponential relationship (monotonic) between urbanization and performance; In other words, it seems that the fact of being in highly populated areas contributes more to the school performance; perhaps because they may have more money (eg. student fees) that you can use to increase performance (more exercises used to pass the tests);
- There is an exponential relationship (monotonic) between the mother's education and school performance. This means that the higher the level of mother's education, the more likely the student to pass the test and therefore the greater the performance of the school.
- There is a U-shaped relationship between a father's education and the school performance. In other words, low levels of education reduce the probability of the student to pass the test, reducing the school performance. There is a change of trend only for high levels of education, contributing positively to the school performance;
- There is an inverse relationship between student-teacher ratio and performance; this means that the increase of class size reduces the performance; in other words, the teacher gives little time to each individual student, which focuses there not enough to pass the test; is very well known in the literature that the class size has a negative effect on the test has been passed by the student;

The results are confirmed when all channels are considered together, except for student-teacher ratio which loses significance and the level of urbanization where it no longer appears to be an exponential relationship with the performance. In other words, it seems that only the least populated areas contribute positively to school performance; this occurs because the school can optimally allocate resources among the few units, in such a way as to increase the performance. The results are similar when we consider math, read, and science test score, alternatively;
Focusing only OECD countries seems that fees per student has a weaker effect, the same goes for the presence of computers connected to the internet, while the other two forms of funding does not contribute in some way to the school performance, the same goes for student-teacher ratio. Furthermore, when we consider all channels, it appears to show that the most populated areas have a negative effect on school performance; there is always a U-shaped relationship between the father's education and school performance. In these countries (so-called developed) only people with higher levels of education seem to contribute positively to the school performance.
In terms of policy implications, the policy makers and regulators, in order to guarantee higher school performance, in OECD countries should be:

- increase the fees for student and public funds;
- reduce class size;
- increase levels of education, especially for father, given that average levels contribute negatively to the performance;
- increase the number of computers connected to the internet, then given greater important to technology;

Finally, we focus about NO-OECD countries. Now, even claim that part of the funds that contributes most, albeit weakly, the performance is that of charity. In fact, schools in those countries (i.e. so called developing) base their spending expectations on charitable offerings; the presence of computers connected to the internet does not contributes to the performance, also because there is a lack of technology (comparing the percentage between OECD and NO-OECD countries); interesting result is that considering these countries, there is no longer a U-shaped between the father's education and school performance, but an exponential relationship as in the case in which the mother's education is considered; This is because, unlike the richer and more developed countries (OECD), the NO-OECD countries, the percentage of those who have a high level of education is very low (comparing statistics), so just a little (in terms of education) to facilitate his son to pass the test, ensuring the highest levels of school performance; there is also an exponential relationship between populous area and performance even when we consider all the channels together; finally, student-teacher ratio is negative and significant considering all channels; This is because, in general, the classes are very populous and numerously, making very difficult the task of teachers in overcoming the students test. In terms of policy implications, the policy makers and regulators in order to guarantee higher school performance in NO-OECD countries should be:

- increase funds from charitable offerings;
- increase the level of education;
- reduce classe size;

6. Robustness Check

In order to check whether the findings previously showed (see Section 5.1 above) change when different estimators are used, we repeat our models using quantile and multilevel regression[4]. This part allows us to give robustness to our analysis supporting the results of the multi-regression estimation with the quantile regression that, in the most of the cases, is consistent with the conclusions which before.

6.1. Quantile Regression. The Results

In order to make our analysis more robust, we employ the quantile analysis. Generally, quantile regression is a type of regression analysis used in statistics and econometrics. Whereas the method of least squares results in estimates that approximate the conditional *mean* of the response variable given certain values of the predictor variables, quantile regression aims at estimating either the conditional median or other quantile of the response variable. In this way, this method is not affected by the presence of outliers or extreme values could distort the estimation, but unlike to multivariate analysis does not allow controlling for simultaneity problem.

[4] For sake of brevity and space, we only show the quantile regression, while multilevel models are available on request.

Quantile regression is suitable if conditional quantile functions are of interest. One advantage of quantile regression, relative to the ordinary least squares regression, is that the quantile regression estimates are more robust against outliers in the response measurements. However, the main attraction of quantile regression goes beyond that. Different measures of central tendency and statistical dispersion can be useful to obtain a more comprehensive analysis of the relationship between variables.

In ecology, quantile regression has been proposed and used as a way to discover more useful predictive relationships between variables in cases where there is no relationship or only a weak relationship between the means of such variables. The need for and success of quantile regression in ecology has been attributed to the complexity of interactions between different factors leading to data with unequal variation of one variable for different ranges of another variable. Another application of quantile regression is in the areas of growth charts, where percentile curves are commonly used to screen for abnormal growth.

Considering the math test score of student, averaged by school, both in all sample than in OECD countries the performance increases with the government expenditure, fees and girl's presence; the public school has a negative effect and the sign of mother's and father's education has the same characteristics as before; no evidence is supported for student teacher ratio.

As to the NO-OECD countries also in this case, such as in multi-regression, the charity funds play an important role and in some cases also the student fees and government expenditure are significant. As to the other determinants these have, more or less, the signs of before, in particular negative is the effect of student teacher ratio in all the models considered.

As to the science score of student, averaged by school, also the student fees, government expenditure and computer connected to internet are significant; negative at significant level is the effect of student teacher ratio both in all sample than in NO-OECD countries, but this disappear when we consider only OECD countries; the other variables approximately affect the outcomes such as in the previously cases.

Considering the reading test score of student, averaged by school, in the all sample the significance of variables does not change and the effect of student teacher ratio is negative in all the cases. Moreover, when we taking into account only the OECD countries the fees, computer connected to internet and student teacher ratio does not appear to be a significant determinants of increasing in reading, in the case of NO-OECD the charity funds appear to be less important than before while the student teacher ratio is negative and significant.

Considering the average value of the all test score, as to the all sample, a similarity with the previous results exist; when we take into account only the OECD countries, the effect of government expenditure disappears, while student teacher ratio is not robust to the inclusion of all the variables.

Surprising, considering only NO-OECD countries the government expenditure has a positive and significant coefficient; however very little changes affect the others component considered; the scores decrease when student teacher ratio increases.

[Tables 7-10 around here]

7. Concluding Remarks and Policy Implications

In this paper, we analyzed on the determinants of school performance measured by the average value of students' tests score (math, reading and science) at school level. We used the PISA data from 2000 to 2012 in order to explore this relationship. A multivariate regression is assessed considering the different channels (funds, computers connected to internet, parental education, student teacher ratio, number of girls and ownership) and controlling for time and country fixed effects. The analysis is done both allowing for the total sample and grouping for OECD countries and NO-OECD countries.

The most important results show that, considering the all sample and the only OECD countries, school performances are positively driven by the student fees, presence of girls and computers; also the mother's education plays an important role, while the father's one is notable only at high level, otherwise is negative. Moreover, differently from that the improvement of the student achievement in NO-OECD countries is encouraged from charity funds, the presence of girls, and the parent's education level. As to the student teacher ratio it negatively affects the outcomes in the most of the estimations performed.

Finally it's reasonable that more funds allow school to invest more in the quality of teaching, increasing the probability of student overcome the test in math, science and reading.

This exercise might be useful to the policy makers and regulators in order to understand how the different channels affect school performance in different context. In particular, they could decide to give more resources in order to improve the educational levels in NO-OECD countries. This should help to increase the teacher's number, reducing the class size and improving the school performance. Robustness checks have been performed in order to explore whether the results change at different empirical methods, such as quantile and multilevel regression.

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Appendix 1: Tables on Sample and Statistics

Table 1. The sample

Countries (OECD)	Number of Schools (2000-2012)	Frequency	Countries (NO-OECD)	Number of Schools (2000-2012)	Frequency
AUS	777	2.79	**ALB**	249	1.72
AUT	590	2.12	**ARE**	483	3.34
BEL	934	3.36	**ARG**	438	3.03
CAN	2,258	8.11	**AZE**	230	1.59
CHE	1,391	5.00	**BGR**	376	2.60
CHL	389	1.40	**BRA**	1,547	10.69
CZE	896	3.22	**CHL**	112	0.77
DEU	782	2.81	**COL**	510	3.52
DNK	828	2.97	**CRI**	240	1.66
ESP	2,001	7.19	**EST**	130	0.90
EST	271	0.97	**GEO**	148	1.02
FIN	749	2.69	**HKG**	324	2.24
FRA	269	0.97	**HRV**	365	2.52
GBR	1,525	5.48	**IDN**	735	5.08
GRC	624	2.24	**ISR**	101	0.70
HUN	724	2.60	**JOR**	421	2.91
IRL	525	1.89	**KAZ**	321	2.22
ISL	356	1.28	**KGZ**	231	1.60
ISR	257	0.92	**LIE**	45	0.31
ITA	2,248	8.08	**LTU**	420	2.90
JPN	648	2.33	**LVA**	654	4.52
KOR	520	1.87	**MAC**	110	0.76
LUX	136	0.49	**MDA**	138	0.95
MEX	2,469	8.87	**MLT**	31	0.21
NLD	540	1.94	**MNE**	119	0.82
NOR	642	2.31	**MUS**	116	0.80
NZL	593	2.13	**MYS**	235	1.62
POL	651	2.34	**PAN**	90	0.62
PRT	671	2.41	**PER**	325	2.25
SVK	602	2.16	**QAT**	206	1.42
SVN	468	1.68	**QCN**	239	1.65
SWE	603	2.17	**QHP**	48	0.33
TUR	458	1.65	**QRS**	44	0.30
USA	439	1.58	**QTN**	96	0.66
			QVE	55	0.38
			ROU	385	2.66
			RUS	850	5.87
			SGP	257	1.78
			SRB	346	2.39
			SVN	295	2.04
			TAP	396	2.74
			THA	775	5.35
			TTO	107	0.74
			TUN	338	2.34
			URY	658	4.55
			VNM	136	0.94
Total	27,834	100.00		14,475	100.00

Notes: own elaborations;

Table 2: Variables Description

Variables	Description
Math score	School performance, i.e. test score of student averaged by school in Math
Reading score	School performance, i.e. test score of student averaged by school in Reading
Science score	School performance, i.e. test score of student averaged by school in Science
F_gov	Funding obtained by each school by the Government (%)
F_stud_fees	Funding obtained by each school by Student fees (%)
F_benef	Funding obtained by each school by Benefits (%)
F_other	Funding obtained by each school by Other Source (%)
Computers	Number of computers connected to the internet
Boys	Number of boys enrolled in the school
Girls	Number of girls enrolled in the school
Ownership	Set of dummies (1-2) denoting the typology of school; private is used as benchmark group
F_isced	Set of dummies (1-6) describing the fathers' education; 1 used as benchmark group
M_isced	Set of dummies (1-6) describing the mothers' education; 1 used as benchmark group
Community	Set of dummies (1-5) describing the community in which school is located; 1 used as benchmark group
Size	Student-teacher ratio

Notes: own elaborations;

Table 3: Descriptive Statistics of the Variables

YEAR	Math score	Reading score	Science score	F_gov	F_stud_fees	F_benefit	F_other	Computers	Boys	Girls	Ownership	F_isced	M_isced	Community	Size
ALL															
2000	467,5879	466,6846	469,9534	83,7766	10,2632	3,1986	2,8394	31,8552	348,7170	355,1692	0,8260	4,1986	4,1238	2,9596	14,9163
2003	490,4581	485,1399	490,7343	80,8260	12,7196	3,6176	3,0477	72,6774	343,7851	333,7189	0,8499	3,7626	3,7394	2,9478	14,1037
2006	467,6538	459,4026	471,5916	80,7259	13,5680	2,7857	3,0327	86,2898	370,7683	367,5658	0,8344	3,6563	3,6155	2,9512	15,3873
2009	455,8260	453,7206	460,2562	78,5641	15,7989	3,0080	2,8536	60,2980	384,0478	385,6732	0,8254	3,7506	3,7155	2,9986	15,8827
2012	466,2665	467,8486	473,3987	79,7656	14,7271	2,7005	2,9251	75,3660	376,7137	378,2486	0,8063	3,8003	3,8279	3,0571	14,9983
Mean	466,7849	464,1309	471,1488	80,2092	14,0421	2,9668	2,9349	68,6121	370,4101	370,0907	0,8250	3,7930	3,7717	2,9949	15,2065
OECD															
2000	491,1413	489,8561	490,6585	85,4904	9,6294	2,2825	2,6945	35,7852	331,4044	333,0129	0,8028	4,2750	4,2181	2,9605	13,8699
2003	500,7565	493,5412	498,2563	80,6473	12,8396	3,6078	3,1313	72,8323	335,2557	318,4461	0,8409	3,8109	3,7786	2,9396	13,2719
2006	491,3231	484,5141	494,0437	79,8452	14,3548	2,7452	3,1861	88,7500	338,7301	329,8128	0,8251	3,7413	3,6962	2,9910	14,2586
2009	484,1492	481,1808	487,6442	77,5397	16,8176	2,9195	2,9700	62,2081	342,5724	337,3881	0,8374	3,8125	3,8138	3,0018	15,1946
2012	482,0154	483,9148	489,4032	78,6654	15,6739	2,8008	2,9884	76,2106	338,7083	330,4625	0,8064	3,8786	3,9539	3,0419	14,1602
Mean	488,4711	485,5849	491,4867	79,7343	14,5349	2,8863	3,0135	70,2680	338,2655	330,3868	0,8228	3,8673	3,8679	2,9965	14,2560
NO-OECD															
2000	413,9701	413,6613	421,7093	78,8596	12,2159	5,7184	3,2168	21,2562	375,1959	394,3612	0,8604	3,9663	3,8603	2,9493	17,4239
2003	426,3546	432,8457	443,9133	81,9387	11,9729	3,6784	2,5391	71,7133	396,8771	428,7853	0,9054	3,4640	3,4973	2,9986	19,2813
2006	428,1662	417,5088	434,1345	82,1951	12,2553	2,8532	2,7801	82,1854	424,2178	430,5495	0,8499	3,5145	3,4810	2,8845	17,2704
2009	416,5654	415,6565	422,2920	79,9841	14,3869	3,1308	2,6939	57,6502	442,1255	452,6039	0,8087	3,6647	3,5793	2,9942	16,8365
2012	437,5177	438,5206	444,1832	81,7740	12,9986	2,5175	2,8104	73,8243	446,7621	465,4799	0,8062	3,6577	3,5981	3,0847	16,5282
Mean	425,7513	423,4866	432,5601	81,0389	13,1692	3,1289	2,7872	65,8870	431,2868	445,0508	0,8269	3,6423	3,5810	2,9915	17,0186
PUBLIC															
2000	463,9374	462,2860	466,5826	87,5519	6,9942	2,8402	2,7125	31,6251	356,2172	357,5911	//	4,1750	4,1095	2,9230	14,8856
2003	485,6733	480,9175	486,8156	80,9408	12,6399	3,6138	3,0247	73,5484	338,8682	327,6404	//	3,6924	3,6832	2,9330	14,1545
2006	462,5873	454,0231	466,8605	81,1483	13,0298	2,9055	3,0300	86,1718	363,3956	364,6553	//	3,5750	3,5480	2,9375	15,3517
2009	451,0296	448,3474	455,3927	79,0070	15,4269	2,9752	2,8109	60,1628	374,6139	376,1396	//	3,6646	3,6416	2,9896	15,8339
2012	459,5865	460,7587	467,0415	80,0298	14,3392	2,7947	2,9608	75,1652	366,1529	370,2013	//	3,6800	3,7165	3,0510	15,0749
Mean	461,6243	458,5702	466,2367	80,9251	13,3410	2,9746	2,9168	68,5865	363,3686	363,9550	//	3,7068	3,6967	2,9814	15,2074
PRIVATE															
2000	484,9350	487,5665	485,9268	65,8538	25,7825	4,9000	3,4373	32,9475	312,2272	343,6712	//	4,3133	4,1935	3,1322	15,0624
2003	517,5405	509,0396	512,9150	80,1767	13,1710	3,6387	3,1749	67,7474	371,6159	368,1237	//	4,1602	4,0586	3,0322	13,8165
2006	493,1819	486,5074	495,4299	78,5976	16,2799	2,1821	3,0460	86,8842	407,9162	382,2310	//	4,0663	3,9562	3,0207	15,5664
2009	478,4928	479,1134	483,2403	76,4711	17,5569	3,1632	3,0558	60,9365	428,5627	430,7273	//	4,1575	4,0653	3,0412	16,1134
2012	494,0811	497,3694	499,8687	78,6655	16,3421	2,3086	2,7776	76,2021	420,6471	411,7558	//	4,3012	4,2917	3,0821	14,6793
Mean	491,1098	490,3390	494,2959	76,8348	17,3465	2,9303	3,0199	68,7326	403,6665	399,0087	0,8250	4,2003	4,1266	3,0587	15,2025

Notes: own elaborations;

Appendix 2: Tables on Multivariate Regression

Table 4: Multivariate Regression. Determinants of Math Test Score

	A1 (1) ALL SAMPLE	B1 (2) ONLY OECD	C1 (3) ONLY NO-OECD	D1 (4) ALL SAMPLE	E1 (5) ONLY OECD	F1 (6) ONLY NO-OECD	G1 (7) ALL SAMPLE	H1 (8) ONLY OECD	I1 (9) ONLY NO-OECD	L1 (10) ALL SAMPLE	M1 (11) ONLY OECD	N1 (12) ONLY NO-OECD	O1 (13) ALL SAMPLE	P1 (14) ONLY OECD	Q1 (15) ONLY NO-OECD
F_gov	0.0531*	0.0401	0.0788	0.0445	0.0423	0.0518	0.0446	0.0354	0.0755	0.0640*	0.0529	0.0845	0.0489*	0.0588	0.0354
	[0.0270]	[0.0331]	[0.0465]	[0.0233]	[0.0287]	[0.0393]	[0.0269]	[0.0331]	[0.0455]	[0.0284]	[0.0346]	[0.0489]	[0.0245]	[0.0300]	[0.0414]
F_stud_fees	0.0813**	0.0831*	0.0860	0.0504*	0.0541	0.0524	0.0671*	0.0738*	0.0759	0.0934**	0.0967**	0.0897	0.0561*	0.0736*	0.0312
	[0.0286]	[0.0350]	[0.0494]	[0.0247]	[0.0304]	[0.0417]	[0.0285]	[0.0350]	[0.0482]	[0.0301]	[0.0367]	[0.0519]	[0.0259]	[0.0319]	[0.0439]
F_benef	0.0163	-0.0312	0.124	0.0511	0.0256	0.123*	0.0134	-0.0276	0.109	0.0490	0.00664	0.152*	0.0687	0.0607	0.115
	[0.0398]	[0.0496]	[0.0665]	[0.0343]	[0.0430]	[0.0561]	[0.0395]	[0.0495]	[0.0650]	[0.0417]	[0.0517]	[0.0698]	[0.0360]	[0.0449]	[0.0591]
Computers	0.00801**	0.00701*	0.00745	0.00517*	0.00410	0.00511	0.00753**	0.00695*	0.00662	0.00846**	0.00777*	0.00789	0.00613**	0.00494	0.00724
	[0.00252]	[0.00311]	[0.00430]	[0.00217]	[0.00270]	[0.00363]	[0.00250]	[0.00311]	[0.00421]	[0.00264]	[0.00324]	[0.00449]	[0.00228]	[0.00281]	[0.00382]
girls	0.0360***	0.0478***	0.0265***	0.0195***	0.0271***	0.0130***	0.0279***	0.0417***	0.0161***	0.0377***	0.0493***	0.0302***	0.0203***	0.0294***	0.0131***
	[0.000798]	[0.00119]	[0.00107]	[0.000704]	[0.00106]	[0.000927]	[0.000836]	[0.00126]	[0.00110]	[0.000867]	[0.00129]	[0.00118]	[0.000792]	[0.00120]	[0.00105]
ownership	-31.71***	-28.59***	-38.24***	-1.963**	-2.313*	-0.722	-27.37***	-26.48***	-29.42***	-30.55***	-27.91***	-36.36***	-1.472	-3.012**	1.502
	[0.810]	[0.995]	[1.381]	[0.738]	[0.908]	[1.259]	[0.819]	[1.009]	[1.381]	[0.856]	[1.044]	[1.475]	[0.781]	[0.952]	[1.352]
misced_2				5.662*	9.378**	6.230							6.673**	10.97**	6.787*
				[2.257]	[3.171]	[3.208]							[2.439]	[3.436]	[3.440]
misced_3				18.05***	23.80***	17.94***							19.07***	25.93***	18.08***
				[2.401]	[3.426]	[3.371]							[2.605]	[3.727]	[3.631]
misced_4				37.07***	44.00***	35.38***							39.27***	47.42***	35.80***
				[2.507]	[3.537]	[3.573]							[2.715]	[3.833]	[3.854]
misced_5				62.11***	67.93***	63.91***							63.94***	71.03***	63.31***
				[2.595]	[3.619]	[3.812]							[2.799]	[3.911]	[4.091]
misced_6				86.25***	88.27***	96.74***							88.09***	91.47***	95.16***
				[2.803]	[3.862]	[4.171]							[3.011]	[4.151]	[4.471]
fisced_2				-16.55***	-32.23***	3.652							-20.93***	-39.07***	1.575
				[2.465]	[3.474]	[3.477]							[2.658]	[3.740]	[3.744]
fisced_3				-11.67***	-28.50***	9.962**							-16.69***	-34.09***	5.170
				[2.565]	[3.666]	[3.581]							[2.771]	[3.958]	[3.868]
fisced_4				4.065	-12.41***	25.66***							-0.443	-17.22***	20.63***
				[2.660]	[3.762]	[3.768]							[2.873]	[4.052]	[4.081]
fisced_5				26.09***	10.50**	43.96***							21.98***	6.739	38.23***
				[2.736]	[3.831]	[3.979]							[2.953]	[4.125]	[4.304]
fisced_6				51.73***	37.41***	66.89***							48.12***	35.60***	59.06***
				[2.922]	[4.029]	[4.348]							[3.143]	[4.325]	[4.686]
Community_2							11.50***	8.535***	13.53***				2.727**	1.256	3.474*
							[0.953]	[1.202]	[1.555]				[0.870]	[1.093]	[1.426]
Community_3							20.18***	15.21***	25.43***				4.153***	1.784	5.893***
							[0.935]	[1.186]	[1.517]				[0.867]	[1.090]	[1.427]
Community_4							25.93***	16.18***	40.04***				0.307	-6.062***	9.739***
							[0.983]	[1.261]	[1.560]				[0.926]	[1.173]	[1.503]
Community_5							33.36***	18.62***	53.16***				1.987	-6.469***	13.76***
							[1.203]	[1.558]	[1.876]				[1.139]	[1.454]	[1.825]
size										-0.0712**	0.0383	-0.442***	-0.0160	0.0379	-0.199***
										[0.0267]	[0.0305]	[0.0547]	[0.0230]	[0.0265]	[0.0464]
const	384.2***	472.3***	386.5***	291.7***	371.8***	263.6***	369.1***	461.6***	363.6***	381.1***	468.5***	389.1***	291.1***	368.8***	269.3***
	[4.523]	[4.488]	[5.988]	[4.392]	[4.625]	[6.148]	[4.523]	[4.556]	[5.919]	[4.742]	[4.671]	[6.333]	[4.609]	[4.838]	[6.534]
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	46597	30090	16194	46597	30090	16194	46001	29879	15809	43035	28005	14839	42485	27822	14472

Notes: The independent variables are the percentage of fund government, student fees, benefits, number of computers connected to Internet, number of girls, dummy for Private School, dummies describing the community in which school is located, dummies for fathers and mother education, student teacher ratio. The estimation allows for time and Country-level fixed effects. Standard errors are in parenthesis. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level; Standard errors in brackets.

Table 5: Multivariate Regression. Determinants of Science Test Score

	A2 (1) ALL SAMPLE	B2 (2) ONLY OECD	C2 (3) ONLY NO-OECD	D2 (4) ALL SAMPLE	E2 (5) ONLY OECD	F2 (6) ONLY NO-OECD	G2 (7) ALL SAMPLE	H2 (8) ONLY OECD	I2 (9) ONLY NO-OECD	L2 (10) ALL SAMPLE	M2 (11) ONLY OECD	N2 (12) ONLY NO-OECD	O2 (13) ALL SAMPLE	P2 (14) ONLY OECD	Q2 (15) ONLY NO-OECD
F_gov	0.0512	0.0433	0.0646	0.0430	0.0456	0.0402	0.0431	0.0396	0.0584	0.0648*	0.0514	0.0867	0.0503*	0.0578	0.0393
	[0.0264]	[0.0329]	[0.0444]	[0.0228]	[0.0287]	[0.0377]	[0.0264]	[0.0329]	[0.0437]	[0.0278]	[0.0345]	[0.0467]	[0.0241]	[0.0300]	[0.0401]
F_stud_fees	0.0833**	0.0832*	0.0884	0.0535*	0.0549	0.0576	0.0707*	0.0765*	0.0769	0.0991***	0.0940*	0.107*	0.0643*	0.0734*	0.0520
	[0.0280]	[0.0348]	[0.0471]	[0.0242]	[0.0304]	[0.0400]	[0.0280]	[0.0349]	[0.0463]	[0.0295]	[0.0366]	[0.0495]	[0.0256]	[0.0318]	[0.0425]
F_benef	0.0317	-0.0192	0.134*	0.0656	0.0367	0.133*	0.0302	-0.0137	0.124*	0.0701	0.0145	0.181**	0.0916**	0.0698	0.150**
	[0.0389]	[0.0493]	[0.0634]	[0.0336]	[0.0429]	[0.0539]	[0.0388]	[0.0493]	[0.0624]	[0.0408]	[0.0515]	[0.0666]	[0.0355]	[0.0448]	[0.0573]
Computers	0.00659**	0.00560	0.00560	0.00380	0.00271	0.00328	0.00618*	0.00586	0.00415	0.00674**	0.00609	0.00590	0.00446*	0.00355	0.00460
	[0.00246]	[0.00310]	[0.00410]	[0.00213]	[0.00270]	[0.00348]	[0.00246]	[0.00310]	[0.00404]	[0.00258]	[0.00322]	[0.00428]	[0.00225]	[0.00281]	[0.00370]
girls	0.0385***	0.0510***	0.0282***	0.0225***	0.0307***	0.0155***	0.0314***	0.0460***	0.0188***	0.0403***	0.0527***	0.0319***	0.0240***	0.0341***	0.0162***
	[0.000781]	[0.00118]	[0.00102]	[0.000691]	[0.00106]	[0.000891]	[0.000821]	[0.00125]	[0.00105]	[0.000849]	[0.00129]	[0.00112]	[0.000782]	[0.00119]	[0.00101]
ownership	-31.52***	-28.63***	-37.63***	-2.847***	-2.951**	-2.648*	-27.78***	-26.98***	-29.82***	-30.52***	-28.06***	-35.86***	-2.760***	-3.969***	-0.744
	[0.793]	[0.990]	[1.317]	[0.724]	[0.906]	[1.209]	[0.804]	[1.004]	[1.326]	[0.839]	[1.040]	[1.409]	[0.771]	[0.952]	[1.309]
misced_2				8.109***	13.54***	6.947*							8.932***	15.00***	7.400*
				[2.215]	[3.163]	[3.081]							[2.407]	[3.435]	[3.333]
misced_3				19.80***	26.93***	18.67***							21.07***	29.64***	18.79***
				[2.357]	[3.417]	[3.238]							[2.570]	[3.726]	[3.517]
misced_4				37.67***	46.72***	34.31***							40.10***	50.58***	34.72***
				[2.461]	[3.528]	[3.432]							[2.679]	[3.832]	[3.733]
misced_5				63.03***	71.31***	61.89***							65.07***	74.77***	61.24***
				[2.547]	[3.610]	[3.661]							[2.762]	[3.910]	[3.962]
misced_6				85.49***	90.33***	91.94***							87.93***	94.37***	90.77***
				[2.751]	[3.852]	[4.006]							[2.971]	[4.150]	[4.331]
fisced_2				-13.93***	-29.81***	4.940							-18.44***	-36.58***	2.648
				[2.419]	[3.464]	[3.340]							[2.623]	[3.739]	[3.627]
fisced_3				-9.575***	-28.30***	11.88***							-14.33***	-33.85***	7.488*
				[2.517]	[3.656]	[3.440]							[2.734]	[3.956]	[3.747]
fisced_4				6.242*	-12.06**	27.16***							2.085	-16.66***	22.59***
				[2.611]	[3.752]	[3.619]							[2.835]	[4.051]	[3.953]
fisced_5				27.51***	10.45**	43.76***							23.91***	6.946	38.93***
				[2.686]	[3.821]	[3.822]							[2.914]	[4.123]	[4.169]
fisced_6				50.82***	35.60***	63.85***							47.97***	34.14***	57.44***
				[2.868]	[4.018]	[4.177]							[3.102]	[4.323]	[4.540]
Community_2							10.12***	7.301***	12.14***				1.188	-0.242	2.181
							[0.936]	[1.196]	[1.493]				[0.859]	[1.093]	[1.381]
Community_3							18.29***	13.33***	23.40***				2.114*	-0.333	4.355**
							[0.918]	[1.180]	[1.457]				[0.855]	[1.090]	[1.382]
Community_4							23.02***	13.92***	35.51***				-2.233*	-8.146***	6.555***
							[0.965]	[1.254]	[1.498]				[0.914]	[1.173]	[1.456]
Community_5							29.14***	14.25***	48.92***				-1.913	-10.86***	11.14***
							[1.181]	[1.550]	[1.802]				[1.124]	[1.454]	[1.767]
size										-0.0785**	0.0214	-0.432***	-0.0262	0.0214	-0.205***
										[0.0262]	[0.0304]	[0.0522]	[0.0227]	[0.0265]	[0.0449]
const	388.5***	478.8***	393.8***	294.9***	376.4***	274.7***	374.9***	469.8***	372.6***	385.0***	476.0***	394.4***	294.4***	375.3***	277.8***
	[4.424]	[4.461]	[5.709]	[4.311]	[4.613]	[5.905]	[4.441]	[4.534]	[5.683]	[4.647]	[4.652]	[6.045]	[4.548]	[4.836]	[6.330]
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	46597	30090	16194	46597	30090	16194	46001	29879	15809	43035	28005	14839	42485	27822	14472

Notes: The independent variables are the percentage of fund government, student fees, benefits, number of computers connected to Internet, number of girls, dummy for Private School, dummies describing the community in which school is located, dummies for fathers and mother education, student teacher ratio. The estimation allows for time and Country-level fixed effects. Standard errors are in parenthesis. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level; Standard errors in brackets.

Table 6: Multivariate Regression. Determinants of Reading Test Score

	A3 (1) ALL SAMPLE	B3 (2) ONLY OECD	C3 (3) ONLY NO-OECD	D3 (4) ALL SAMPLE	E3 (5) ONLY OECD	F3 (6) ONLY NO-OECD	G3 (7) ALL SAMPLE	H3 (8) ONLY OECD	I3 (9) ONLY NO-OECD	L3 (10) ALL SAMPLE	M3 (11) ONLY OECD	N3 (12) ONLY NO-OECD	O3 (13) ALL SAMPLE	P3 (14) ONLY OECD	Q3 (15) ONLY NO-OECD
F_gov	0.0528	0.0377	0.0769	0.0442	0.0391	0.0495	0.0459	0.0337	0.0758	0.0658*	0.0501	0.0899	0.0527*	0.0562	0.0440
	[0.0277]	[0.0338]	[0.0482]	[0.0241]	[0.0296]	[0.0411]	[0.0276]	[0.0337]	[0.0473]	[0.0291]	[0.0352]	[0.0507]	[0.0254]	[0.0309]	[0.0436]
F_stud_fees	0.0894**	0.0853*	0.100	0.0584*	0.0558	0.0659	0.0768**	0.0768*	0.0925	0.104***	0.0990**	0.110*	0.0688*	0.0769*	0.0557
	[0.0294]	[0.0358]	[0.0511]	[0.0255]	[0.0313]	[0.0436]	[0.0292]	[0.0357]	[0.0501]	[0.0308]	[0.0374]	[0.0538]	[0.0269]	[0.0328]	[0.0462]
F_benef	-0.000176	-0.0472	0.0963	0.0351	0.0107	0.0964	-0.00000555	-0.0416	0.0881	0.0343	-0.00830	0.128	0.0576	0.0472	0.0988
	[0.0408]	[0.0505]	[0.0688]	[0.0355]	[0.0443]	[0.0587]	[0.0405]	[0.0505]	[0.0675]	[0.0427]	[0.0526]	[0.0724]	[0.0373]	[0.0462]	[0.0623]
Computers	0.00612*	0.00463	0.00589	0.00322	0.00170	0.00353	0.00551*	0.00472	0.00413	0.00650*	0.00523	0.00673	0.00401	0.00250	0.00527
	[0.00258]	[0.00318]	[0.00445]	[0.00225]	[0.00278]	[0.00379]	[0.00257]	[0.00317]	[0.00437]	[0.00270]	[0.00330]	[0.00465]	[0.00236]	[0.00289]	[0.00402]
girls	0.0506***	0.0650***	0.0389***	0.0339***	0.0441***	0.0252***	0.0418***	0.0582***	0.0277***	0.0529***	0.0675***	0.0428***	0.0348***	0.0472***	0.0251***
	[0.000818]	[0.00122]	[0.00111]	[0.000729]	[0.00109]	[0.000970]	[0.000857]	[0.00128]	[0.00114]	[0.000888]	[0.00132]	[0.00122]	[0.000821]	[0.00123]	[0.00110]
ownership	-35.03***	-32.00***	-41.74***	-5.471***	-6.270***	-3.967**	-30.27***	-29.60***	-32.38***	-33.78***	-30.98***	-40.16***	-4.695***	-6.579***	-1.640
	[0.831]	[1.016]	[1.430]	[0.764]	[0.935]	[1.317]	[0.840]	[1.028]	[1.435]	[0.877]	[1.063]	[1.530]	[0.810]	[0.980]	[1.424]
misced_2				10.72***	12.43***	12.67***							11.72***	14.64***	12.38***
				[2.336]	[3.265]	[3.356]							[2.529]	[3.536]	[3.623]
misced_3				22.70***	27.27***	23.46***							23.45***	29.82***	22.55***
				[2.485]	[3.528]	[3.526]							[2.701]	[3.835]	[3.824]
misced_4				41.26***	47.19***	40.20***							43.22***	50.91***	39.66***
				[2.595]	[3.642]	[3.738]							[2.815]	[3.945]	[4.059]
misced_5				67.36***	72.14***	69.44***							68.93***	75.57***	67.55***
				[2.685]	[3.726]	[3.987]							[2.902]	[4.025]	[4.308]
misced_6				92.14***	91.44***	105.5***							93.79***	95.08***	102.8***
				[2.901]	[3.976]	[4.363]							[3.122]	[4.272]	[4.709]
fisced_2				-11.07***	-23.18***	4.078							-14.27***	-28.83***	2.953
				[2.551]	[3.576]	[3.637]							[2.756]	[3.849]	[3.943]
fisced_3				-6.486*	-19.34***	9.543*							-10.71***	-24.42***	5.540
				[2.654]	[3.774]	[3.746]							[2.873]	[4.073]	[4.074]
fisced_4				9.943***	-3.135	26.52***							5.857*	-7.862	22.14***
				[2.753]	[3.873]	[3.942]							[2.979]	[4.170]	[4.298]
fisced_5				30.79***	18.75***	43.29***							26.72***	14.60***	38.23***
				[2.832]	[3.944]	[4.163]							[3.062]	[4.244]	[4.533]
fisced_6				54.42***	43.06***	65.14***							50.54***	40.59***	57.76***
				[3.024]	[4.148]	[4.549]							[3.259]	[4.451]	[4.936]
Community_2							12.29***	8.282***	16.21***				2.794**	0.183	5.281***
							[0.978]	[1.225]	[1.616]				[0.903]	[1.125]	[1.501]
Community_3							22.10***	16.19***	28.39***				5.486***	1.977	8.511***
							[0.959]	[1.208]	[1.576]				[0.899]	[1.122]	[1.502]
Community_4							28.46***	17.88***	43.13***				2.499**	-4.793***	12.55***
							[1.009]	[1.285]	[1.621]				[0.960]	[1.207]	[1.583]
Community_5							35.94***	20.12***	56.86***				4.201***	-5.338***	16.77***
							[1.234]	[1.587]	[1.950]				[1.181]	[1.496]	[1.922]
size										-0.0799**	0.0294	-0.447***	-0.0307	0.0234	-0.215***
										[0.0274]	[0.0311]	[0.0567]	[0.0239]	[0.0273]	[0.0488]
const	370.8***	480.4***	373.7***	269.1***	369.5***	245.3***	353.9***	469.1***	347.4***	367.4***	476.2***	375.5***	267.0***	366.1***	247.6***
	[4.639]	[4.578]	[6.199]	[4.545]	[4.762]	[6.431]	[4.639]	[4.643]	[6.149]	[4.859]	[4.754]	[6.566]	[4.779]	[4.979]	[6.882]
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	46597	30090	16194	46597	30090	16194	46001	29879	15809	43035	28005	14839	42485	27822	14472

Notes: The independent variables are the percentage of fund government, student fees, benefits, number of computers connected to Internet, number of girls, dummy for Private School, dummies describing the community in which school is located, dummies for fathers and mother education, student teacher ratio. The estimation allows for time and Country-level fixed effects. Standard errors are in parenthesis. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level; Standard errors in brackets.

Appendix 3: Tables on Quantile Regression

Table 7: Quantile Regression. Determinants of Math Test Score

	A1 (1) ALL SAMPLE	B1 (2) ONLY OECD	C1 (3) ONLY NO-OECD	D1 (4) ALL SAMPLE	E1 (5) ONLY OECD	F1 (6) ONLY NO-OECD	G1 (7) ALL SAMPLE	H1 (8) ONLY OECD	I1 (9) ONLY NO-OECD	L1 (10) ALL SAMPLE	M1 (11) ONLY OECD	N1 (12) ONLY NO-OECD	O1 (13) ALL SAMPLE	P1 (14) ONLY OECD	Q1 (15) ONLY NO-OECD
F_gov	0.0604*	0.0599*	0.0603	0.0603**	0.0522*	0.104**	0.0682*	0.0566*	0.0795*	0.0893**	0.0900**	0.0502	0.0591***	0.0642*	0.0768
	[0.0256]	[0.0256]	[0.0386]	[0.0216]	[0.0249]	[0.0327]	[0.0277]	[0.0280]	[0.0393]	[0.0272]	[0.0275]	[0.0435]	[0.0152]	[0.0299]	[0.0430]
F_stud_fees	0.0724**	0.0828**	0.0571	0.0581*	0.0473	0.119**	0.0753*	0.0801**	0.0889*	0.103***	0.114***	0.0434	0.0626***	0.0654*	0.0934*
	[0.0274]	[0.0278]	[0.0423]	[0.0231]	[0.0273]	[0.0362]	[0.0293]	[0.0302]	[0.0421]	[0.0291]	[0.0299]	[0.0473]	[0.0173]	[0.0323]	[0.0461]
F_benef	0.00750	-0.0295	0.146*	0.0736*	0.0195	0.198***	0.0274	-0.0476	0.122*	0.0936*	0.0267	0.198**	0.0945**	0.0636	0.176**
	[0.0410]	[0.0443]	[0.0676]	[0.0374]	[0.0480]	[0.0566]	[0.0452]	[0.0474]	[0.0609]	[0.0463]	[0.0463]	[0.0617]	[0.0350]	[0.0515]	[0.0643]
Computers	0.00623*	0.00424*	0.00939*	0.00222	0.00128	0.00117	0.00594**	0.00411	0.00599	0.00648*	0.00411	0.00898*	0.00273	0.000817	0.00512
	[0.00245]	[0.00201]	[0.00423]	[0.00202]	[0.00288]	[0.00397]	[0.00183]	[0.00218]	[0.00376]	[0.00261]	[0.00255]	[0.00447]	[0.00239]	[0.00244]	[0.00472]
girls	0.0407***	0.0491***	0.0322***	0.0182***	0.0228***	0.0141***	0.0316***	0.0438***	0.0187***	0.0424***	0.0496***	0.0360***	0.0193***	0.0259***	0.0143***
	[0.000980]	[0.000907]	[0.00120]	[0.000451]	[0.000669]	[0.000605]	[0.000723]	[0.00124]	[0.00126]	[0.00111]	[0.000836]	[0.00144]	[0.000594]	[0.000695]	[0.00113]
ownership	-33.00***	-29.99***	-40.60***	-3.002***	-3.317***	-2.109	-29.56***	-28.04***	-33.16***	-32.18***	-29.13***	-39.76***	-2.648**	-4.643***	-0.332
	[1.037]	[1.157]	[1.966]	[0.767]	[0.923]	[1.473]	[0.936]	[1.175]	[1.857]	[1.067]	[1.205]	[2.077]	[0.825]	[0.994]	[1.577]
misced_2				13.24***	18.32***	8.522*							14.61***	19.55***	9.630**
				[2.532]	[4.654]	[3.346]							[3.513]	[5.073]	[3.480]
misced_3				26.98***	34.10***	22.22***							28.41***	35.37***	24.13***
				[2.681]	[4.868]	[3.499]							[3.665]	[5.337]	[3.651]
misced_4				45.22***	53.82***	38.85***							47.64***	56.47***	39.70***
				[2.782]	[4.947]	[3.707]							[3.762]	[5.429]	[3.970]
misced_5				70.48***	78.35***	66.01***							72.67***	80.85***	66.11***
				[2.869]	[5.021]	[4.036]							[3.828]	[5.494]	[4.288]
misced_6				93.93***	97.77***	99.04***							96.64***	101.2***	98.27***
				[3.050]	[5.198]	[4.540]							[4.003]	[5.689]	[4.796]
fisced_2				-7.877*	-18.13**	5.017							-9.981*	-23.67**	1.205
				[3.448]	[6.789]	[3.810]							[4.139]	[7.695]	[4.222]
fisced_3				-3.026	-16.48*	11.08**							-6.359	-19.76*	5.152
				[3.529]	[6.903]	[3.879]							[4.217]	[7.858]	[4.429]
fisced_4				12.38***	-2.115	27.03***							10.21*	-4.428	20.81***
				[3.624]	[6.981]	[3.982]							[4.300]	[7.937]	[4.641]
fisced_5				33.24***	18.44**	45.89***							31.32***	17.56*	39.31***
				[3.684]	[7.016]	[4.287]							[4.362]	[7.976]	[4.893]
fisced_6				59.23***	45.75***	68.61***							58.02***	46.59***	60.47***
				[3.803]	[7.150]	[4.803]							[4.506]	[8.083]	[5.354]
Community_2							9.151***	5.165***	14.24***				1.543	-0.745	4.610**
							[0.867]	[1.155]	[1.618]				[0.881]	[1.002]	[1.616]
Community_3							14.98***	9.476***	23.47***				0.913	-1.802	5.026**
							[0.912]	[1.195]	[1.643]				[0.851]	[1.022]	[1.683]
Community_4							21.63***	12.15***	36.57***				-1.790*	-8.040***	9.334***
							[0.976]	[1.342]	[1.667]				[0.897]	[1.101]	[1.742]
Community_5							28.32***	13.52***	48.97***				-0.429	-9.511***	12.93***
							[1.353]	[1.796]	[2.411]				[1.147]	[1.517]	[2.145]
size										-0.0698	0.0354	-0.407***	-0.0179	0.0358	-0.215***
										[0.0400]	[0.0280]	[0.0553]	[0.0101]	[0.0207]	[0.0400]
Const	389.2***	473.5***	390.9***	278.8***	357.7***	253.9***	375.7***	467.0***	371.3***	382.1***	468.7***	393.9***	276.3***	354.5***	260.7***
	[6.358]	[4.176]	[7.354]	[5.723]	[6.873]	[6.522]	[6.192]	[4.486]	[6.646]	[6.903]	[4.133]	[7.638]	[5.985]	[7.728]	[7.895]
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	46723	30214	16196	46723	30214	16196	46126	30002	15811	43154	28122	14841	42603	27938	14474

Notes: The independent variables are the percentage of fund government, student fees, benefits, number of computers connected to Internet, number of girls, dummy for Private School, dummies describing the community in which school is located, dummies for fathers and mother education, student teacher ratio. The estimation allows for time and Country-level fixed effects. Standard errors are in parenthesis. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level; Standard errors in brackets.

Table 8: Quantile Regression. Determinants of Science Test Score

	A2 (1) ALL SAMPLE	B2 (2) ONLY OECD	C2 (3) ONLY NO-OECD	D2 (4) ALL SAMPLE	E2 (5) ONLY OECD	F2 (6) ONLY NO-OECD	G2 (7) ALL SAMPLE	H2 (8) ONLY OECD	I2 (9) ONLY NO-OECD	L2 (10) ALL SAMPLE	M2 (11) ONLY OECD	N2 (12) ONLY NO-OECD	O2 (13) ALL SAMPLE	P2 (14) ONLY OECD	Q2 (15) ONLY NO-OECD
F_gov	0.0481**	0.0636*	0.0365	0.0683***	0.0899***	0.0456	0.0686*	0.0789**	0.0926*	0.0543*	0.0685*	0.0447	0.0844***	0.0942***	0.0314
	[0.0185]	[0.0273]	[0.0501]	[0.0191]	[0.0223]	[0.0388]	[0.0268]	[0.0302]	[0.0469]	[0.0242]	[0.0330]	[0.0470]	[0.0218]	[0.0233]	[0.0375]
F_stud_fees	0.0656**	0.0826**	0.0514	0.0702***	0.0856***	0.0683	0.0809**	0.0932**	0.106*	0.0739**	0.0882*	0.0545	0.0908***	0.100***	0.0448
	[0.0207]	[0.0295]	[0.0531]	[0.0210]	[0.0246]	[0.0407]	[0.0286]	[0.0324]	[0.0503]	[0.0265]	[0.0352]	[0.0501]	[0.0233]	[0.0259]	[0.0395]
F_benef	0.0228	-0.0183	0.130	0.0890**	0.0698	0.159**	0.0534	0.0149	0.175**	0.0587	0.0142	0.177*	0.128***	0.106**	0.176**
	[0.0329]	[0.0426]	[0.0784]	[0.0305]	[0.0359]	[0.0556]	[0.0425]	[0.0505]	[0.0651]	[0.0397]	[0.0463]	[0.0728]	[0.0330]	[0.0377]	[0.0569]
Computers	0.00834**	0.00599*	0.0109*	0.00557**	0.00443	0.00416	0.00730**	0.00656**	0.00716	0.00772**	0.00554*	0.00991	0.00587**	0.00406	0.00434
	[0.00262]	[0.00250]	[0.00466]	[0.00191]	[0.00275]	[0.00313]	[0.00257]	[0.00214]	[0.00564]	[0.00257]	[0.00259]	[0.00515]	[0.00206]	[0.00336]	[0.00320]
girls	0.0420***	0.0491***	0.0351***	0.0208***	0.0256***	0.0153***	0.0337***	0.0447***	0.0233***	0.0438***	0.0512***	0.0391***	0.0237***	0.0301***	0.0167***
	[0.000788]	[0.00107]	[0.00123]	[0.000372]	[0.000546]	[0.000888]	[0.000594]	[0.000740]	[0.00132]	[0.000785]	[0.000846]	[0.00132]	[0.000431]	[0.000759]	[0.000878]
ownership	-33.02***	-30.45***	-38.41***	-3.566***	-3.657***	-2.896*	-29.28***	-28.61***	-31.51***	-32.47***	-30.01***	-36.79***	-3.676***	-5.350***	-1.305
	[1.012]	[1.129]	[1.881]	[0.769]	[0.928]	[1.260]	[1.014]	[1.153]	[1.841]	[1.083]	[1.145]	[2.020]	[0.805]	[1.009]	[1.265]
misced_2				13.29***	23.10***	7.580*							15.04***	27.33***	6.813
				[2.192]	[4.084]	[3.117]							[2.831]	[5.019]	[3.791]
misced_3				25.60***	37.79***	19.65***							28.19***	41.93***	18.64***
				[2.351]	[4.373]	[3.290]							[2.988]	[5.335]	[3.983]
misced_4				42.36***	56.16***	33.82***							45.53***	61.44***	33.44***
				[2.474]	[4.479]	[3.516]							[3.089]	[5.427]	[4.182]
misced_5				67.83***	81.06***	60.39***							70.71***	85.99***	59.77***
				[2.578]	[4.554]	[3.832]							[3.177]	[5.494]	[4.442]
misced_6				89.49***	98.67***	90.86***							92.48***	104.3***	90.12***
				[2.786]	[4.764]	[4.247]							[3.376]	[5.642]	[4.823]
fisced_2				-5.535	-19.67***	4.046							-10.63**	-24.88***	1.320
				[3.370]	[4.570]	[4.286]							[3.664]	[5.670]	[5.308]
fisced_3				-1.895	-20.48***	11.44**							-6.762	-24.47***	7.184
				[3.449]	[4.730]	[4.431]							[3.729]	[5.813]	[5.408]
fisced_4				13.40***	-6.026	28.16***							9.875*	-7.672	23.59***
				[3.557]	[4.834]	[4.594]							[3.835]	[5.929]	[5.569]
fisced_5				33.03***	13.77**	46.06***							29.93***	13.77*	40.67***
				[3.618]	[4.891]	[4.800]							[3.903]	[5.997]	[5.766]
fisced_6				57.83***	40.87***	66.45***							56.09***	42.81***	58.91***
				[3.773]	[5.022]	[5.239]							[4.075]	[6.123]	[6.106]
Community_2							6.816***	3.196**	11.38***				-0.916	-2.507*	1.624
							[0.875]	[1.023]	[1.389]				[0.822]	[1.126]	[1.433]
Community_3							13.27***	8.077***	21.39***				-1.567	-3.564**	2.683
							[0.892]	[1.041]	[1.620]				[0.850]	[1.116]	[1.520]
Community_4							18.34***	9.980***	30.81***				-4.792***	-10.48***	5.373***
							[0.972]	[1.177]	[1.641]				[0.912]	[1.204]	[1.576]
Community_5							23.66***	9.296***	42.45***				-5.084***	-14.59***	9.289***
							[1.409]	[1.708]	[2.123]				[1.182]	[1.518]	[1.839]
size										-0.0812***	0.00774	-0.501***	-0.0423***	0.0229	-0.230***
										[0.0164]	[0.0261]	[0.0551]	[0.00939]	[0.0182]	[0.0421]
const	391.6***	488.5***	393.7***	278.8***	365.8***	273.4***	378.3***	480.7***	371.8***	387.9***	486.1***	397.9***	280.2***	363.1***	277.6***
	[4.063]	[4.318]	[6.186]	[4.840]	[4.869]	[7.378]	[5.067]	[4.455]	[6.566]	[4.780]	[4.701]	[5.801]	[5.166]	[5.997]	[7.991]
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	46725	30217	16195	46725	30217	16195	46127	30004	15810	43156	28125	14840	42604	27940	14473

Notes: The independent variables are the percentage of fund government, student fees, benefits, number of computers connected to Internet, number of girls, dummy for Private School, dummies describing the community in which school is located, dummies for fathers and mother education, student teacher ratio. The estimation allows for time and Country-level fixed effects. Standard errors are in parenthesis. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level; Standard errors in brackets.

Table 9: Quantile Regression. Determinants of Reading Test Score

	A3 (1) ALL SAMPLE	B3 (2) ONLY OECD	C3 (3) ONLY NO-OECD	D3 (4) ALL SAMPLE	E3 (5) ONLY OECD	F3 (6) ONLY NO-OECD	G3 (7) ALL SAMPLE	H3 (8) ONLY OECD	I3 (9) ONLY NO-OECD	L3 (10) ALL SAMPLE	M3 (11) ONLY OECD	N3 (12) ONLY NO-OECD	O3 (13) ALL SAMPLE	P3 (14) ONLY OECD	Q3 (15) ONLY NO-OECD
F_gov	0.0557*	0.0265	0.119*	0.0598*	0.0665*	0.0680	0.0488	0.0342	0.0810	0.0657*	0.0365	0.0804	0.0789**	0.0792**	0.0446
	[0.0234]	[0.0282]	[0.0555]	[0.0260]	[0.0312]	[0.0510]	[0.0259]	[0.0334]	[0.0535]	[0.0266]	[0.0317]	[0.0666]	[0.0270]	[0.0265]	[0.0548]
F_stud_fees	0.0892***	0.0570	0.148*	0.0682*	0.0761*	0.0847	0.0762**	0.0669	0.104	0.0945***	0.0716*	0.111	0.0926**	0.0966***	0.0657
	[0.0253]	[0.0311]	[0.0592]	[0.0276]	[0.0330]	[0.0538]	[0.0275]	[0.0362]	[0.0565]	[0.0285]	[0.0345]	[0.0697]	[0.0284]	[0.0289]	[0.0563]
F_benef	0.0153	-0.0779	0.222**	0.0560	0.0252	0.140	-0.000334	-0.0617	0.116	0.0599	-0.0506	0.206*	0.0885*	0.0676	0.0948
	[0.0406]	[0.0422]	[0.0737]	[0.0415]	[0.0480]	[0.0734]	[0.0357]	[0.0475]	[0.0728]	[0.0424]	[0.0518]	[0.0814]	[0.0408]	[0.0422]	[0.0758]
Computers	0.00609*	0.00530	0.0108	0.00579*	0.00285	0.00266	0.00653*	0.00400	0.00649	0.00679*	0.00466	0.0108	0.00530*	0.000151	0.00612
	[0.00263]	[0.00300]	[0.00579]	[0.00270]	[0.00319]	[0.00479]	[0.00298]	[0.00284]	[0.00509]	[0.00284]	[0.00334]	[0.00656]	[0.00268]	[0.00322]	[0.00575]
girls	0.0560***	0.0641***	0.0459***	0.0337***	0.0398***	0.0269***	0.0451***	0.0571***	0.0312***	0.0579***	0.0665***	0.0509***	0.0352***	0.0433***	0.0268***
	[0.000534]	[0.00117]	[0.000804]	[0.000702]	[0.000530]	[0.00116]	[0.000577]	[0.000534]	[0.00151]	[0.000910]	[0.00146]	[0.00136]	[0.000763]	[0.000721]	[0.00128]
ownership	-36.47***	-34.80***	-42.91***	-5.298***	-6.761***	-2.470	-32.32***	-31.62***	-34.32***	-35.85***	-33.96***	-41.09***	-4.870***	-8.076***	-0.446
	[0.896]	[1.058]	[2.119]	[0.843]	[1.026]	[1.551]	[0.978]	[1.073]	[1.967]	[0.977]	[1.140]	[2.102]	[0.866]	[1.018]	[1.623]
misced_2				14.14***	19.92***	10.95**							15.10***	20.23***	12.49*
				[3.556]	[4.689]	[3.641]							[2.872]	[4.788]	[5.130]
misced_3				27.10***	34.79***	22.55***							27.76***	36.28***	25.01***
				[3.698]	[4.907]	[3.860]							[3.090]	[5.123]	[5.328]
misced_4				44.53***	53.06***	38.70***							46.25***	55.31***	42.09***
				[3.806]	[5.019]	[4.122]							[3.242]	[5.245]	[5.582]
misced_5				70.94***	78.19***	70.55***							72.94***	80.33***	71.75***
				[3.882]	[5.088]	[4.445]							[3.331]	[5.317]	[5.836]
misced_6				94.65***	96.45***	107.5***							97.04***	98.33***	107.6***
				[4.041]	[5.275]	[4.915]							[3.535]	[5.515]	[6.149]
fisced_2				-2.731	-14.84**	7.570							-3.532	-16.92**	4.705
				[3.944]	[5.099]	[3.989]							[3.870]	[5.908]	[5.744]
fisced_3				2.758	-11.11*	13.86***							1.063	-12.76*	8.667
				[4.022]	[5.266]	[4.141]							[4.036]	[6.117]	[5.884]
fisced_4				19.35***	4.790	31.48***							17.47***	3.758	24.61***
				[4.108]	[5.339]	[4.360]							[4.137]	[6.213]	[6.088]
fisced_5				39.64***	25.42***	48.25***							37.71***	25.14***	42.09***
				[4.175]	[5.402]	[4.652]							[4.208]	[6.271]	[6.335]
fisced_6				64.60***	51.28***	68.76***							62.64***	52.87***	60.84***
				[4.299]	[5.541]	[5.122]							[4.361]	[6.412]	[6.641]
Community_2							9.238***	5.338***	15.97***				1.390	-1.564	3.850*
							[0.807]	[0.990]	[1.540]				[0.925]	[1.054]	[1.618]
Community_3							16.45***	10.74***	25.70***				2.639**	-1.518	6.422***
							[0.856]	[1.033]	[1.634]				[0.902]	[1.068]	[1.698]
Community_4							24.20***	14.40***	39.48***				-0.301	-7.429***	9.844***
							[0.928]	[1.139]	[1.710]				[0.983]	[1.162]	[1.807]
Community_5							30.42***	15.66***	51.31***				2.093	-7.496***	14.24***
							[1.376]	[1.668]	[2.248]				[1.312]	[1.580]	[2.083]
size										-0.135***	0.0224	-0.515***	-0.0814***	0.0178	-0.274***
										[0.0386]	[0.0430]	[0.0612]	[0.00977]	[0.0395]	[0.0508]
const	372.5***	492.2***	370.4***	257.6***	363.4***	239.2***	359.7***	484.5***	350.6***	372.0***	488.5***	380.3***	253.5***	359.6***	243.4***
	[5.045]	[4.428]	[6.853]	[6.250]	[5.655]	[7.377]	[4.241]	[4.653]	[6.370]	[4.083]	[4.426]	[8.511]	[6.395]	[6.339]	[9.132]
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	46615	30105	16197	46615	30105	16197	46016	29891	15812	43053	28020	14842	42500	27834	14475

Notes: The independent variables are the percentage of fund government, student fees, benefits, number of computers connected to Internet, number of girls, dummy for Private School, dummies describing the community in which school is located, dummies for fathers and mother education, student teacher ratio. The estimation allows for time and Country-level fixed effects. Standard errors are in parenthesis. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level; Standard errors in brackets.

Table 10: Quantile Regression. Determinants of (Mean) Test Score

	A4 (1) ALL SAMPLE	B4 (2) ONLY OECD	C4 (3) ONLY NO-OECD	D4 (4) ALL SAMPLE	E4 (5) ONLY OECD	F4 (6) ONLY NO-OECD	G4 (7) ALL SAMPLE	H4 (8) ONLY OECD	I4 (9) ONLY NO-OECD	L4 (10) ALL SAMPLE	M4 (11) ONLY OECD	N4 (12) ONLY NO-OECD	O4 (13) ALL SAMPLE	P4 (14) ONLY OECD	Q4 (15) ONLY NO-OECD
F_gov	0.0711**	0.0588	0.0744*	0.0748**	0.0809**	0.109**	0.0587*	0.0597	0.0717	0.0742**	0.0653	0.0735	0.0757**	0.0782**	0.0869*
	[0.0223]	[0.0314]	[0.0317]	[0.0246]	[0.0293]	[0.0362]	[0.0269]	[0.0320]	[0.0447]	[0.0285]	[0.0353]	[0.0491]	[0.0266]	[0.0256]	[0.0381]
F_stud_fees	0.0908***	0.0856**	0.0698	0.0762**	0.0800**	0.118**	0.0756**	0.0799*	0.0883	0.0981**	0.0905*	0.0636	0.0840**	0.0891**	0.0978*
	[0.0241]	[0.0329]	[0.0369]	[0.0257]	[0.0310]	[0.0390]	[0.0284]	[0.0338]	[0.0478]	[0.0303]	[0.0366]	[0.0527]	[0.0280]	[0.0278]	[0.0411]
F_benef	0.0372	-0.0187	0.168**	0.0729	0.0313	0.228***	0.0361	-0.0176	0.134*	0.0713	0.0202	0.218***	0.0946*	0.0525	0.199***
	[0.0349]	[0.0485]	[0.0557]	[0.0395]	[0.0450]	[0.0417]	[0.0469]	[0.0488]	[0.0562]	[0.0443]	[0.0497]	[0.0654]	[0.0429]	[0.0436]	[0.0490]
Computers	0.00745**	0.00524	0.00831	0.00446*	0.00327	0.00365	0.00494*	0.00463*	0.00395	0.00684*	0.00604*	0.00818	0.00512**	0.00412***	0.00683*
	[0.00288]	[0.00287]	[0.00530]	[0.00184]	[0.00228]	[0.00262]	[0.00224]	[0.00211]	[0.00433]	[0.00310]	[0.00291]	[0.00592]	[0.00194]	[0.00119]	[0.00283]
girls	0.0474***	0.0553***	0.0388***	0.0245***	0.0296***	0.0185***	0.0381***	0.0494***	0.0250***	0.0493***	0.0568***	0.0436***	0.0263***	0.0334***	0.0191***
	[0.000766]	[0.000866]	[0.00127]	[0.000582]	[0.000757]	[0.00101]	[0.000515]	[0.000718]	[0.00121]	[0.000686]	[0.000396]	[0.00137]	[0.000520]	[0.000793]	[0.00101]
ownership	-34.31***	-31.50***	-41.08***	-3.871***	-5.048***	-3.360*	-30.25***	-29.28***	-33.02***	-33.40***	-30.45***	-39.38***	-3.597***	-5.881***	-0.902
	[0.897]	[1.037]	[1.918]	[0.742]	[0.898]	[1.332]	[0.924]	[1.084]	[1.828]	[0.947]	[1.085]	[1.926]	[0.807]	[0.954]	[1.390]
misced_2				11.59***	20.01***	8.267**							13.94***	24.00***	9.669***
				[2.674]	[4.936]	[2.887]							[2.743]	[4.938]	[2.539]
misced_3				24.80***	35.53***	21.71***							27.69***	40.18***	21.53***
				[2.824]	[5.084]	[3.177]							[2.915]	[5.159]	[2.841]
misced_4				42.72***	54.21***	38.25***							46.96***	59.27***	38.61***
				[2.942]	[5.188]	[3.433]							[3.041]	[5.292]	[3.169]
misced_5				68.96***	79.70***	66.16***							73.16***	84.79***	65.74***
				[3.020]	[5.255]	[3.733]							[3.118]	[5.359]	[3.461]
misced_6				91.68***	97.10***	100.1***							96.61***	102.8***	99.03***
				[3.199]	[5.430]	[4.196]							[3.325]	[5.540]	[3.855]
fisced_2				-2.978	-17.98**	5.114							-6.682	-24.00***	2.020
				[3.171]	[6.120]	[3.294]							[3.536]	[6.656]	[2.785]
fisced_3				1.238	-16.52**	11.58**							-3.156	-21.12**	6.828*
				[3.292]	[6.211]	[3.528]							[3.680]	[6.836]	[3.089]
fisced_4				17.57***	-0.784	29.12***							13.75***	-3.618	23.54***
				[3.374]	[6.291]	[3.755]							[3.763]	[6.908]	[3.383]
fisced_5				37.02***	18.93**	46.33***							33.59***	17.28*	40.60***
				[3.439]	[6.340]	[3.982]							[3.832]	[6.960]	[3.651]
fisced_6				62.40***	45.89***	66.77***							59.30***	46.30***	59.52***
				[3.548]	[6.448]	[4.442]							[3.970]	[7.061]	[4.079]
Community_2							8.353***	3.836***	13.10***				0.501	-1.764	3.098*
							[0.836]	[1.103]	[1.354]				[0.805]	[1.026]	[1.319]
Community_3							15.25***	9.127***	23.55***				0.496	-2.815**	4.395**
							[0.881]	[1.133]	[1.498]				[0.828]	[1.015]	[1.405]
Community_4							21.75***	11.71***	35.78***				-2.471**	-9.095***	8.027***
							[0.923]	[1.212]	[1.566]				[0.906]	[1.111]	[1.484]
Community_5							27.97***	12.79***	47.14***				-1.506	-10.39***	11.58***
							[1.332]	[1.613]	[1.927]				[1.162]	[1.470]	[1.882]
size										-0.0733***	0.0278**	-0.513***	-0.0442**	0.0154	-0.254***
										[0.00433]	[0.00918]	[0.0544]	[0.0155]	[0.0321]	[0.0207]
const	382.0***	484.7***	386.0***	270.4***	365.1***	251.4***	368.3***	478.1***	363.3***	380.0***	481.3***	390.6***	269.7***	361.0***	259.1***
	[3.963]	[4.314]	[5.330]	[5.044]	[6.664]	[6.628]	[4.685]	[4.595]	[6.448]	[4.778]	[4.621]	[6.677]	[5.817]	[6.815]	[6.576]
Time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	46597	30090	16194	46597	30090	16194	46001	29879	15809	43035	28005	14839	42485	27822	14472

Notes: The independent variables are the percentage of fund government, student fees, benefits, number of computers connected to Internet, number of girls, dummy for Private School, dummies describing the community in which school is located, dummies for fathers and mother education, student teacher ratio. The estimation allows for time and Country-level fixed effects. Standard errors are in parenthesis. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level; Standard errors in brackets.