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**Working Paper**

## The Role of Background Factors for Reading Literacy: Straight National Scores in the PISA 2000 Study

IZA Discussion Papers, No. 545

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* Fertig, Michael; Schmidt, Christoph M. (2002) : The Role of Background Factors for Reading Literacy: Straight National Scores in the PISA 2000 Study, IZA Discussion Papers, No. 545, Institute for the Study of Labor (IZA), Bonn

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August 2002

# **The Role of Background Factors for Reading Literacy: Straight National Scores in the PISA 2000 Study**

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## **ABSTRACT**

### **The Role of Background Factors for Reading Literacy: Straight National Scores in the PISA 2000 Study\***

Based on the individual-level data of the PISA 2000 study, this note provides a detailed econometric analysis of the way that reading test scores are associated with individual and family background information and with characteristics of the school and class of the 15 to 16 year old respondents to the survey. Based on our quantile regressions, we interpret the national performance scores conditional on these observable characteristics, as the reflection of different education systems. Our findings suggest that US students, particularly those in the lower quantiles, are served relatively unsatisfactorily by their system of education. Moreover, part of the potential for improvement seems to involve measurable aspects which could be altered and monitored easily.

JEL Classification: I21, I28

Keywords: reading literacy, school resources, quantile regression

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\* The authors are grateful to Georgios Tassoukis for his valuable help with the data and Jan Brenner for research assistance.

# 1 Introduction

The way in which nations try to mold their young minds and talents into productive young adults differs widely across the OECD. A plethora of education systems employs different organizational structures and educational tools with varying intensity. The extent to which this really makes a difference is a topic of perpetual interest. Within the United States, researchers intensely debate the role of school quality for educational attainment and subsequent success in the labor market (see e.g. CARD AND KRUEGER (1992) and (1996), COLEMAN (1966) and HANUSHEK (1986)). International studies (see e.g. BARRO AND LEE (2001)) directly compare educational investment. Studies of migrant performance (see e.g. BORJAS (1985)) emphasize the different preparation of immigrants from distinct origin countries for the US labor market.

Yet, it is very difficult to compare the comparable across countries. While it might be straightforward to ascertain information about inputs and organizational approaches, and while it might also be a convincing identification assumption to presume identical distributions of cognitive abilities of any cohort of newborns, it is the comparison of outcomes across economies that is so difficult. After all, graduates from the education system compete in vastly different labor markets. Similarly, the comparison of labor market achievements of US graduates with those of migrants to the US would be problematic as well. Finally, even globally conducted tests such as the *Graduate Record Examination* (GRE) cannot really provide such a comparison, since this test is part of the “testing culture” only for American-trained students, it does not collect a satisfactory set of background information, and it is typically taken only by prospective academics.

By contrast, the world-wide “OECD Programme for International Student Assessment” (*PISA 2000*), held the promise to deliver the data for a meaningful international comparison. It was designed by eminent specialists in pedagogical issues with the aim of measuring practical knowledge in math, science and reading. The study induced quite different reactions throughout the participating countries. Whereas, for instance, the British were quite satisfied with the results of their students (see e.g. *The Economist*, December 8, 2001), Americans showed themselves rather disappointed (see e.g. *The New York Times*, December 4, 2001) and Germans were shocked (chose any newspaper of this time period you can find).

In the aftermath of the report (OECD (2002)) the *PISA 2000* examination has initiated an intense discussion on the causes of these results and the consequences to be drawn. This reaction is astounding, however. After all, the results presented by the report consist by and large of country averages which do not control for any other covariate of individual student achievement. Specifically, whether education systems operate under similar or vastly different conditions regarding (family) background and intergenerational skill transmission, has not been explored. There has not been any serious attempt to compare comparable students across countries. Yet, the the publicly available background information (<http://www.pisa.oecd.org>) collected in *PISA 2000*, family and individual characteristics and a rich set of school-related variables allows for a deeper analysis.

This note, therefore, aims at providing some more detailed information on the cor-

relates of the reading performance of students in *PISA 2000*. By providing conditional national performance scores, we hope to identify that part of international differences attributable to genuine differences in education systems. The next section briefly describes the design of the *PISA 2000* study. Section 3 then discusses the econometric approach chosen in this paper, an individually based quantile regression analysis of the reading literacy test score on a set of individual characteristics, family background information, as well as class and school characteristics. Section 4 reports the empirical finding of the mean as well as the quantile regressions and the final section discusses their implications.

## 2 The Design of PISA 2000

The *PISA 2000* target population are 15 to 16 year old students enrolled in an educational institution at the time of the survey (the first half of 2000). The primary sample unit, however, were schools. In a second step, in every school a random sample of students from the target population was drawn resulting in a stratified cluster sample. The examination conducted among the students in the sample consisted of a reading, math and science literacy test. Furthermore, a wide variety of background information on the students was collected by student questionnaires. Among this individual information is the family background of the student, his or her attitudes towards visiting school, his or her learning strategy, a self-assessment of reading pleasure etc. Furthermore, the study also conducted interviews among the principals of the respective schools in order to collect information on the school resources, the number of teachers in the school, the principles of selecting students etc.

The particular test score of an individual student is not the direct share of correct answers. Rather, it is computed based on a procedure originating in *Item Response Theory* (see e.g. HAMBLETON AND SWAMINATHAN (1989)). Calculated scores are weighted averages of the correct responses to all questions of a specific category (e.g. reading literacy) with the difficulty of the question serving as weight (see e.g. WARM (1989)). These individual test scores are standardized in a subsequent step so that the unconditional sample mean of the *PISA 2000* scores equals 500 and their unconditional sample standard error equals 100. The dependent variable in our analysis is the reading score of *PISA 2000*, since this part of the study requires the most *know-how* and the least *know-that* compared to the math and science part.

## 3 Country Differences in Individual Achievement

To assess the impact of institutional differences in school systems it is necessary to compare the test score of comparable individual students from the different countries involved. Specifically, since educational achievement is an inherently individual phenomenon, and exhibits considerable persistence across generations it is necessary to control for individual characteristics and family background in analyzing individual differences in test scores. Furthermore, the school and class specific information provide a first, albeit incomplete, picture of the tangible aspects of institutional differences in school systems across the

participating countries. Institutional differences would tend to manifest themselves in the estimated impact of the school characteristics, while an unexplained remainder would be expressed as the differences in the national scores, that is the coefficients of the country indicators.

Our explanatory variables are described in detail in **Table A1** in the Appendix and comprise individual and family background variables as well as class and school characteristics<sup>1</sup>. TABLE A2 in the Appendix reports some descriptive statistics of the PISA 2000 dataset. Due to students with missing observations for some variables that were deleted from the sample, the unconditional sample mean of the reading literacy is 502.921 instead of 500 and the sample standard error is 98.098 instead of 100.

The PISA 2000 study ascertains a wide variety of individual information regarding the participating students. There is a set of questions asking for a self-assessment of e.g. the pleasure in reading or the strategy of studying. However, these factors are in all likelihood endogenous outcomes affected by the same determinants as the dependent variable itself. For instance, for the self-assessed pleasure in reading it could be imagined easily that students who score high also perceive reading as a pleasure and vice versa.

Finally, we utilize quantile regression techniques to infer on the determining factors of reading literacy. This technique, introduced by KOENKER AND BASSETT (1978) has found many empirical applications in different fields in recent years (see e.g. CHAMBERLAIN (1994), EIDE AND SHOWALTER (1998), FITZENBERGER (1999) or LEVIN (2001)). Quantile regression aims at providing an exhaustive analysis of the effect of the explanatory variables on the complete conditional distribution of the test score. Contrary to the usual OLS mean regression, the most prominent quantile regression, i.e. the median regression estimator, minimizes the sum of *absolute* errors instead of *squared* errors as in the usual OLS (mean) regression. Correspondingly, all other conditional quantile functions minimize an asymmetrically weighted sum of absolute errors.

Our analysis proceeds in three steps. A first series of quantile regressions estimates unconditional national performance scores – specified in deviation to the corresponding US quantile. These scores are our benchmark, basically replicating the results of the OECD (2002) report. In a second step, we further introduce all available individual and background characteristics into our quantile specifications. Estimated conditional national scores now capture how successfully different countries' education systems serve the cognitive development of students who are comparable in terms of their observable individual characteristics. Finally, a third set of quantile regressions additionally includes school and class characteristics. The estimated relative national scores now reflect differ-

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<sup>1</sup>Many papers in the received literature stress the importance of school resources for the performance of students in the labor market after finishing school (see e.g. CARD AND KRUEGER (1992) and (1996)). One very prominent measure in this literature is the pupil-teacher-ratio. Unfortunately, we are not able to apply this ratio in our analysis as an explanatory factor as well since the necessary information on students and teachers is missing for *all* Canadian schools in the sample. Yet, Canada is the country with the most individual students attending the test in our sample. Therefore, we are hesitant to remove all Canadian participants from the sample, only to be able to apply the pupils-teacher-ratio as an additional regressor. However, a sensitivity analysis without Canada demonstrated that results do not change qualitatively if Canadian students are not considered.

ences in the intangible aspects of the education systems.

## 4 Empirical Results

An inspection of the estimated unconditional national performance scores – expressed in deviation to the performance of US students in the same quantile – demonstrates that in terms of reading ability students of many countries are performing statistically significant better than US students. These results confirm the OECD (2002) report, hold throughout all quantiles without exception and are therefore not reported separately here. Among the top scorers are students from Finland, Korea and Australia, whereas the students from Brazil, Mexico, Poland, and Russia perform particularly poorly. Yet, such unconditional figures cannot be used to assess the relative performance of systems in which students typically originate from educated parents as compared to typically uneducated parents.

**Table 1** reports the estimation results of the OLS and the quantile regressions for the saturated specifications including both individual and family background variables (first panel) and for the class and school covariates (second panel)<sup>2</sup>.

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<sup>2</sup>The results for the individual and family background are qualitatively unaltered as the set of class and school covariates is included in or excluded from the quantile regressions.

**Table 1:** Estimation Results – Individual Characteristics and Family Background

EXPLANATORY VARIABLE	OLS	10% QUANTILE	25% QUANTILE	50% QUANTILE	75% QUANTILE	90% QUANTILE
<b>Individual and Family Background</b>						
Female	28.63 (66.81)	37.87 (44.40)	32.48 (56.25)	27.04 (52.86)	22.82 (44.50)	20.26 (29.14)
Both Parents Work	7.78 (16.93)	11.52 (12.49)	9.53 (15.32)	7.25 (13.22)	6.02 (10.96)	4.94 (6.62)
Intact Family	13.42 (26.39)	15.35 (15.22)	13.92 (20.32)	13.38 (22.03)	11.88 (19.49)	11.70 (14.13)
Native Student	4.30 (1.95)	15.64 (3.56)	7.14 (2.40)	4.88 (1.86)	-5.19 (-1.97)	-9.17 (-2.58)
Parents Foreign	-18.11 (-7.56)	-12.65 (-2.65)	-19.51 (-6.04)	-17.75 (-6.21)	-24.03 (-8.40)	-25.22 (-6.52)
Second Generation	15.89 (6.44)	6.59 (1.34)	15.20 (4.57)	15.62 (5.31)	23.55 (8.00)	25.63 (6.44)
Other Language at Home	-28.83 (-35.19)	-31.44 (-19.23)	-33.08 (-29.98)	-29.56 (-30.23)	-24.79 (-25.26)	-23.48 (-17.63)
<b>Parents Education</b>						
No Schooling Mother	-43.71 (-23.03)	-44.32 (-11.14)	-44.79 (-17.08)	-46.43 (-20.50)	-44.74 (-20.09)	-40.92 (-13.60)
Mother Compl. ISCED-1	-24.67 (-25.25)	-24.14 (-12.04)	-26.22 (-19.63)	-24.26 (-20.80)	-25.43 (-21.93)	-24.52 (-15.70)
Mother Compl. ISCED-2	-17.75 (-25.58)	-15.21 (-10.93)	-18.41 (-19.59)	-17.97 (-21.71)	-19.17 (-23.19)	-19.01 (-16.96)
Mother Compl. ISCED-3b	-9.39 (-12.52)	-6.84 (-4.53)	-10.77 (-10.59)	-9.59 (-10.70)	-10.71 (-11.97)	-10.38 (-8.59)
No Schooling Father	-34.29 (-18.20)	-38.06 (-9.70)	-40.27 (-15.50)	-32.98 (-14.67)	-32.26 (-14.59)	-30.09 (-10.12)
Father Compl. ISCED-1	-16.14 (-16.69)	-14.95 (-7.58)	-16.56 (-12.57)	-17.31 (-14.99)	-15.69 (-13.67)	-15.72 (-10.14)
Father Compl. ISCED-2	-13.01 (-18.72)	-11.72 (-8.43)	-13.58 (-14.47)	-13.83 (-16.68)	-13.28 (-15.98)	-12.18 (-10.81)
Father Compl. ISCED-3b	-6.31 (-8.77)	-3.56 (-2.47)	-5.71 (-5.88)	-7.07 (-8.24)	-8.61 (-10.04)	-9.49 (-8.18)
Mother Tertiary Educ.	10.76 (18.65)	7.82 (6.82)	10.18 (13.06)	10.64 (15.45)	12.05 (17.56)	12.57 (13.56)
Father Tertiary Educ.	16.74 (29.25)	16.94 (14.73)	16.46 (21.19)	16.90 (24.74)	16.28 (23.95)	16.81 (18.34)

**Table 1 cont'd:** Estimation Results – Class and School Characteristics

EXPLANATORY VARIABLE	OLS	10% QUANTILE	25% QUANTILE	50% QUANTILE	75% QUANTILE	90% QUANTILE
Class Size	1.96 (57.07)	2.29 (28.90)	2.16 (43.97)	1.93 (47.25)	1.64 (41.28)	1.50 (28.64)
Homework Feedback	-1.75 (-3.72)	-1.91 (-1.96)	-3.15 (-4.87)	-1.69 (-3.01)	-2.10 (-3.78)	-2.07 (-2.79)
Urban School	7.54 (13.90)	9.29 (8.41)	8.43 (11.43)	7.58 (11.70)	6.86 (10.65)	7.03 (8.15)
Private School	14.79 (18.34)	16.44 (9.80)	13.37 (12.10)	12.15 (12.62)	12.55 (13.11)	13.53 (10.50)
Selective School	19.83 (32.16)	20.03 (15.60)	20.39 (24.00)	19.63 (26.67)	19.29 (26.59)	19.41 (19.84)
Poor Basic Conditions	-9.41 (-13.04)	-11.58 (-8.10)	-10.67 (-11.01)	-9.45 (-10.97)	-6.89 (-7.97)	-5.31 (-4.54)
Regular Tests	4.57 (7.60)	3.67 (3.05)	4.53 (5.59)	5.23 (7.29)	5.22 (7.30)	4.23 (4.37)
Teacher Shortage	-6.03 (-10.32)	-6.52 (-5.58)	-7.58 (-9.59)	-5.76 (-8.27)	-5.16 (-7.41)	-5.93 (-6.30)

Number of observations: 163,082. t-values in parentheses. See appendix **Table A1** and text for a description of the variables. The reference category for the education levels is ISCED 3a, i.e. completed upper secondary education.

The overwhelming majority of the estimated coefficients is highly significant (the 99% critical value of the t-distribution is 2.576). The null hypothesis that the impact of the different education levels for the father and the mother equal each other is rejected for almost all quantiles by a sequence of Wald tests not reported in the table. Overall, it turns out that the estimates of the OLS mean regression paint a rather incomplete picture of the conditional distribution of the test score, since the impact of many covariates differs considerably throughout different quantiles. In the following, the estimation results of the different quantile regressions are considered in some more detail.

#### *Individual Characteristics and Family Background*

Females score considerably higher in the reading literacy test than males throughout all quantiles but especially in the lower part of the distribution. Surprisingly, students whose parents both work perform significantly better as well, with a quantitatively larger impact in the lower quantiles. Students living in an intact family, i.e. together with both parents, perform significantly better throughout all quantiles.

Being a non-citizen exhibits a significantly negative correspondence with reading literacy for the lowest quantile but displays a significantly positive coefficient estimate for the highest quantile. The mean and the median regression, however, report this variable as being insignificant. Second generation immigrants perform better throughout all quantiles but especially in the upper part of the distribution if compared to first-generation immigrant students. Students with parents who are non-citizens perform considerably worse especially in the upper quantiles. A very pronounced negative effect throughout all quantiles is exhibited for students who are regularly speaking another than the test

language at home. Thus, in countries with a large immigrant population the education system has to work harder to achieve the same average performance scores as in a homogeneous society.

As all studies regarding the intergenerational transmission of education would have suggested, the educational background of the students' parents exhibits considerably predictive power. Correspondingly, a clear profile of reading performance emerges, with the score monotonously increasing in the education level of both parents. Specifically, the results suggest that the impact of low education of the mother is more detrimental for student success than that of the father<sup>3</sup>. By contrast, students with parents who completed tertiary education perform significantly better with stable coefficients throughout all quantiles. However, the positive impact of fathers' tertiary education is quantitatively more important than that of the mother. Consequently, it would be inappropriate to compare education systems without parental background of the current student generation.

#### *Class and School Characteristics*

Class size, albeit statistically significant, exhibits only a small positive impact on student success. Similarly, students receiving feedback to their homework, i.e. students whose homework is regularly graded or part of their marks perform slightly worse than average. Being enrolled in an urban and private school both exhibit positive, and sizeable impacts on student achievement. The results suggest that the effect of schools selecting their students on the basis of student performance, including placement tests is strongly positive whereas regular tests during the school year exhibit a rather small, albeit also positive impact. On the other hand, poor basic school conditions, e.g. lacking instructional material, and a shortage of teachers seem to exert a significantly negative impact on reading performance. This effect appears to be especially pronounced for the lower quantiles.

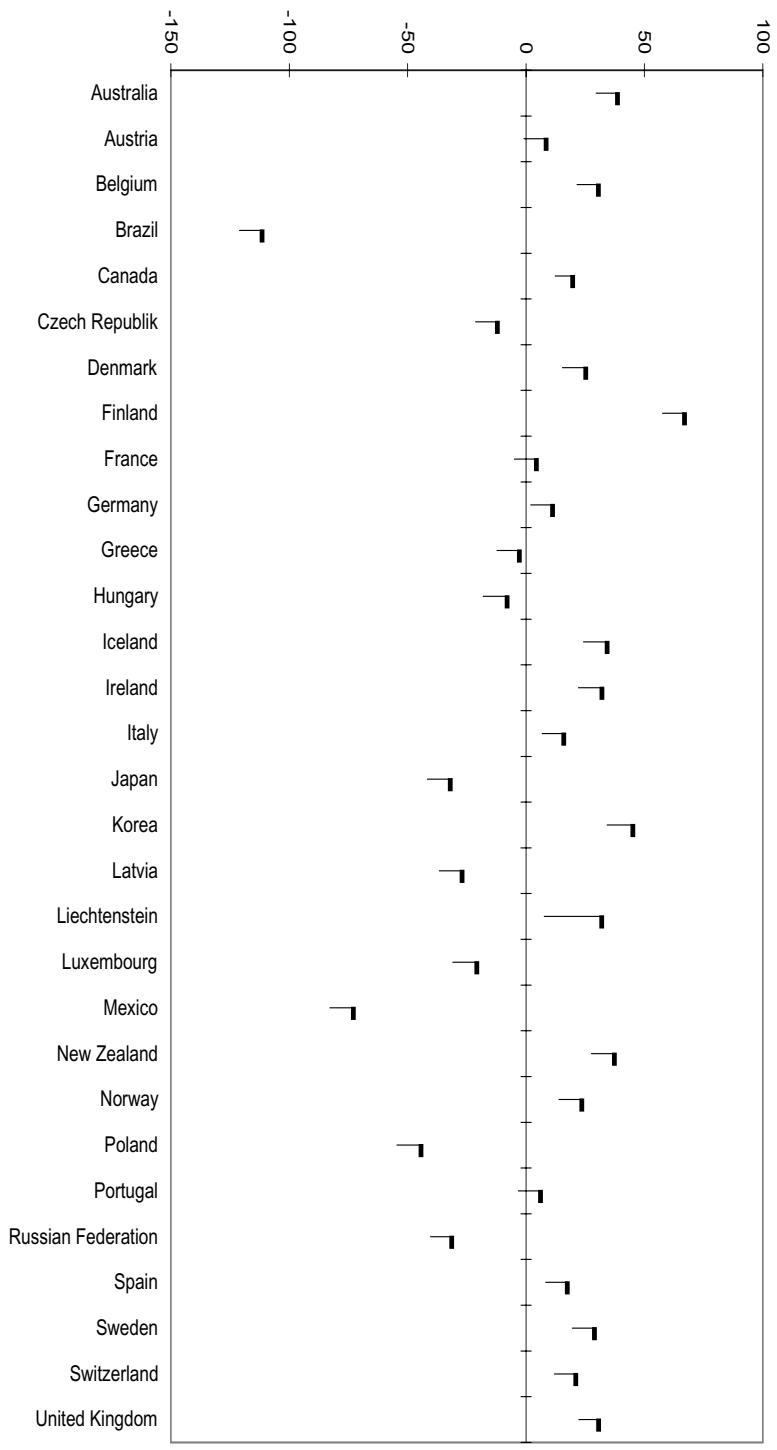
#### *Adjusted National Scores*

The estimation of quantile regressions involving three different specifications, (i) without any explanatory factors, (ii) including individual and family background, and (iii) also including school and class characteristics allows a re-assessment of national average scores. **Figure 1** documents the the estimated scores arising from specification (iii) for the median quantile. In order to condense this information further, we estimated weighted averages of the national scores for three different specifications, relative to the US. This measure reveals how US students compare to randomly chosen students from the same performance quantile in the rest of the world. The weights are the shares of the population of country  $i$  relative to the total population of all participating countries. Furthermore, we also report the weighted standard deviation around this average performance, corrected for first-stage estimation error (see HASKEN-DENEW AND SCHMIDT (1997) for a similar application to inter-industry wage differentials).

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<sup>3</sup>The reference category for parental education is a completed ISCED-3a level, i.e. upper secondary education.

**Figure 1:** Estimated Country Differences to US in Full Model



**Table 2:** Estimation Results – Weighted Country Differences

	OLS	10% QUANTILE	25% QUANTILE	50% QUANTILE	75% QUANTILE	90% QUANTILE
Weighted Country Differences	-31.523 (1.615)	-12.271 (1.693)	-21.333 (0.629)	-33.778 (0.109)	-23.953 (0.220)	-43.099 (0.608)
Dispersion Measure	58.926	49.825	53.988	62.566	65.577	63.946
Weighted Country Differences	-19.478 (1.537)	-6.722 (3.026)	-10.228 (2.040)	-20.200 (1.757)	-24.021 (1.932)	-30.807 (1.932)
Dispersion Measure	49.090	47.080	47.827	50.592	50.644	53.597
Weighted Country Differences	-39.413 (1.562)	-28.825 (3.128)	-32.091 (2.112)	-39.968 (1.865)	-43.458 (3.026)	-48.057 (2.518)
Dispersion Measure	65.175	60.126	62.018	66.466	66.953	69.839

Specification (i): Country indicators only; Specification (ii): Specification (i) plus individual characteristics and family background; Specification (iii): Specification (ii) plus class and school characteristics. Standard errors in parentheses.

**Table 2** reveals that on average as well as in all quantiles US students display better reading skills than randomly chosen students from other parts of the (participating) world. This difference is clearly more pronounced in higher quantiles. However, the corresponding dispersion measures document that these average results hide a large heterogeneity across countries (recall that the overall standard error in *PISA 2000* was normalized to 100). A detailed inspection of the national scores (see also **Figure 1**) reveals that the summary measures are clearly dominated by the extremely poor performance of the rather large countries Brazil, Mexico, and Russia. Therefore, setting up alternative comparison groups for the performance of US students would clearly result in a less optimistic assessment.

The US education system currently serves a cohort of teenagers who started from a privileged position: in international comparison, the share of US students whose parents, and in particular whose mothers display a substantive education is high. Controlling for these individual and family background variables indeed reduces the advantage of the US across all quantiles. Given that Brazil, Mexico, and Russia are included in this comparison, this result is worrisome. In particular, at the top of the performance distribution, the US retains a sizeable advantage, but it almost vanishes completely for the lower quantiles.

In specifications (i) and (ii), education systems might exhibit low national score estimates whenever either or several measurable aspects, such as teacher shortages, or intangible characteristics of the system are unfavorable. Specification (iii) allows the concentration to lie on the latter. Judging from the estimated national scores, controlling for tangible aspects of the school system leads to a larger advantage for the US. These estimates imply that, with a better organization of its education system the US would even lie more ahead in international comparison than is currently the case. Again, the US currently serves students in higher quantiles significantly more than those in the bottom of the performance distribution.

## 5 Implications for Education Policy

Our results qualify the intensely discussed OECD (2002) report on the *PISA 2000* study, by an attempt to compare the performance of comparable students. Even after adjusting for a large set of background factors, significant differences between countries remain. The advantageous position of US students is especially pronounced in the upper part of the test score distribution. While those in the bottom of the distribution should be the source of serious discomfort. Overall, family background and school characteristics play a more important role for success in *PISA 2000* than previously recognized in the debate.

Furthermore, from a policy perspective our results indicate that countries directly improve the performance of their school system by investing into tangible aspects of the system. In particular, school conditions including teacher provision account for a sizeable fraction of student's individual success in *PISA 2000*. However, for exhaustive policy advice it is necessary to collect even more information. To paint a complete picture of institutional differences and their impact would require for more extensive background

information, most of all repeated information on the same set of students. This is, unfortunately, not the planned design of the next *PISA* waves. Moreover, it is indispensable to evaluate the impact of institutional changes and policy interventions in the education sector with an emphasis on comparing genuinely comparable students.

Thus, school quality apparently does matter. Moreover, it seems to be the students in the bottom of the performance distribution who suffer most if their education environment is lacking. Consequently, before policy makers should be seeking for deep philosophical distinctions underlying the education systems in the more successful countries of *PISA 2000*, they should turn to improvements in the tangible aspects of the system.

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# Appendix

**Table A1:** Description of Variables

VARIABLE	DESCRIPTION
Reading Score	Difficulty-adjusted test score in the reading literacy test
<b>Demographic and Family Background</b>	
Female	1 if student is female; 0 otherwise
Both Parents Work	1 if student's mother and father are working full-time or part-time; 0 otherwise
Intact Family	1 if student lives together with both parents; 0 otherwise
Native Student	1 if student is a citizen of the country of residence; 0 otherwise
Parents Foreign	1 if student's parents are non-citizens of the country of residence; 0 otherwise
Second Generation	1 if student is a second-generation migrant in the country of residence; 0 otherwise
Diff. Language at Home	1 if the regular language at student's home is different from the respective test language; 0 otherwise
<b>Parents Education</b>	
No Schooling Mother	1 if student's mother did not attend school; 0 otherwise
No Schooling Father	1 if student's father did not attend school; 0 otherwise
Mother ISCED-1	1 if student's mother completed primary education; 0 otherwise
Father ISCED-1	1 if student's father completed primary education; 0 otherwise
Mother ISCED-2	1 if student's mother completed lower secondary education; 0 otherwise
Father ISCED-2	1 if student's father completed lower secondary education; 0 otherwise
Mother ISCED-3b	1 if student's mother completed secondary education; 0 otherwise
Father ISCED-3b	1 if student's father completed secondary education; 0 otherwise
Mother ISCED-3a	1 if student's mother completed upper secondary education; 0 otherwise
Father ISCED-3a	1 if student's father completed upper secondary education; 0 otherwise
Mother Tertiary Educ.	1 if student's mother completed tertiary education; 0 otherwise
Father Tertiary Educ.	1 if student's father completed tertiary education; 0 otherwise
<b>School-Related Information</b>	
Class Size	Average number of students in class
Homework Feedback	1 if students homework is regularly graded or if homework is part of his/her marks; 0 otherwise

**Table A1 cont'd:** Description of Variables

VARIABLE	DESCRIPTION
Urban School	1 if the school is located in a city of more than 100,000 inhabitants; 0 otherwise
Private School	1 if the school is a private school; 0 otherwise
Selective School	1 if admission to school is based on student's record of academic performance including placement tests; 0 otherwise
Poor Basic Conditions	1 if school is suffering from poor conditions of building structure, poor heating/cooling/lighting systems, lack of instruction space or lack of instruction material; 0 otherwise
Regular Tests	1 if students are assessed four or more times a year using standardized or teacher-developed tests; 0 otherwise
Teacher Shortage	1 if school suffers from a teacher shortage or test language teacher shortage; 0 otherwise
Number of observations: 163,082. All explanatory variables except class size are categorical. Source:OECD (2002).	

**Table A2:** Summary Statistics

VARIABLE	MEAN	STANDARD ERROR
Reading Score	502.921	98.098
<b>Explanatory Variables</b>		
Australia	0.031	0.173
Austria	0.028	0.165
Belgium	0.039	0.193
Brasil	0.029	0.167
Canada	0.171	0.376
Czech Republic	0.031	0.174
Denmark	0.023	0.150
Finland	0.029	0.168
France	0.027	0.163
Germany	0.030	0.170
Greece	0.027	0.163
Hungary	0.029	0.168
Iceland	0.020	0.140
Ireland	0.023	0.151
Italy	0.030	0.171
Japan	0.030	0.172
Korea	0.026	0.158
Latvia	0.022	0.148
Liechtenstein	0.002	0.043
Luxembourg	0.019	0.137
Mexico	0.026	0.158
New Zealand	0.022	0.146
Norway	0.025	0.155
Poland	0.020	0.142
Portugal	0.027	0.162
Russia	0.039	0.195
Spain	0.036	0.187
Sweden	0.026	0.158
Switzerland	0.036	0.185
United Kingdom	0.056	0.229
USA	0.021	0.145
Female	0.504	0.500
Both Parents Work	0.595	0.491
Intact Family	0.754	0.431
Native Student	0.907	0.290
Parents Foreign	0.202	0.402
Second Generation	0.119	0.324
Other language at home	0.151	0.358
Number of observations: 163,082; Source:OECD (2002).		

**Table A2 cont'd:** Summary Statistics

VARIABLE	MEAN	STANDARD ERROR
No Schooling Mother	0.017	0.128
Mother Completed ISCED-1	0.092	0.289
Mother Completed ISCED-2	0.171	0.376
Mother Completed ISCED-3b	0.153	0.360
No Schooling Father	0.017	0.128
Father Completed ISCED-1	0.089	0.285
Father Completed ISCED-2	0.167	0.373
Father Completed ISCED-3b	0.169	0.375
Mother Tertiary Education	0.286	0.452
Father Tertiary Education	0.301	0.459
Class Size	24.899	8.073
Homework Feedback	0.405	0.491
Urban School	0.271	0.445
Private School	0.124	0.330
Selective School	0.267	0.442
Poor Basic Conditions	0.115	0.319
Regular Tests	0.727	0.446
Teacher Shortage	0.188	0.390
Number of observations: 163,082; Source:OECD (2002).		

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