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# How school-choice policies are related to quality and equity in education

This chapter analyses how changes observed in the degree of social and academic segregation across schools is related to the link between socio-economic status and performance in PISA. The chapter also examines whether the criteria used for admissions to school have a direct impact on performance and equity, as measured by PISA.

## **A note regarding Israel**

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

## **A note regarding Lithuania**

Lithuania became a member of the OECD on 5 July 2018. However, consistent with other publications based on PISA 2015 data, Lithuania is shown as a partner country and is not included in the OECD average.

This document, as well as any data and map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

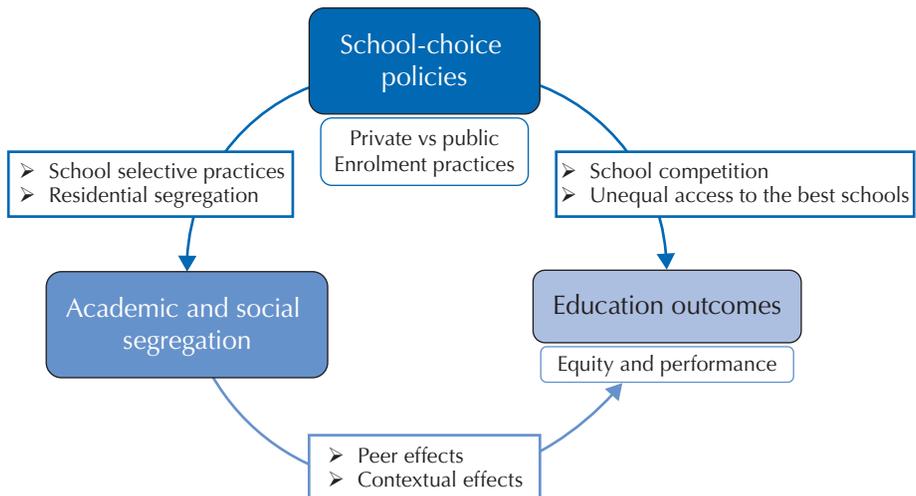


The relationships between school-choice policies and the outcomes of an education system are equivocal. On the one hand, more competition may improve the efficiency of schools: greater freedom to choose the school that best matches the needs of every student may improve the overall performance of the school system. Greater competition could also improve equity if students from disadvantaged families have access to the best schools – even if these schools are not located in their neighbourhoods. On the other hand, school-choice policies may reduce equity in education if only the best-informed and most-advantaged students benefit from the opportunity of opting out of their neighbourhood schools to enrol in higher-performing schools.

These effects may also be indirectly amplified – or mitigated – if the performance of students is affected by the socio-economic status of their peers in school, as school choice policies may affect social and academic segregation between schools. The consequences of school segregation is unclear, as they depend on the magnitude and the nature of peer effects at school. The effect of sorting students based on performance or social status may be positive for some students and negative for others; it is thus an open question whether greater segregation will have a positive or negative impact on education outcomes.

While the previous section analyses the link between school-choice policies, and social and academic segregation, this section analyses the link with academic outcomes, as illustrated in the following figure. It analyses whether school segregation is related to education outcomes, and then examines the direct relationship with certain proxies of school choice, such as school admissions practices and the proportion of private schools in a system.

Figure 5.1 ■ **School-choice policies, segregation in schools and education outcomes**

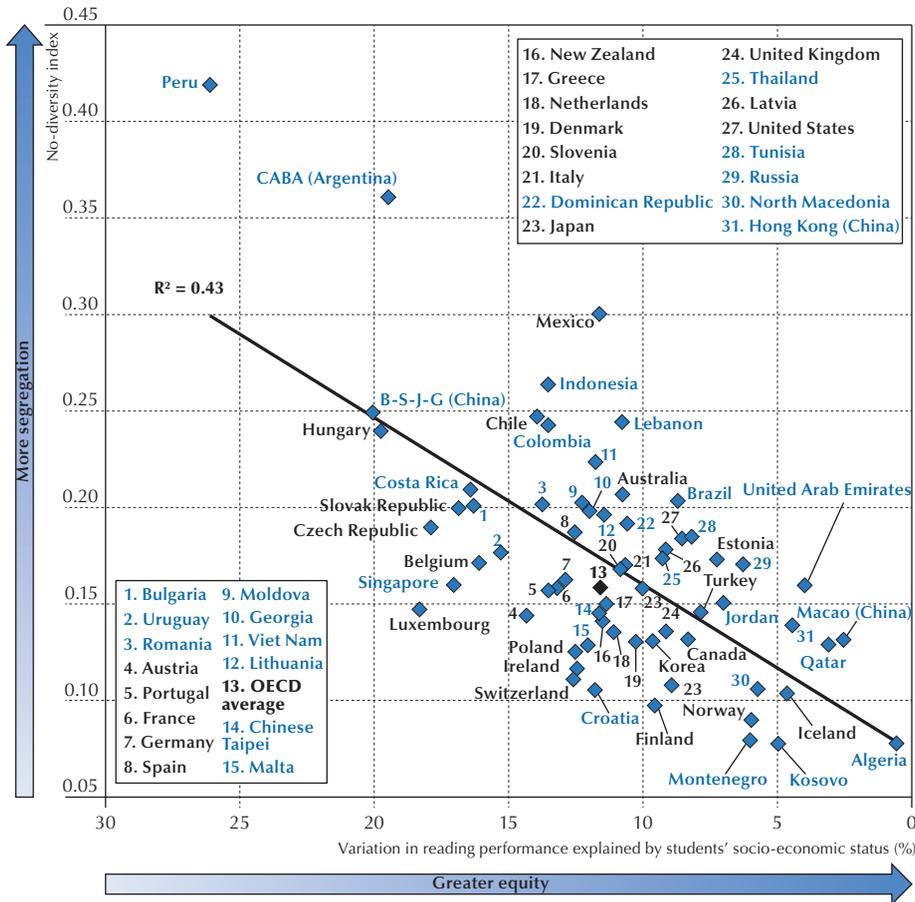




## SORTING BY SOCIO-ECONOMIC STATUS ACROSS SCHOOLS IS NEGATIVELY RELATED TO EQUITY IN EDUCATION

In 2015, countries where schools were less socially diverse also had less-equitable education systems (Figure 5.2). For instance, Peru has one of the highest levels of social segregation amongst all the countries and economies that participated in PISA in 2015; it is also one of the countries where the link between performance in reading and students' socio-economic status is the strongest.<sup>1</sup> At the other extreme, in Algeria, where students' reading performance is weakly related to their socio-economic status, schools are more socially diverse, on average, than those in other countries and economies.

Figure 5.2 ■ **Equity in reading performance and no-diversity index for disadvantaged students**



**Notes:** All analyses are restricted to schools with the modal ISCED level for 15-year-old students. The R<sup>2</sup> value indicates the proportion of the variance in the no-diversity index that is accounted for by differences in equity in reading performance across education systems. It is a measure of the strength of the relationship between the no-diversity index and equity in reading performance at the country level.  
**Source:** OECD, PISA 2015 Database, Table 5.4.

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As described above, several confounding factors (some observed, such as early tracking or grade repetition, some unobserved, such as differentiated financial support for disadvantaged families) may affect both performance and equity. Again, examining the data from several cycles of PISA and introducing country-fixed effects help disentangle these effects. Specificities of individual school systems that may have an impact on student performance should be taken into account, as that impact may otherwise be spuriously attributed to school segregation.

Both average performance and the socio-economic gradient (both the strength and the slope<sup>2</sup>) at the country/economy level are examined to determine how they are related to indicators of both academic and social segregation. A specification similar to the one provided in equation (1) in Chapter 4 is used. To get a more accurate picture, one may rely on panel estimates at the student level (Hanushek and Woessmann, 2006<sup>[1]</sup>), as shown in Table 5.2. One may take into account students' individual characteristics, such as gender, immigrant background and socio-economic status, and measure the relationship with country-level segregation indices.

As seen below, the econometric specification includes country-specific effects, meaning that the effect is identified by comparing changes in the level of segregation within countries.<sup>3</sup> The interaction of the country-level segregation indices with dummies of advantaged and disadvantaged students is a proxy for the impact on equity (the reference is students of average socio-economic status). One may thus determine whether or not school segregation has a different impact on students, depending on their socio-economic status (if these interacted dummies are significantly different from zero) and, when this is the case, whether school segregation tends to favour or penalise disadvantaged students more than advantaged students. As emphasised above, the estimated relations correspond to short-term effects – and thus may underestimate the final results.

Empirical evidence suggests that social segregation across schools is negatively correlated with equity in education, with a weak but positive relationship with performance (Table 5.1 and Table 5.2). An increase in the no-diversity index results in an increase in both the strength and the slope of the social gradient (how much student performance in PISA changes with a one-unit increase in the PISA index of economic, social and cultural status), as measured at the country level (Table 5.1). Less diversity in schools tends to favour advantaged students (column [2] of Table 5.2). It has a weak, positive relationship with performance, but one that is insufficient to counteract the negative relationship for disadvantaged students. This is partly because social segregation is often related to academic segregation, which appears to be harmful for all types of students. Academic segregation is negatively correlated with both the average performance and the equity of education systems (Table 5.2, columns [3] and [4]).

When academic segregation is taken into account, estimates suggest that social segregation may be slightly positive, even for disadvantaged students. However, these correlations should be interpreted with caution, first, because disadvantaged students are over-represented among low achievers, and advantaged students are over-represented among high achievers. Social and academic segregation are largely intertwined, and it would be difficult to shift social segregation without changing academic segregation. Second, if students' performance depends on that of their peers, academic segregation may have a self-reinforcing effect. Even limited sorting by ability in admissions may result in larger differences in achievement among the students enrolled in these schools. In addition, academic segregation across schools will be observed if some schools are more effective than others in improving their students' academic achievement. The magnitude of



the estimates is shown in Table 5.3. A 10-point increase in the no-diversity index (on a scale of 0 to 100) results in an increase of 5 score points in the average reading performance of students enrolled in schools of the modal grade, assuming that all specificities of the education system, including academic segregation, remain unchanged. However, disadvantaged students would not benefit as much as other students – the change in their performance would be significantly smaller than the change in average performance – and not more than 3 score points.<sup>4</sup>

Table 5.1 ■ **Social gradient and reading performance related to social and academic segregation, 2009-15**

*Panel estimates, country-level regressions*

	Strength (1)	Strength (2)	Strength (3)	Slope (3)	Reading performance (3)
No-diversity index	<b>0.733</b> (0.105)		<b>0.671</b> (0.112)	<b>1.066</b> (0.214)	0.939 (0.715)
Isolation index for high-achieving students in reading		<b>0.184</b> (0.054)	0.079 (0.050)	0.060 (0.096)	-0.345 (0.320)
Grade repetition (%)	<b>0.021</b> (0.005)	<b>0.017</b> (0.006)	<b>0.019</b> (0.005)	0.012 (0.010)	-0.037 (0.033)
Vocational programmes (%)	-0.064 (0.044)	<b>-0.142</b> (0.049)	-0.073 (0.044)	-0.077 (0.085)	0.130 (0.285)
Private schools (%)	-0.064 (0.035)	-0.034 (0.040)	-0.062 (0.035)	<b>-0.136</b> (0.067)	0.198 (0.223)
Intercept	2.889 (1.857)	<b>9.732</b> (1.663)	1.958 (1.935)	<b>19.947</b> (3.708)	<b>457.094</b> (12.308)
Number of observations	176	176	176	176	177
R <sup>2</sup>	0.42	0.23	0.43	0.28	0.05

Notes: All analyses are restricted to schools with the modal ISCED level. The results above may thus differ from those estimated on the entire sample of 15-year-old students.

Data are aggregated at the country/cycle level.

The strength of the social gradient corresponds to the variation in student performance in one country that is explained by socio-economic status; the slope refers to the score-point difference in performance associated with one-unit increase in ESCS (the R<sup>2</sup> and coefficient, respectively, of a regression of individual performance on socio-economic status).

For the sake of readability, the strength of the social gradient and the segregation indices have been rescaled from 0 to 100. Standard errors are indicated in parentheses.

Values that are statistically significant at the 10% level are indicated in italics and those at the 5% level are indicated in bold.

Source: OECD, PISA 2009, PISA 2012 and PISA 2015 Databases.

StatLink  <https://doi.org/10.1787/888933971841>

By contrast, advantaged students would benefit to a much larger extent from greater social stratification between schools, as their performance would improve by 16 score points. According to these estimates, increasing social segregation amongst schools would widen the gap between disadvantaged and advantaged students. That is consistent with the positive correlation observed at the aggregated level (Table 5.1) between the no-diversity index and the slope of the social gradient. In the sample, the range observed between the lowest and highest levels of the no-diversity index in 2009, 2012 and 2015 (see Table B.2 in Annex B) is around 20 (on a scale of 100), but the changes in social diversity observed within countries are much smaller than this range.

While greater social segregation is positively related to the average performance of a school system, this may be offset by greater academic segregation. According to the estimates, a 10-point increase (on a scale of 100) in the isolation of high achievers would result in a decrease of around 6 score points in the reading performance of advantaged students and those of average socio-economic status, while the reading performance of disadvantaged students would decline by 10 score points. All in all, greater segregation of higher achievers would thus amplify social inequity in education.

Figure 5.2 illustrates the negative relationship between social segregation and equity in a cross-country comparison.

Table 5.2 ■ Reading performance, by school practices, academic and social segregation, 2009-15

Panel estimates, student-level regressions

	Benchmark (1)	Social segregation (2)	Academic segregation (3)	Social and academic segregation (4)	School enrolment criteria (5)
<b>Boy</b>	<b>-35.086</b> (0.258)	<b>-35.121</b> (0.257)	<b>-35.103</b> (0.257)	<b>-35.120</b> (0.256)	-35.094 (0.259)
<b>Immigrant</b>	<b>-5.026</b> (0.516)	<b>-5.231</b> (0.518)	<b>-5.179</b> (0.519)	<b>-5.251</b> (0.520)	-5.214 (0.520)
<b>Disadvantaged</b>	<b>-38.773</b> (0.570)	<b>-31.740</b> (1.303)	<b>-31.424</b> (0.894)	<b>-29.873</b> (1.315)	-46.575 (1.132)
<b>Advantaged</b>	<b>45.527</b> (0.568)	<b>27.391</b> (1.263)	<b>37.761</b> (0.886)	<b>26.926</b> (1.280)	53.704 (1.370)
<b>No-diversity index</b>		0.095 (0.165)		<b>0.469</b> (0.179)	
x Disadvantaged		<b>-0.484</b> (0.078)		-0.170 (0.090)	
x Advantaged		<b>1.245</b> (0.083)		<b>1.163</b> (0.093)	
<b>Isolation index for high-achieving students</b>			<b>-0.562</b> (0.118)	<b>-0.637</b> (0.128)	
x Disadvantaged			<b>-0.355</b> (0.035)	<b>-0.311</b> (0.040)	
x Advantaged			<b>0.376</b> (0.040)	<i>0.081</i> (0.045)	
<b>School admissions based on academic performance (%)</b>					<b>-0.252</b> (0.035)
x Disadvantaged					0.023 (0.014)
x Advantaged					<b>-0.050</b> (0.013)
<b>School admissions based on residence (%)</b>					<b>0.204</b> (0.042)
x Disadvantaged					<b>0.137</b> (0.016)
x Advantaged					<b>-0.127</b> (0.021)
<b>Private schools (%)</b>	<b>0.206</b> (0.051)	<b>0.196</b> (0.051)	<b>0.223</b> (0.050)	<b>0.198</b> (0.051)	<b>0.237</b> (0.051)
x Disadvantaged	<b>0.093</b> (0.013)	<b>0.095</b> (0.013)	<b>0.098</b> (0.013)	<b>0.099</b> (0.013)	<b>0.136</b> (0.014)
x Advantaged	<b>-0.167</b> (0.012)	<b>-0.173</b> (0.012)	<b>-0.174</b> (0.012)	<b>-0.174</b> (0.012)	<b>-0.199</b> (0.014)
<b>Vocational programmes (%)</b>	0.084 (0.076)	0.115 (0.075)	0.088 (0.075)	<b>0.155</b> (0.075)	<b>0.179</b> (0.079)
x Disadvantaged	0.011 (0.017)	0.003 (0.018)	<b>0.083</b> (0.019)	<b>0.071</b> (0.021)	<b>0.080</b> (0.020)
x Advantaged	<b>0.087</b> (0.017)	<b>0.107</b> (0.016)	0.011 (0.020)	<b>0.089</b> (0.019)	<i>0.039</i> (0.022)
<b>Grade repetition (%)</b>	<b>-0.005</b> (0.014)	<b>-0.001</b> (0.013)	<b>-0.002</b> (0.013)	0.003 (0.013)	<b>-0.013</b> (0.015)
x Disadvantaged	<i>-0.019</i> (0.010)	-0.015 (0.010)	-0.013 (0.010)	-0.012 (0.010)	<b>-0.020</b> (0.010)
x Advantaged	<b>0.030</b> (0.010)	<i>0.017</i> (0.009)	<b>0.023</b> (0.010)	<i>0.016</i> (0.009)	<b>0.026</b> (0.009)
<b>Intercept</b>	<b>403.806</b> (2.388)	<b>402.838</b> (2.912)	<b>410.342</b> (2.644)	<b>404.560</b> (2.928)	<b>405.906</b> (3.270)
<b>Number of observations</b>	1,175,972	1,175,972	1,175,972	1,175,972	1,175,972
<b>R<sup>2</sup></b>	0.283	0.284	0.284	0.284	0.284
<b>Country fixed effect</b>	yes	yes	yes	yes	yes
<b>Cycle fixed effect</b>	yes	yes	yes	yes	yes

Notes: All analyses are restricted to schools with the modal ISCED level. The results above may thus differ from those estimated on the entire sample of 15-year-old students.

Disadvantaged students are students in the bottom quarter of the PISA index of economic, social and cultural status (ESCS) in their own country.

Advantaged students are students in the top quarter of the PISA index of economic, social and cultural status (ESCS) in their own country.

Individual student weights are normalised in such a way that the contributions of all countries are equal, regardless of the size of their population (senate weights). The benchmark specification does not include segregation variables nor school-enrolment criteria included in the following ones.

The strength of the social gradient corresponds to the variation in student performance in one country that is explained by socio-economic status; the slope refers to the score-point difference in performance associated with one-unit increase in ESCS (the R<sup>2</sup> and coefficient, respectively, of a regression of individual performance on socio-economic status).

For the sake of readability, the strength of the social gradient and the segregation indices have been rescaled from 0 to 100. Standard errors are indicated in parentheses.

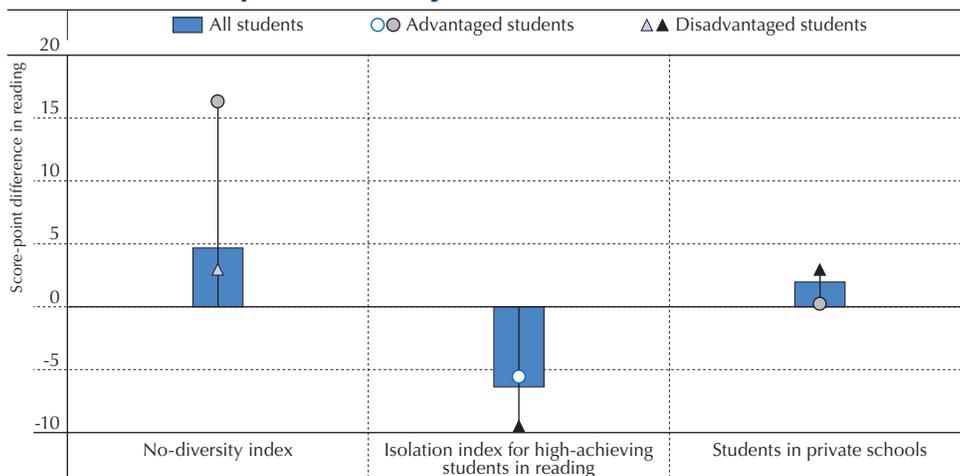
Values that are statistically significant at the 10% level are indicated in italics and those at the 5% level are indicated in bold.

Source: OECD, PISA 2009, PISA 2012 and PISA 2015 Databases.

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Figure 5.3 ■ **Estimated impact of segregation and school type on reading performance, by socio-economic status**



**Notes:** All analyses are restricted to schools with the modal ISCED level for 15-year-old students.

Disadvantaged students are students in the bottom quarter of the PISA index of economic, social and cultural status (ESCS) in their own country.

Advantaged students are students in the top quarter of the PISA index of economic, social and cultural status (ESCS) in their own country.

Estimated impact of an increase of 10 points in the no-diversity index or the isolation index, and 10 percentage points in the percentage of students in private schools, using specification (3) in Table 5.2. In the sample, the observed maximum range (highest - lowest level) is 21.1 for the no-diversity index, 43.6 for the isolation index of high achievers, and 97.4 percentage points for the proportion of students in private schools (see Table B.2 in Annex B).

Dark blue bars correspond to an effect that is statistically significantly different from the null for average students; dark grey and black symbols correspond to a significant additional impact for advantaged or disadvantaged students.

**Source:** OECD, PISA 2009, PISA 2012 and PISA 2015 Databases, Table 5.2.

**StatLink** <https://doi.org/10.1787/888933971689>

When taking the level of academic segregation into account, the share of private schools in a country/economy tends to be positively related to both equity and performance, although this relationship is not statistically significant (Table 5.1). The difference is small, though. As illustrated in Figure 5.3, a 10 percentage-point increase in the proportion of students in private schools would improve average student performance by 2 score points. After accounting for academic and social segregation, it would narrow the performance gap between advantaged and disadvantaged students by three score points. One may conclude from this estimation that the availability of private schools, as it induces greater competition, may result in better school performance. However, this conclusion should be regarded with caution, as such a positive effect may be undermined by sorting effects, as private schools are also usually more academically selective than public schools (see Figure 2.6 in Chapter 2).

## THE DIRECT IMPACT OF SCHOOL ADMISSIONS POLICIES ON PERFORMANCE AND SOCIAL EQUITY IN EDUCATION IS SMALL

While the previous section suggests that segregation may be related to both equity and performance, one may measure the direct impact of school enrolment practices on education outcomes. Specifically, the same analyses are performed using the proportions of students in

schools using academically selective admissions practices and those relying on residence-based admissions policies, at both the student (Table 5.2) and country levels (Table 5.3). Table 5.2 shows the impact on equity of the interaction of these proportions with dummies of disadvantaged and advantaged students.

Table 5.3 ■ **Social gradient and reading performance related to admissions criteria, 2009-15**

*Panel estimates, country-level regressions*

	Strength (1)	Strength (2)	Slope (1)	Reading performance (1)	Reading performance (2)
School admissions based on academic performance (%)	<b>-0.059</b> (0.022)	<b>-0.038</b> (0.019)	-0.041 (0.037)	-0.125 (0.117)	-0.088 (0.121)
School admissions based on residence (%)	-0.029 (0.031)	-0.012 (0.026)	-0.020 (0.050)	0.245 (0.161)	0.294 (0.165)
No-diversity index		<b>0.697</b> (0.106)	<b>1.072</b> (0.204)		0.675 (0.676)
Grade repetition (%)	<b>0.014</b> (0.007)	<b>0.017</b> (0.006)	0.009 (0.011)	<b>-0.075</b> (0.034)	<b>-0.065</b> (0.036)
Vocational programmes (%)	<b>-0.123</b> (0.051)	-0.060 (0.044)	-0.065 (0.085)	0.039 (0.272)	0.103 (0.281)
Private schools (%)	-0.027 (0.041)	<i>-0.058</i> (0.035)	<i>-0.131</i> (0.067)	0.251 (0.218)	0.239 (0.222)
Intercept	<b>17.461</b> (1.870)	<b>5.369</b> (2.429)	<b>23.613</b> (4.665)	<b>459.579</b> (9.809)	<b>446.014</b> (15.488)
Number of observations	176	176	176	188	177
R <sup>2</sup>	0.20	0.44	0.28	0.07	0.08

Notes: All analyses are restricted to schools with the modal ISCED level. The results above may thus differ from those estimated on the entire sample of 15-year-old students.

Data are aggregated at the country/cycle level.

The strength of the social gradient corresponds to the variation in student performance in one country that is explained by socio-economic status; the slope refers to the score-point difference in performance associated with one-unit increase in ESCS (the R<sup>2</sup> and coefficient, respectively, of a regression of individual performance on socio-economic status).

For the sake of readability, the strength of the social gradient and the segregation indices have been rescaled from 0 to 100. Standard errors are indicated in parentheses.

Values that are statistically significant at the 10% level are indicated in italics and those at the 5% level are indicated in bold.

Source: OECD, PISA 2009, PISA 2012 and PISA 2015 Databases.

StatLink  <https://doi.org/10.1787/888933971879>

Overall, results estimated at the student level align with those observed at the country level – even if the former estimates are usually more statistically significant than the latter, given the much larger sample size. An increase in the proportion of students in schools that base enrolment on residence is related to an improvement in performance, while an increase in the proportion of academically selective schools is related to a deterioration in average performance, although in both cases, the coefficients are small – 0.20 and -0.25, respectively (Table 5.2). For the sake of comparison, an increase of 10 percentage points in the proportion of schools that always rely on residence for enrolment would result in an improvement of two score points, at most, in average performance, while a similar change in the proportion of selective schools would have a similarly small, but negative effect on performance<sup>5</sup> (Table 5.2).

Estimates also suggest that school-enrolment practices may have a relationship with equity in education, in the sense that an increase in the proportions of both academically selective schools and residence-based schools tend to be associated with a deterioration in performance amongst advantaged students relative to that of students of average or disadvantaged status. This is consistent with results discussed in Chapter 4 that show, first, that an increase in the proportion





According to the estimates provided in the column (5) in Table 5.2, an increase of 10 percentage points in the proportion of students in academically selective schools would be related to a decrease in the performance gap between advantaged and disadvantaged students by less than one score point, at most. A similar change in the proportion of students in schools that admit students on the basis of residence would reduce that performance gap by three score points. On the other hand, once the level of school selectivity is accounted for, a larger proportion of students in private schools is associated with an improvement in both performance and equity. This is consistent with the results discussed in the section below: that the competition pressures on schools associated with a large share of private schools in a country/economy have a positive impact on student performance; but this is counterbalanced by the negative impact of sorting students by ability.

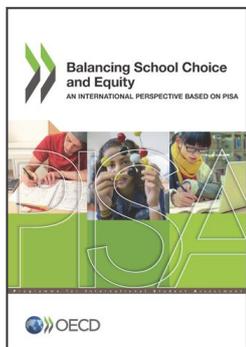


## Notes

1. Note that as the sample is restricted to students in modal grade schools, the figures on the social gradient may differ from those estimated on the entire sample of 15-year-old students.
2. The strength of the social gradient corresponds to the variation in student performance in one country that is explained by socio-economic status; the slope refers to the score-point difference in performance associated with one-unit increase in ESCS (the  $R^2$  and coefficient, respectively, of a regression of individual performance on socio-economic status).
3. Individual student weights are normalised in such a way that the contributions of all countries are equal, regardless of the size of their population (senate weights).
4. In order to estimate the impact on disadvantaged students, one should add  $0.47 + (-0.17) = 0.30$ .
5. From Table 5.2,  $0.20 * 10 = 2$  and  $-0.25 * 10 = -2.5$ .

## References

Hanushek, E. and L. Woessmann (2006), "Does Educational Tracking Affect Performance and Inequality? Differences-in-Differences Evidence Across Countries", *The Economic Journal*, Vol. 116/510, pp. C63-C76, <http://dx.doi.org/10.1111/j.1468-0297.2006.01076.x>. [1]



**From:**  
**Balancing School Choice and Equity**  
An International Perspective Based on Pisa

**Access the complete publication at:**  
<https://doi.org/10.1787/2592c974-en>

**Please cite this chapter as:**

OECD (2019), “How school-choice policies are related to quality and equity in education”, in *Balancing School Choice and Equity: An International Perspective Based on Pisa*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/958d7736-en>

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