5

How do schools compensate for socio-economic disadvantage?

This chapter provides a comparative assessment of the allocation of resources to schools depending on their socio-economic profile. It describes how teacher resources, both in quantity and quality, are distributed across more- and less-advantaged schools. It also examines the relationships between indicators of inequity in sorting teachers across schools and in student performance.

A high degree of socio-economic and ethnic segregation across schools poses additional challenges to ensuring equity in education. A concentration of socio-economically disadvantaged students in some schools can negatively affect their education (see Chapter 4). While having high-quality teachers is essential if schools aim to give all students a chance to succeed (Rivkin, Hanushek and Kain, 2005[1]; Chetty, Friedman and Rockoff, 2014[2]; Hanushek, 2011[3]), schools with a high concentration of disadvantaged students may have difficulties attracting the most effective and experienced teachers. According to the most recent OECD Teaching and Learning International Survey (TALIS), conducted in 2018, in most countries, teachers with only a few years of experience tend to work in schools that have higher concentrations of disadvantaged students (OECD, 2019[4]). Recent analyses suggest that teachers prefer working with higher-achieving students (Pop-Eleches and Urquiola, 2013[5]).

Education policies may partially compensate for disadvantage in schools. They can, for instance, provide more educational resources and staff to these schools, or offer incentives to the best teachers to encourage them to work and remain in the schools where they are most needed. This chapter analyses how school systems compensate for disadvantage in schools. It compares the actual allocation of resources, both material and human, based on the socio-economic profile of schools. It specifically contrasts the situation of disadvantaged schools, defined as those whose average intake of students falls in the bottom quarter of the PISA index of economic, social and cultural status within the relevant country/economy, and advantaged schools, defined as those whose average intake of students falls in the top quarter of that index.

The indicators of resources are constructed using principals' responses to the PISA school questionnaire, distributed in all PISA-participating countries and economies. These indicators provide subjective measures of the lack of adequate resources, as perceived by school principals, as well as more objective measures related to the qualifications and training of the teachers in their schools. In 19 countries and economies, information on teachers' experience and qualifications was gathered through an optional teacher questionnaire. In order to ensure that the characteristics of students sampled for PISA represent the typical profile of students attending the same school (because this profile informs the indicators related to the socio-economic profile of the school), all analyses are restricted to principals and teachers working in schools that include the modal grade for 15-year-old students (see Chapter 4).[1]

What the data tell us

- In 41 countries and economies that participated in PISA 2018, smaller classes were more often observed in disadvantaged schools than in advantaged schools. On average across OECD countries, the average class in disadvantaged schools had 24 students while the average class in advantaged schools had 27 students. But in Beijing, Shanghai, Jiangsu and Zhejiang (China), the Philippines, the United Arab Emirates and the United Kingdom, it was more common to observe both larger classes and higher student-teacher ratios in disadvantaged schools than in advantaged schools.
- On average across OECD countries, 40% of teachers in disadvantaged schools and 48% of teachers in advantaged schools had at least a master's degree.
- In 42 countries and economies, principals of disadvantaged schools were significantly more likely than those of advantaged schools to report that their school's capacity to provide instruction was hindered by a staff shortage teaching. Similarly, in 46 countries and economies, principals of disadvantaged schools were significantly more likely than principals of advantaged schools to report that their school's capacity to provide instruction was hindered by a lack or inadequacy of educational material and physical infrastructure.

CHARACTERISTICS OF DISADVANTAGED SCHOOLS

PISA 2018 asked school principals to report the average size of language-of-instruction classes in the national modal grade for 15-year-old students. They were also asked about the total number of students enrolled in their school and the number of teachers. The average student-teacher ratio in schools was computed using the responses to these last two questions (see Annex A3 for details). The indicators measuring class size and student-teacher ratios, respectively, were expected to be positively linked; but in some countries, including Japan and Singapore, both large classes and low or average student-teacher ratios were observed (see Tables II.B1.5.1 and II.B1.5.2).

Having more teachers in a school may be related to the curriculum and how many subjects a typical student is expected to learn. The number of teachers in a school may also be related to the amount of time teachers are required to spend actually teaching (compared to time devoted to preparing lessons or doing administrative tasks).

Table II.5.1 [1/2] **Teacher quality and quantity, by schools' socio-economic profile**

Results based on principals' reports

Disadvantaged schools are better off compared to advantaged schools
Disadvantaged schools are worse off compared to advantaged schools
Difference not significant
Missing values

		Student-teacher ratio	Class size	Proportion of teachers with a qualification lower than a master's degree[1]	Proportion of teachers not fully certified
OECD	Australia				
	Austria				
	Belgium				
	Canada				
	Chile				
	Colombia				
	Czech Republic				
	Denmark				
	Estonia				
	Finland				
	France				
	Germany				
	Greece				
	Hungary				
	Iceland				
	Ireland				
	Israel				
	Italy				
	Japan				
	Korea				
	Latvia				
	Lithuania				
	Luxembourg				
	Mexico				
	Netherlands				
	New Zealand				
	Norway				
	Poland				
	Portugal				
	Slovak Republic				
	Slovenia				
	Spain				
	Sweden				
	Switzerland				
	Turkey				
	United Kingdom				
	United States				

1. Education levels correspond to level 5A master's degree and level 6 of the International Standard Classification of Education (ISCED-1997).

Notes: The socio-economic profile is measured by the school's average PISA index of economic, social and cultural status (ESCS).

For this analysis, the sample is restricted to schools with the modal ISCED level for 15-year-old students: (see Annex A3).

Source: OECD, PISA 2018 Database, Tables II.B1.5.1-II.B1.5.4.

StatLink https://doi.org/10.1787/888934037583

Table II.5.1 [2/2] Teacher quality and quantity, by schools' socio-economic profile

Results based on principals' reports

Disadvantaged schools are better off compared to advantaged schools
Disadvantaged schools are worse off compared to advantaged schools
Difference not significant
Missing values

		Student-teacher ratio	Class size	Proportion of teachers with a qualification lower than a master's degree[1]	Proportion of teachers not fully certified
Partners	Albania				
	Argentina				
	Baku (Azerbaijan)				
	Belarus				
	Bosnia and Herzegovina				
	Brazil				
	Brunei Darussalam				
	B-S-J-Z (China)				
	Bulgaria				
	Costa Rica				
	Croatia				
	Dominican Republic				
	Georgia				
	Hong Kong (China)				
	Indonesia				
	Jordan				
	Kazakhstan				
	Kosovo				
	Lebanon				
	Macao (China)				
	Malaysia				
	Malta				
	Moldova				
	Montenegro				
	Morocco				
	North Macedonia				
	Panama				
	Peru				
	Philippines				
	Qatar				
	Romania				
	Russia				
	Saudi Arabia				
	Serbia				
	Singapore				
	Chinese Taipei				
	Thailand				
	Ukraine				
	United Arab Emirates				
	Uruguay				
	Viet Nam				

Education systems where disadvantaged schools are better off than advantaged schools	30	41	2	10
Education systems with no difference	37	28	48	47
Education systems where disadvantaged schools are worse off than advantaged schools	8	7	24	15

1. Education levels correspond to level 5A master's degree and level 6 of the International Standard Classification of Education (ISCED-1997).

Notes: The socio-economic profile is measured by the school's average PISA index of economic, social and cultural status (ESCS).

For this analysis, the sample is restricted to schools with the modal ISCED level for 15-year-old students: (see Annex A3).

Source: OECD, PISA 2018 Database, Tables II.B1.51-II.B1.5.4.

StatLink https://doi.org/10.1787/888934037583

In 41 countries and economies that participated in PISA 2018, smaller classes were more often observed in disadvantaged schools than in advantaged schools (Table II.5.1). On average across OECD countries, the average class in disadvantaged schools had 24 students while the average class in advantaged schools had 27 students. The student-teacher ratio was smaller by one student in disadvantaged schools than in advantaged schools (where the ratio was, on average, 12.4 students per teacher). Only in Beijing, Shanghai, Jiangsu and Zhejiang (China) (hereafter "B-S-J-Z [China]"), the Philippines, the United Arab Emirates and the United Kingdom was it more common to observe both larger classes and higher student-teacher ratios in disadvantaged schools than in advantaged schools. In the United Kingdom, this could be because private independent schools are over-represented amongst advantaged schools, and these schools have a small student-teacher ratios (8.5 students per teacher compared to 14.4 students per teacher in public schools) and smaller classes (17.6 students per class in private independent schools compared to 25 students per class in public schools).

Previous findings from PISA show that in schools with smaller classes, students were more likely to report that their teachers adapt their lessons to students' needs and knowledge, provide individual help to struggling students, and change the structure of the lesson if students find it difficult to follow (OECD, 2016[6]). In general, the evaluation of the causal link between class size and performance is complicated by the fact that, in several contexts, disadvantaged schools have lower student-teacher ratios. It may thus be difficult to separate what results from these composition effects (disadvantaged students often perform worse than their more advantaged peers) and what results from the impact of class size. The empirical evidence of the effectiveness of policies to reduce class size on student achievement is mixed. Several studies using sound and robust methodologies suggest that smaller classes may be of particular benefit to primary school pupils (Angrist and Lavy, 1999[7]; Chetty et al., 2011[8]; Vaag Iversen and Bonesrønning, 2013[9]; Fredriksson, Öckert and Oosterbeek, 2012[10]), with some exceptions (Hoxby, 2000[11]). However, while the cost of these programmes is high, the evidence is more scant and less certain for lower and upper secondary students, with large differences across countries (Wößmann and West, 2006[12]). While it is challenging to examine the impact of class size on performance based on a cross-sectional large scale survey such as PISA, the existing PISA results suggests that the observed small class size in disadvantaged schools does not fully compensate the negative impact of the concentration of disadvantage within a school. Allocating more teachers to schools may not be sufficient for enhancing the learning environment.

Analyses that focused on the intertwined relationship between class size and the quality of teachers showed that reducing class size, while costly, may not always have a significant impact on achievement, especially when teachers are not experienced (Mueller, 2013[13]). For instance, the evaluation of an ambitious class-size reduction scheme – from 30 to 20 students in first and second grade in California at the end of the 1990s – suggests that while the reduction in class size positively affected student achievement, most of the gains realised were offset by the need to fill 25,000 new teaching posts in order to effectuate the change. Most of the new teaching positions were filled by teachers without certification or prior teaching experience, especially in schools with large shares of disadvantaged students (Jepsen and Rivkin, 2009[14]). These results suggest that increasing the number of teachers in a school may be ineffective if doing so comes at the expense of the average quality of those teachers.[2]

TEACHERS' CHARACTERISTICS AND SCHOOLS' SOCIO-ECONOMIC PROFILE

While it may be difficult to define precisely what makes a good teacher, the most effective teachers tend to have at least two things in common: experience and solid training. Previous research shows that each additional year of teaching experience is related to higher student achievement, especially during a teacher's first five years in the profession (Rockoff, 2004[15]; Harris and Sass, 2011[16]; Rivkin, Hanushek and Kain, 2005[1]). Results from TALIS 2018 show that, early in their careers, teachers often feel less confident in their ability to teach, in their classroom management skills and in their capacity to use a wide range of effective instruction approaches (OECD, 2019[4]).

The content and the quality of teachers' education can also affect student learning (Clotfelter, Ladd and Vigdor, 2007[17]; Clotfelter, Ladd and Vigdor, 2010[18]; Darling-Hammond, 2004[19]; Monk, 1994[20]; Ronfeldt and Reininger, 2012[21]). Teachers' pre-service education and training, which usually includes work on subject content, pedagogy and classroom practice, aims to equip teachers with the skills necessary to help students learn (OECD, 2019[4]).

Attracting the most effective teachers to the schools in which large shares of struggling students are enrolled may compensate, at least partially, for these students' disadvantage.[3]

To evaluate the sorting of teachers across schools based on their qualifications, PISA 2018 asked school principals to report the number of teachers in their schools (distinguishing between full-time and part-time teachers), the number of teachers who are "fully certified by an appropriate authority", and the number of teachers at each level of qualification (for instance, bachelor's

degree, master's degree, doctoral degree). These questions were combined to calculate the proportion of fully certified teachers and the proportion of teachers with at least a master's degree, respectively.

The credentials defined for "full" certification depend on school systems, but they may also depend on whether a teacher received a credential from a teacher-education programme, accumulated a minimum number of hours of student-teaching, passed an exam, or some combination of these. In some countries, there is no such certification. This is the case in Chile, where principals were asked to report the number of teachers who "are authorised or enabled by the Ministry of Education".

On average across OECD countries in 2018, 86% of teachers in modal grade schools were "fully certified", according to school principals; in most countries, more than 80% of teachers were. These proportions may reflect the fact that, in many countries/economies, a professional qualification is commonly required for teaching. However, whatever the level that prevails at the country/economy level, in several school systems, the proportion of fully certified teachers varied markedly, depending on the socio-economic profile of the school (Table II.B1.5.3). In Argentina, France,[4] Indonesia and Uruguay, the proportion of fully certified teachers was much smaller – by at least 15 percentage points – in disadvantaged schools than in advantaged schools. The opposite was observed in Costa Rica, Malaysia, Morocco, Peru, the Philippines, Singapore and Turkey where schools serving more affluent students appeared to employ smaller shares of fully certified teachers.

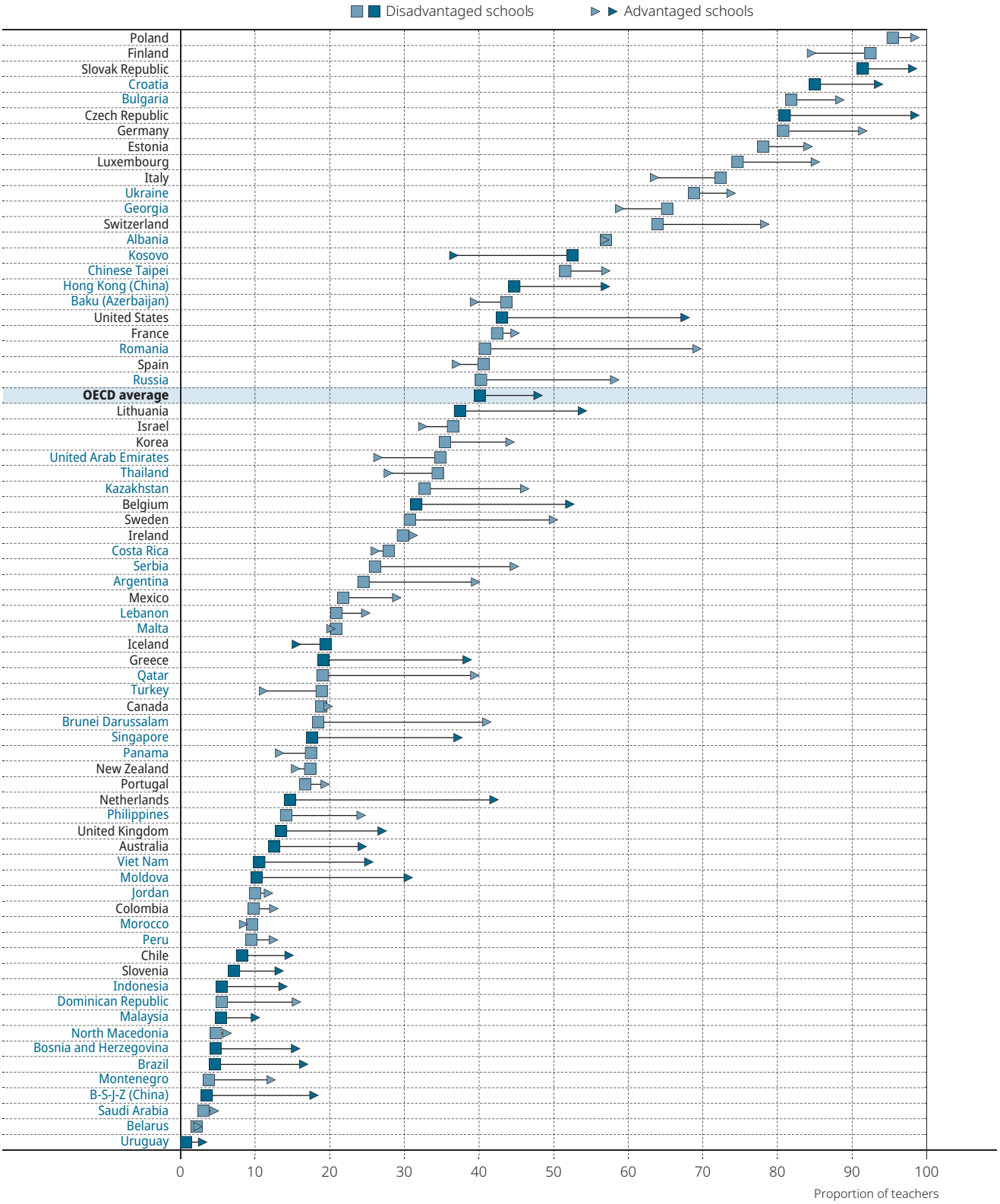
These variations in the proportion of fully certified teachers, both between and within countries and economies, may be difficult to interpret, though. The level of qualifications required of educators (e.g. bachelor's degree, master's degree or doctoral degree) or the area of expertise (e.g. pedagogical or subject-matter) varies widely across school systems (Guerriero, 2017[22]). For this reason, the actual effectiveness of teachers may not be completely related to certification.[5] For instance, in some countries, vocational schools tend to recruit teachers with an expertise in a specific curriculum area instead of the one required in general education (OECD, 2018[23]). By contrast, private independent schools (privately managed schools with at least 50% of funding from private sources; see Box II.4.1 in Chapter 4), which often serve more affluent students than public schools do, may have more freedom to hire teachers with experience teaching a specific curriculum instead of that required for government-dependant schools – as long as the candidates also have proven pedagogical skills. This explains why, in many countries, the proportion of fully certified teachers was much smaller in these schools (Table II.B1.5.3). Depending on the size of the vocational education and private independent school sectors, one may thus expect that the gap in teacher qualifications between disadvantaged and advantaged schools varies in both magnitude and direction.

According to PISA 2018 results, 44% of teachers in modal grade schools had a master's or doctoral degree, on average across OECD countries. Given that the definition of "full certification" varies across countries, the average proportion of teachers at one or another level of qualification differs significantly at the country level. In Croatia, the Czech Republic, Finland, Poland and the Slovak Republic, school principals reported that 90% of the teachers in their school had attained a master's or doctoral degree, while in Belarus, Denmark, Saudi Arabia and Uruguay, less than 5% of teachers had done so. This reflects differences observed in the requirements for entry into the teaching profession (OECD, 2018[23]),

Large differences were also observed within countries and economies. In general, the proportion of teachers with at least a master's degree grew with the average socio-economic profile of the school. On average across OECD countries, 40% of teachers in disadvantaged schools (schools in the bottom quarter of the distribution of average socio-economic status), and 48% of teachers in advantaged schools (schools in the top quarter of that distribution) had at least a master's degree (Figure II.5.1). In 25 countries and economies, the proportion of highly qualified teachers in disadvantaged schools was significantly smaller than that in advantaged schools. In Belgium, Hungary, the Republic of Moldova, the Netherlands and the United States, the difference was greater than 20 percentage points. The only exceptions were Iceland and Kosovo, where there was a 4 and 16 percentage-point difference, respectively, in favour of disadvantaged schools. Significant differences in favour of advantaged schools in the proportion of teachers with at least a master's degree were negatively related to socio-economic differences in performance (Figure II.5.2).

Figure II.5.1 **Percentage of teachers with at least a masters' degree, by schools' socio-economic profile**

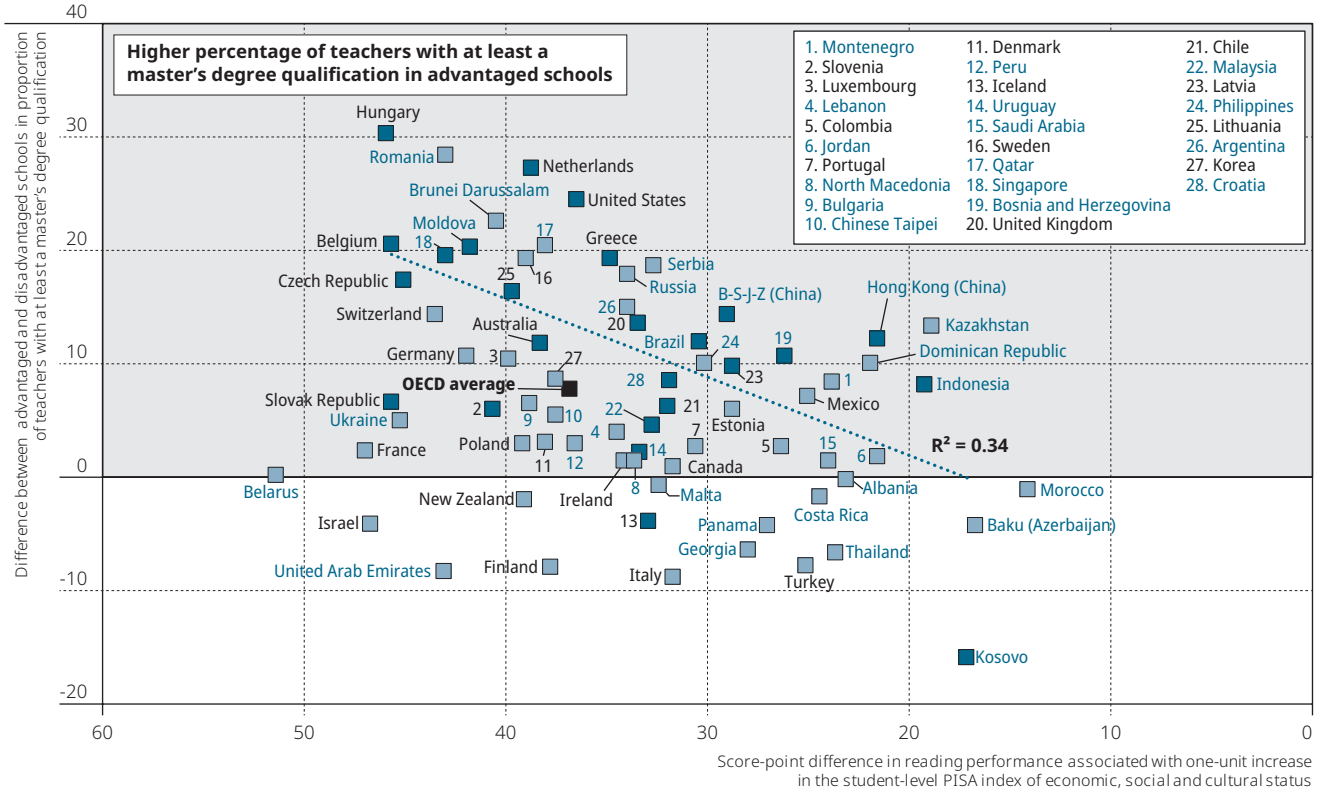
Results based on principals' reports



Notes: Statistically significant differences are shown in a darker tone (see Annex A3).
Education levels correspond to level 5A master's degree and level 6 of the International Standard Classification of Education (ISCED-1997).
The socio-economic profile is measured by the school's average PISA index of economic, social and cultural status (ESCS), see Annex A1.
For this analysis, the sample is restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3).
Countries and economies are ranked in descending order of the percentage of teachers in disadvantaged schools with at least an ISCED 5A qualification.
Source: OECD, PISA 2018 Database, Table II.B1.5.4.
StatLink https://doi.org/10.1787/888934037602

Figure II.5.2 **Under-representation of qualified teachers in disadvantaged schools and difference in reading performance**

Compared to advantaged schools



Notes: Statistically significant differences are show in darker town (see Annex A3)
Regression line only uses significant differences.
The socio-economic profile is measured by the school's average PISA index of economic, social and cultural status (ESCS).
For this analysis, the sample is restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3).
Source: OECD, PISA 2018 Database, Tables II.B1.2.3 and II.B1.5.4.
StatLink https://doi.org/10.1787/888934037621

SORTING EXPERIENCED TEACHERS ACROSS SCHOOLS

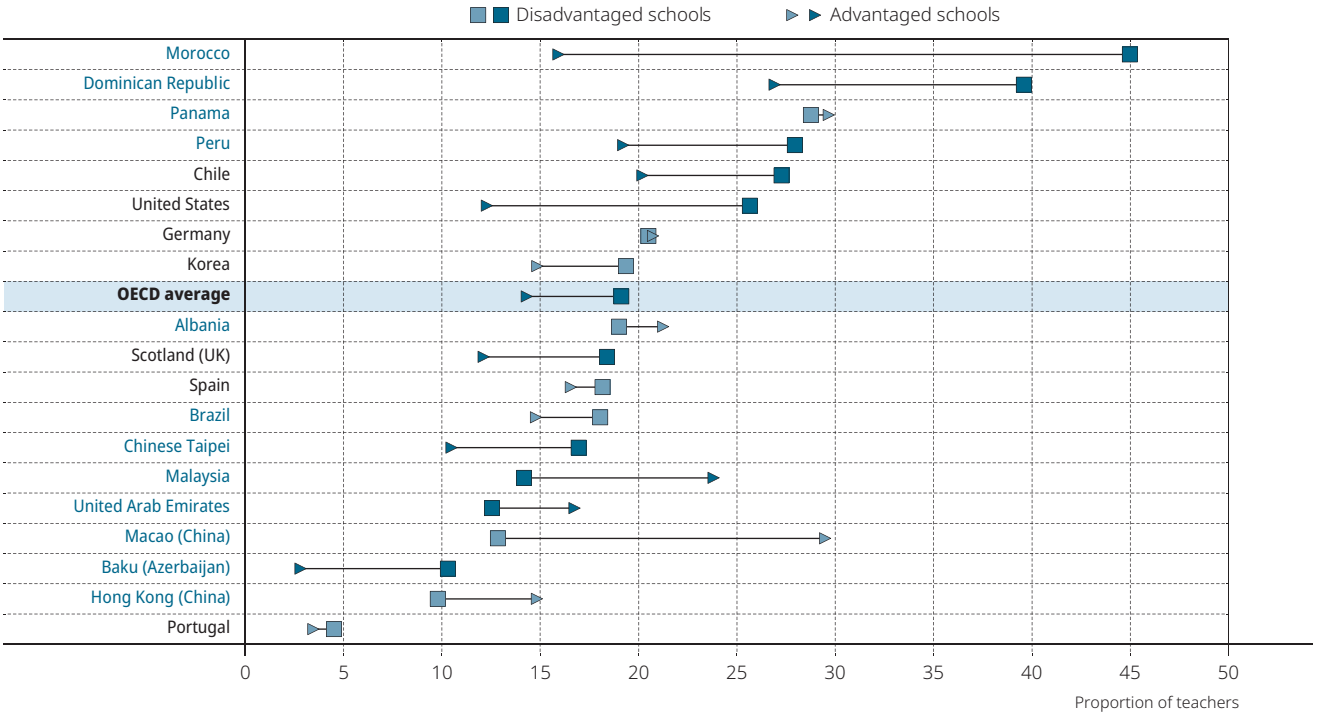
Some 19 countries and economies that participated in PISA 2018 also distributed an optional questionnaire for teachers. As in PISA 2015, responses to this questionnaire provide detailed information on teacher demographics, instruction, teaching strategies, teacher well-being and school contexts (OECD, 2018[23]).[6] As teachers were specifically asked about their professional experience, one can identify "novice" teachers, defined as those with less than five years of experience.

Of the 19 countries/economies that distributed the optional teacher questionnaire, in Baku (Azerbaijan), Chile, the Dominican Republic, Morocco, Peru, Chinese Taipei, Scotland (the United Kingdom) and the United States, the proportion of teachers with less than five years of experience was larger in disadvantaged schools than in advantaged schools (Figure II.5.3). Only in Malaysia and the United Arab Emirates were teachers in disadvantaged schools significantly more experienced than those in advantaged schools. On average across the OECD countries that distributed the optional teacher questionnaire, around 20% of teachers in disadvantaged schools had less than five years of experience – a proportion significantly smaller (by 5 percentage points) than that in advantaged schools. In Morocco, the difference between these shares was around 29 percentage points, and almost one in two teachers in disadvantaged schools in Morocco had less than five years of experience.

Employing mainly less-experienced teachers in schools with high concentrations of disadvantaged students may compound the academic difficulties these students face because novice teachers tend to be less effective, on average, than teachers with several years of experience (Rockoff, 2004[15]; Harris and Sass, 2011[16]; Rivkin, Hanushek and Kain, 2005[1]). As illustrated in Figure II.5.4, the countries/economies where the proportion of novice teachers is larger in disadvantaged than advantaged schools are also often the countries/economies where socio-economic differences in performance are greater.

Figure II.5.3 **Percentage of novice teachers, by schools' socio-economic profile**

Results based on teachers' reports



Notes: Statistically significant differences are shown in s darker tone (see Annex A3).
The socio-economic profile is measured by the school's average PISA index of economic, social and cultural status (ESCS).
For this analysis, the sample is restricted to schools with the modal ISCED level for 15-year-old (see Annex A3).
The OECD average is an average of the seven OECD countries that distributed the teacher questionnaire.
A novice teacher is a teacher with less than 5 years of experience as a teacher.
Countries and economies are ranked in descending order of the percentage of novice teachers in disadvantaged schools.
Source: OECD, PISA 2018 Database, Table II.B1.5.5.
StatLink https://doi.org/10.1787/888934037640

Participation in ongoing, in-service professional development is a crucial component of professionalism amongst teachers (Guerriero, 2017[22]). Continuous professional development activities are also expected to increase teachers' self-efficacy and satisfaction with their job. According to TALIS 2018 results, most teachers reported a positive impact on their teaching practices, self-efficacy and job satisfaction when they participated in such programmes.

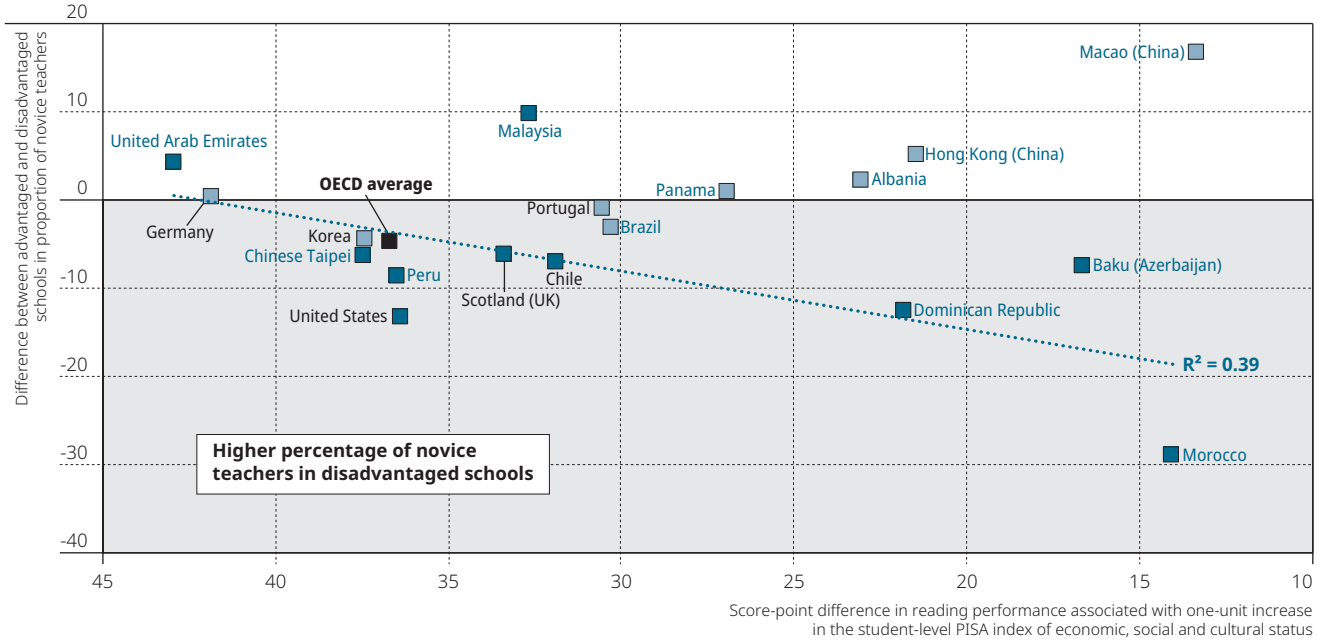
PISA 2018 also asked principals to report the percentage of all teaching staff in their school who had attended a programme of professional development in the three months prior to the PISA test. PISA defines a programme of professional development as a formal initiative, lasting at least one day, that focuses on teaching and education, and is designed to enhance teachers' teaching skills or pedagogical practices. Such a programme may or may not lead to a recognised qualification.

According to school principals, more than one in two teachers in their school had attended such a programme, on average across OECD countries (Table II.B1.5.6).[7] But this proportion varied widely between and within education systems. In 8 countries that participated in PISA 2018, the proportion of teachers in advantaged schools who had attended a professional development programme was smaller than the proportion of teachers in disadvantaged schools who had attended such a programme. The largest differences – of more than 20 percentage points – between the two groups of teachers were observed in Malta and Singapore. Teachers working in the most deprived schools may benefit most from such programmes, given that they often lack professional experience, and work with large numbers of low-achieving and struggling children.

However, in 18 countries, the proportion of teachers who had attended such a programme was smaller amongst teachers working in schools that serve mostly disadvantaged students than amongst those in schools with a more affluent intake. The difference in the proportions between the two groups of teachers was greater than 20 percentage points in Colombia, Panama, Qatar and Saudi Arabia.[8]

Figure II.5.4 **Over-representation of novice teachers in disadvantaged schools and difference in reading performance**

Compared to advantaged schools



Notes: Statistically significant differences are shown in a darker tone (see Annex A3).
Regression line only uses significant differences.
The socio-economic profile is measured by the school's average PISA index of economic, social and cultural status (ESCS).
For this analysis, the sample is restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3).
The OECD average is an average of the six OECD countries that distributed the teacher questionnaire.
Source: OECD, PISA 2018 Database, Tables II.B1.2.3 and II.B1.5.5.
StatLink https://doi.org/10.1787/888934037659

TEACHER ABSENTEEISM

Whatever the qualifications and experience of teachers in a school, the quality of teaching may be undercut if there is a high rate of teacher absenteeism. Teacher absenteeism may result in a loss of instruction time and disruption in student learning. Empirical evidence shows that teacher absenteeism has a considerable negative impact on student achievement (Miller, Murmane and Willett, 2008[24]; Clotfelter, Ladd and Vigdor, 2009[25]; Duflo, Hanna and Ryan, 2012[26]; Herrmann and Rockoff, 2012[27]).

On average across OECD countries in 2018, 21% of students in disadvantaged schools compared to 15% of students in advantaged schools were enrolled in a school whose principal reported that instruction is hindered at least to some extent by teacher absenteeism (Table II.B1.5.7). But in many countries/economies, differences in the rate of teacher absenteeism between advantaged and disadvantaged schools were much greater. For example, in 13 countries/economies the difference was more than 20 percentage points; amongst those countries, in Brunei Darussalam, Colombia, Costa Rica, Panama, Sweden and Uruguay, the difference was larger than 30 percentage points.

These differences may be related to working conditions, as perceived by teachers. In the absence of sufficient compensation, working in a challenging and stressful environment is expected to lead to increases in the rate of absenteeism (Ose, 2005[28]).

In the optional teacher questionnaire, PISA 2018 asked teachers how they feel about their job, in general, and specifically the degree to which they agree or disagree ("strongly agree", "agree", "disagree", "strongly disagree") with the following statements: "The advantages of being a teacher clearly outweigh the disadvantages"; "If I could decide again, I would still choose to work as a teacher"; "I regret that I decided to become a teacher"; "I wonder whether it would have been better to choose another profession"; "I enjoy working at this school"; "I would recommend my school as a good place to work"; "I am satisfied with my performance in this school"; and "All in all, I am satisfied with my job". Teachers' responses to the first four items were used to create an index of satisfaction with the teaching profession, while responses to the last four items were used to create an index of satisfaction with the current job. Both indices were standardised to have a mean of 0 and a standard deviation of 1 across OECD countries that distributed the optional teacher questionnaire. Higher values in the indices correspond to greater satisfaction.

On average across the OECD countries that distributed the teacher questionnaire, teachers in advantaged and disadvantaged schools reported similar levels of satisfaction with the teaching profession. Patterns varied, though, across countries. In

Hong Kong (China) and Peru, and to a lesser extent in Macao (China) and the United Arab Emirates, teachers in disadvantaged schools were less satisfied with the teaching profession than their colleagues in advantaged schools; the opposite was observed in Albania and the Dominican Republic. The high levels of satisfaction indicated by the index of satisfaction with the teaching profession may reflect the respondents' motivation for becoming a teacher. In nearly all countries that participated in TALIS 2018, teaching was the first-choice career for most teachers. Most cited the opportunity to influence children's development and contribute to society as their motivation to become a teacher (OECD, 2019[4]).

However, in eight of the countries/economies that distributed the optional teacher questionnaire, teachers who work in schools that serve predominantly disadvantaged students were much less likely to report being satisfied with their current job environment, than those who work in more advantaged schools (Table II.B1.5.8). The difference was especially marked in Chile, Germany, Hong Kong (China), Scotland (the United Kingdom), Chinese Taipei and the United States. Only in Macao (China) and the United Arab Emirates did teachers in disadvantaged schools report greater satisfaction with their working conditions that those in advantaged schools. This aligns with the results of PISA 2015 indicating that teachers tend to be more satisfied with their job when they work in advantaged schools, even after accounting for school performance (Mostafa and Pál, 2018[29]). In almost all countries where the optional teacher questionnaire was distributed, teachers in disadvantaged schools tended to report less self-efficacy in maintaining positive relations with students (Table II.B1.5.10), in classroom management (Table II.B1.5.11) and in instructional settings (Table II.B1.5.12). Results from TALIS 2018 indicate that teachers spend less time on actual teaching and learning in those schools with a large share of disadvantaged students (OECD, 2019[4]).

EDUCATIONAL RESOURCES AND STAFF SHORTAGES

Teachers' experience and the type of diploma teachers hold are incomplete measures of the actual effectiveness of teachers to help their students learn. Certifications and qualifications may be poor indications of teaching effectiveness, and they are often not comparable across countries. To better measure how students' learning may be affected by the way resources are allocated to schools, PISA 2018 asked school principals to report the extent to which their school's capacity to provide instruction is hindered ("not at all", "very little", "to some extent", "a lot") by a lack or inadequacy of teaching and assisting staff; a shortage or inadequacy of physical infrastructure, such as school buildings, heating and cooling systems, and instructional space; and educational material, such as textbooks, laboratory equipment, instructional material and computers. The responses were combined to create an index of shortage of educational materials. Principals were also asked whether the lack or quality of teaching and assisting staff hinders the capacity to provide instruction in the school. Their responses were combined to create an index of shortage of education staff. The average in both indices is 0 and the standard deviation is 1 across OECD countries. Positive values reflect principals' perceptions that the shortage of staff or educational material hinders the school's capacity to provide instruction to a greater extent than the OECD average; negative values indicate that school principals believe the shortage hinders the school's capacity to provide instruction to a lesser extent.

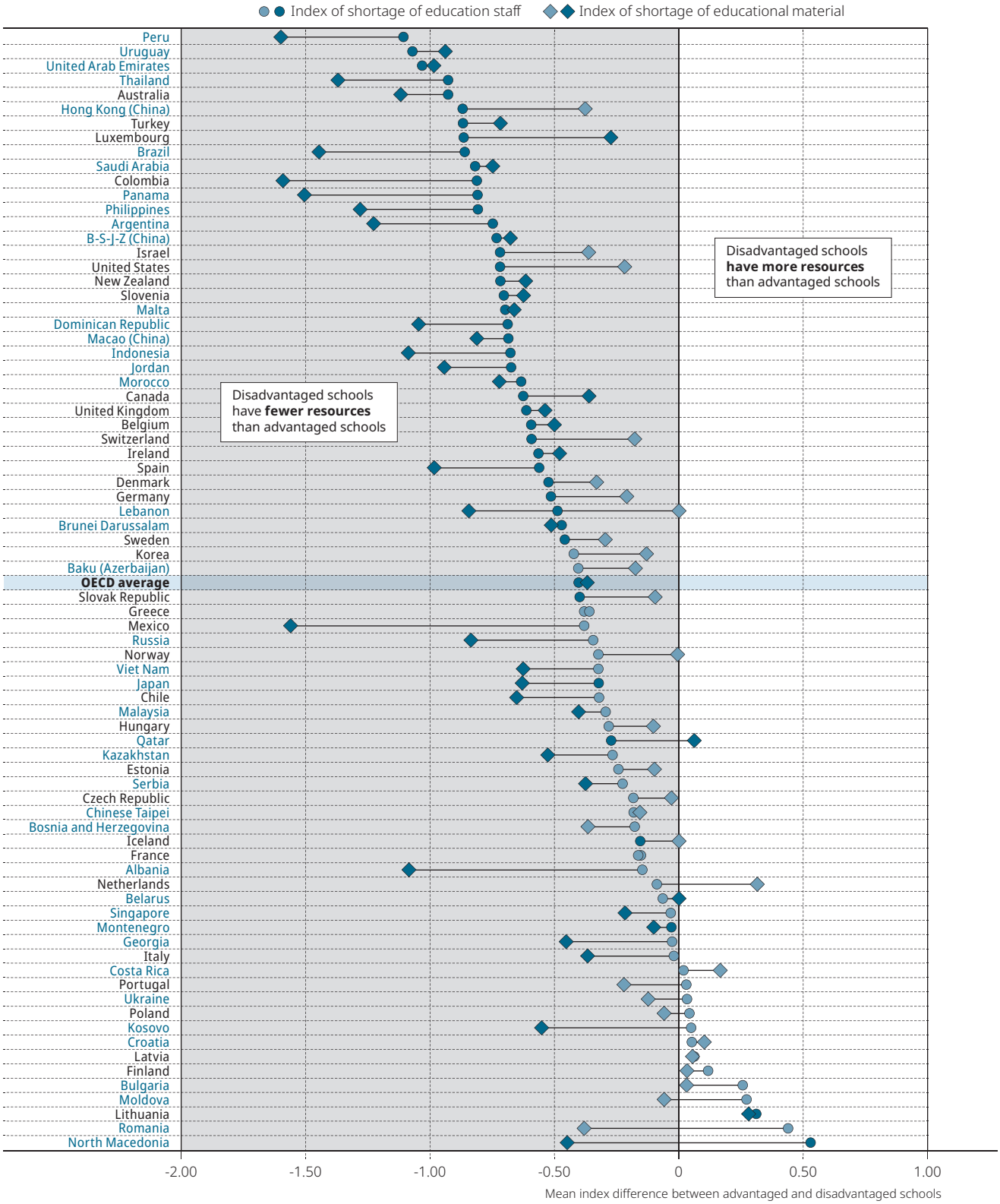
Figure II.5.5 presents the differences in these two indices between advantaged and disadvantaged schools. A negative value in this difference indicates that disadvantaged schools are worse off with respect to shortages of staff or material; a positive value indicates that disadvantaged schools are better off. In 41 PISA-participating countries and economies, principals of disadvantaged schools were significantly more likely than principals of advantaged schools to report that their school's capacity to provide instruction was hindered by a lack or inadequacy of educational material and physical infrastructure. In 45 countries and economies, principals of disadvantaged schools were significantly more likely than principals of advantaged schools to report shortages of education staff.

An analysis of the different components of these indices shows that amongst students enrolled in disadvantaged schools, 34% attended a school whose principal reported that instruction is hindered, at least to some extent, by a lack of educational material. This share was 13.5 percentage-points larger than the share of students enrolled in advantaged schools whose principal reported the same. This difference between advantaged and disadvantaged schools is not significant in 34 of the 79 PISA-participating countries and economies (Table II.B1.5.15). Only in Lithuania, Montenegro and Qatar did advantaged schools appear to suffer more than disadvantaged schools from a lack of educational material.

On average across OECD countries, principals of advantaged schools were much less likely than principals of disadvantaged schools to report that their school's capacity to provide instruction was hindered, at least to some extent, by a lack of teaching staff. Only 19% of students in advantaged schools attended a school whose principal so reported, while these proportions ranged from 28% amongst students who attended schools in the second quarter of socio-economic status, to 34% amongst students who attended the most disadvantaged schools (Table II.B1.5.16). Similar patterns were observed in several countries. In Belgium, Germany, Indonesia, Ireland, Japan, Luxembourg, the Russian Federation and Saudi Arabia, more than one in two students in a disadvantaged school attended a school whose principal reported that a lack of teaching staff hinders the school's capacity to provide instruction.

Figure II.5.5 **Difference in shortage of educational material and staff, by schools' socio-economic profile**

Results based on principals' reports



Notes: Statistically significant differences are shown in a darker tone (see Annex A3).
The socio-economic profile is measured by the school's average PISA index of economic, social and cultural status (ESCS).
For this analysis, the sample is restricted to schools with the modal ISCED level for 15-year-old students (see Annex A3).
Countries and economies are ranked in ascending order of the difference in the mean index of shortage of education staff.
Source: OECD, PISA 2018 Database, Tables II.B1.5.13 and II.B1.5.14.
StatLink https://doi.org/10.1787/888934037678

In most education systems, the consolidated reports of principals of disadvantaged schools were reflected in a positive value in the index of shortage of teaching staff, suggesting a higher incidence of shortage than on average across OECD countries. By contrast, the consolidated reports of principals of advantaged schools were reflected in a negative value in the index, implying a lower incidence of shortage than the OECD average. On average across OECD countries, only one in five disadvantaged students attended a school whose principal reported that their school's capacity to provide instruction is hindered, at least to some extent, by a lack of adequate teaching staff (Table II.B1.5.19).

Principals of disadvantaged schools were less likely than principals of advantaged schools to report that their school's capacity to provide instruction is hindered by insufficiently qualified teachers (10% of students enrolled in advantaged schools attended a school whose principal so reported). Similarly, 37% of students in disadvantaged schools attended a school whose principal reported that a lack of assisting staff hinders their school's capacity to provide instruction to some extent, compared with 27% of students in advantaged schools whose principal so reported (Table II.B1.5.20). And 20% of students in disadvantaged schools attended a school whose principal reported that inadequate or poorly qualified assisting staff hinders instruction to some extent, compared with 12% of students in advantaged schools whose principal so reported (Table II.B1.5.21).

Notes

1. See discussion in Chapter 4. The "modal ISCED level" is defined here as the level attended by at least one-third of the PISA sample. In Albania, Argentina, Baku (Azerbaijan), Belarus, B-S-J-Z (China), Colombia, Costa Rica, the Czech Republic, the Dominican Republic, Indonesia, Ireland, Kazakhstan, Luxembourg, Macao (China), Morocco, the Slovak Republic, Chinese Taipei and Uruguay, both lower secondary (ISCED level 2) and upper secondary (ISCED level 3) schools meet this definition. In all other countries, analyses are restricted to either lower secondary or upper secondary schools (see Annex C for details). In several countries, lower and upper secondary education are provided in the same school. As the restriction is made at the school level, results from some students from a grade other than the modal grade in the country may also be used in the analysis.
2. Research also emphasises that teacher quality may matter more than class size for student performance (Hoekstra, Mouganie and Wang, 2018[30]), in the specific context of selective high schools in China.
3. For instance, the evaluation of the Talent Transfer Initiative (TTI), a programme implemented in 10 school districts in seven states of the United States, suggests that providing financial incentives may be an effective way of attracting high-performing teachers to low-performing schools (Glazerman et al., 2013[31]). Student performance improves in these schools, at least in elementary school, but no significant impact on middle-school students was observed. This result is at odds with that in France, where financial incentives (but much smaller than those provided in the TTI programme) provided to teachers working in disadvantaged schools failed to attract more experienced teachers. According to a survey across a large sample of Australian teachers, the most effective teachers placed considerably more importance on professional factors (such as having leadership positions) when deciding to transfer to a different school (Rice, 2010[32]).
4. In France, only 84.9% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.11); therefore, comparisons should be interpreted with caution.
5. For instance, evidence from the US Teach For America programme, which aims to attract graduates of the nation's top colleges to teach at least two years in low-income schools, finds that the programme's novice teachers may be at least as effective, or even more so, than traditionally prepared teachers (Penner, 2016[33]; Glazerman, Mayer and Decker, 2005[34]).
6. The sampled population included only teachers who were eligible to teach the modal grade of 15-year-old students, whether they were teaching that grade currently, had done so before or will/could do so in the future. Up to ten teachers who teach the test language (the main domain in PISA 2018) and up to ten teachers who teach any other subject were surveyed. The questionnaires for these two subpopulations were slightly different (OECD, 2018[23]), but in this chapter they are considered jointly. In order to compute averages and shares based on teachers' responses, teacher weights were generated so that the sum of teacher weights in each school is equal to the sum of student weights in the same school (see Annex A3 for details).
7. However, over a longer period of time, in 19 countries/economies that distributed the optional teacher questionnaire, almost all teachers reported that they had participated in professional development activities during the previous 12 months (see Table.II.B1.5.25). In the vast majority of cases, the reported activity was "courses/workshops (e.g. on subject matter or methods and/or other education-related topics)".
8. In Panama, only 84.8%, in Qatar, only 84% and in Saudi Arabia, only 81.3% of 15-year-old students with non-missing information for estimating the indices were enrolled in schools with the modal grade (Table II.B1.4.11).

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