Education Research Paper

Massive Gaps in Teacher Resources Between Disadvantaged and Advantaged Schools

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Key Points

1. Australia allocates more teacher resources to socio-economically advantaged schools than to disadvantaged schools.
   - Disadvantaged schools in Australia have more students per teacher, more teacher shortages, more teacher absenteeism, more poorly qualified teachers, more teachers teaching out-of-field, more inexperienced teachers, more teacher turnover, more novice teachers, and more teachers on short-term contracts than advantaged schools.
   - The gaps in teacher shortages and poorly qualified teachers are particularly large.

2. Teacher resource gaps in Australia are the largest or amongst the largest in the OECD. For example:
   - Disadvantaged schools in Australia are worse off than those in any other OECD country on an aggregate of several measures of teacher quantity.
   - The gap in the number of students per teacher is the largest in the OECD.
   - The gap in the shortage of teachers is the equal 5th largest in the OECD.
   - The gap in poorly qualified teachers is the equal 3rd largest in the OECD.

3. Australian governments are effectively discriminating against disadvantaged schools in terms of their access to quality teaching resources. They have failed to ensure high quality teaching resources in disadvantaged schools.

4. The disparity in teaching resources between disadvantaged and advantaged schools impacts most heavily on public schools. Some 95% of disadvantaged schools in Australia are public schools.

5. The difference in teacher resourcing between disadvantaged and advantaged schools contributes significantly to the very large achievement gaps between disadvantaged and advantaged 15-year-old students of about three years of learning.

6. Australian governments must take a much more active role in promoting a more equitable allocation of teacher resources if progress is to be made in reducing the achievement gaps. Governments must increase the number of teachers and the quality of teachers in disadvantaged schools and better support them to remain in these schools.

Key Facts

Teaching Resources in Disadvantaged & Advantaged Schools in Australia

Indicators of Teacher Quantity & Quality	Disadvantaged Schools	Advantaged Schools	Gaps: Disadv-Adv
Av Class Size (no.)	24.6	24.9	-0.3
Students per teacher (no.)	12.6	11.6	1.0
Teacher Shortage (% of students in schools where principals report shortage)	35.6	6.3	29.4
Teacher Shortage (% of science teachers reporting shortage)	26.1	7.1	19.0
Teacher Shortage (% of non-science teachers reporting shortage)	29.2	8.9	20.3
Teacher Absenteeism (% of students in schools where teacher absenteeism hinders learning)	21.1	5.6	15.5
Teacher Qualifications (% with University Degree)	90.7	96.1	-5.4
Out-of-field Teaching (% of science teachers not trained in all subjects they teach)	25.0	15.4	9.6
Out-of-field Teaching (% of non-science teachers not trained in all subjects they teach)	21.7	15.5	6.3
Teacher Quality (% of students in schools with poorly qualified teachers)	31.9	4.8	27.1
Teacher Quality (% of students in schools with teachers not well prepared for classes)	20.7	5.8	15.0
Teacher Quality (% of science teachers reporting poor quality teachers)	28.5	8.2	20.3
Teacher Quality (% of non-science teachers reporting poor quality teachers)	27.4	9.3	18.1
Science Teacher Experience (Average years of teaching)	14.3	17.5	-3.2
Non-Science Teacher Experience (Average years of teaching)	15.1	18.4	-3.3
Science Teacher Turnover (Average years in same school)	8.2	8.9	-0.7
Non-Science Teacher Turnover (Average years in same school)	8.4	9.3	-0.9
Novice Science Teachers – less than 5yrs experience (% of teachers)	26.5	17.4	9.1
Novice Non-Science Teachers – less than 5yrs experience (% of teachers)	22.8	14.6	8.2
Science Teachers on contract of 1 year or less (%)	12.0	8.9	3.1
Non-Science Teachers on contract of 1 year or less (%)	12.5	9.7	2.8

Source: OECD, *Effective Teacher Policies: Insights From PISA*, 2018, Online tables.

1. Introduction

A recent report by the OECD reveals a scandalous mis-allocation of teaching resources in Australia. It shows that Australia allocates more teacher resources to socio-economically advantaged schools than to disadvantaged schools.

Disadvantaged schools in Australia have more students per teacher, more teacher shortages, more teacher absenteeism, more poorly qualified teachers, more teachers teaching out-of-field, more less experienced teachers, more teacher turnover, more novice teachers, and more teachers on short-term contracts than advantaged schools. The gaps are the largest or amongst the largest in the OECD. It is an appalling situation.

The shocking gaps in teaching resources between disadvantaged and advantaged schools in Australia are revealed in an OECD report titled *Effective Teacher Policies* that draws on data from the 2015 Programme for International Student Assessment (PISA). It is the most comprehensive data base on the allocation of teaching resources available.

The report also found that gaps in teacher resources between disadvantaged and advantaged schools are strongly associated with differences in achievement between disadvantaged and advantaged students.

> Cross-country correlations show that gaps in student performance related to socioeconomic status are wider when fewer qualified and experienced teachers operate in socio-economically disadvantaged schools, compared to advantaged schools. [p. 83]

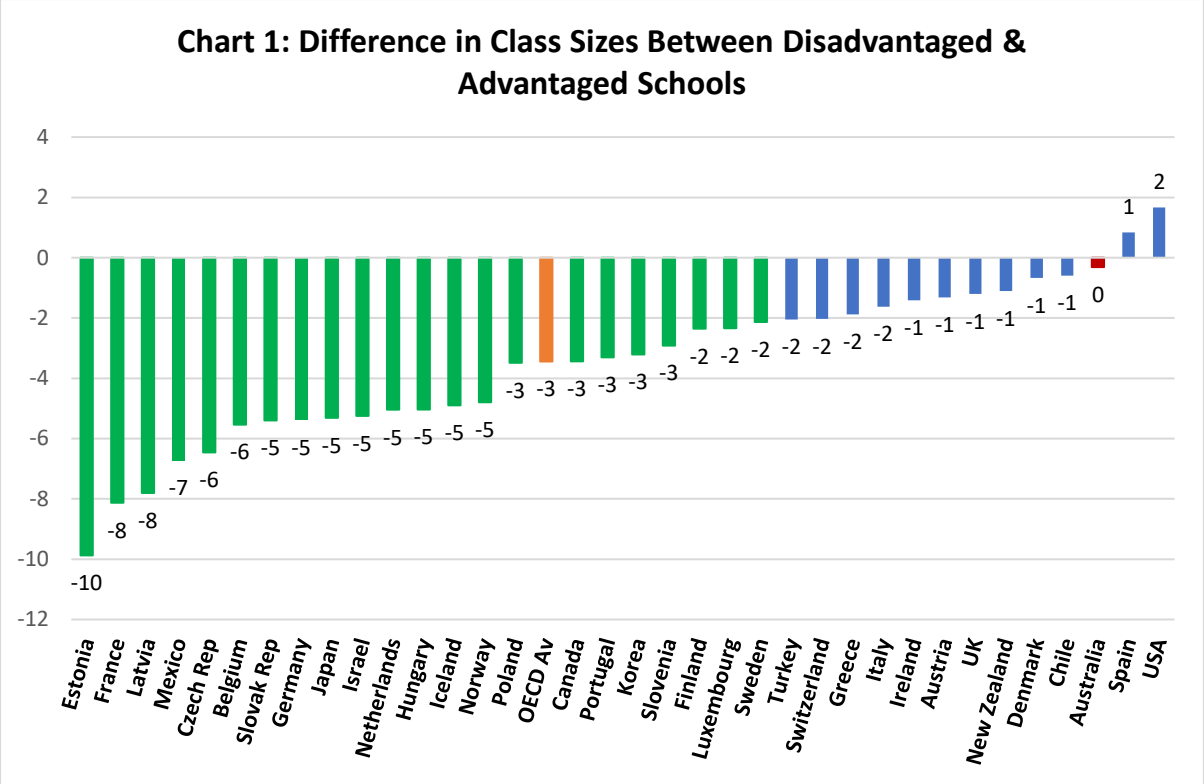
Australia has very large achievement gaps between disadvantaged and advantaged 15-year-old students of about three years of learning. The OECD report suggests that differences in the quantity and quality of teachers between disadvantaged and advantaged schools contribute significantly to these achievement gaps. Australian governments must take a much more active role in promoting a more equitable allocation of teacher resources if progress is to be made in reducing the achievement gaps.

2. Quantity of teachers

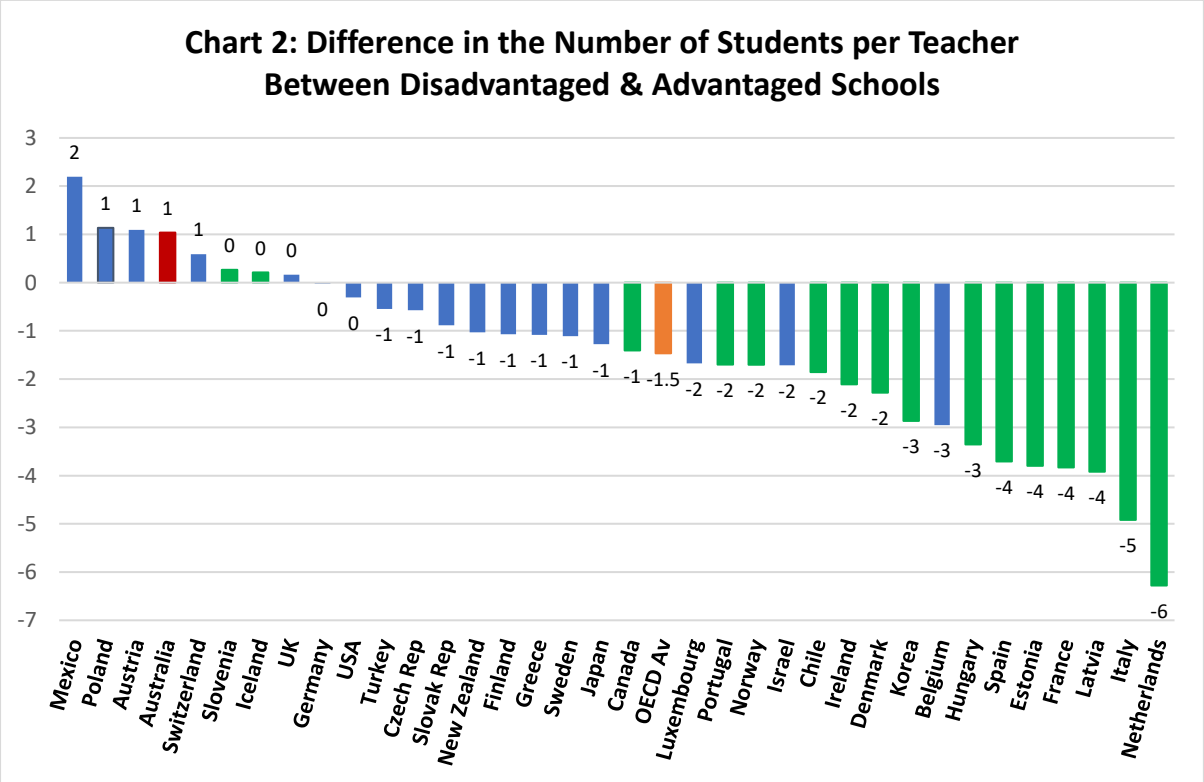
Disadvantaged schools in Australia have fewer teachers and more teacher shortages than advantaged schools. Australia is the only OECD country where disadvantaged schools are worse off than advantaged schools in five out of six measures of teacher quantity in schools. They have more students per teacher, more teacher shortages (as reported by principals, science teachers and non-science teachers) and more teacher absenteeism than advantaged schools. Australia is one of only eight OECD countries (out of 35) where disadvantaged schools are not better off than advantaged schools on at least one measure of teacher quantity.

2.1 Class sizes and student-teacher ratios

The report shows that most OECD countries have lower class sizes in socio-economically disadvantaged schools than in advantaged schools. Out of 35 OECD countries, 22 have significantly lower-class sizes in disadvantaged schools than in advantaged schools [Chart 1]. In 14 countries, class sizes in disadvantaged schools are about five or more students smaller than in advantaged schools. Australia is one of only 13 countries where there are no significant differences in class sizes between disadvantaged and advantaged schools – average of 24.6 in disadvantaged schools and 24.9 in advantaged schools.



Source: OECD, *Effective Teacher Policies: Insights from PISA*, 2018, Online table 3.1.
Note: The differences for Australia, the countries in green and the OECD average are statistically significant. The differences for the countries in blue are not statistically significant.



Source: OECD, *Effective Teacher Policies: Insights from PISA*, 2018, Online table 3.3.
Note: The gaps for Australia, the countries in green and the OECD average are statistically significant. The gaps for the countries in blue are not statistically significant.

The gap between the number of students per teacher (student-teacher ratio) in disadvantaged and advantaged schools in Australia is the largest statistically significant gap in the OECD [Chart 2]. There is an average of 12.6 students per teacher in disadvantaged schools in Australia compared to 11.6 in advantaged schools. This compares with the OECD average of 10.7 students per teacher in disadvantaged schools and 12.2 in advantaged schools.

Australia is one of only three OECD countries where the student-teacher ratio in disadvantaged schools is higher than in advantaged schools and the difference is statistically significant. In contrast, the student-teacher ratio is lower in disadvantaged schools in 14 countries and there is no statistically significant difference in the other 18 countries. Indeed, Australia is one of only five out of the 73 countries/economies participating in PISA 2015 where the student-teacher ratio is significantly higher in disadvantaged schools than in advantaged schools.

The report attributes the difference in student-teacher ratios between disadvantaged and advantaged schools in Australia to the presence of private independent schools that cater to the most affluent students. There are no significant differences in student-teacher ratios between advantaged and disadvantaged schools after excluding private independent schools. However, when private independent schools are excluded, the number of countries in which the student-teacher ratio is lower in disadvantaged schools than in advantaged schools increases to 21. Australia is one of only 12 countries where there is no statistically significant difference in the student-teacher ratio between disadvantaged and advantaged schools after excluding private independent schools.

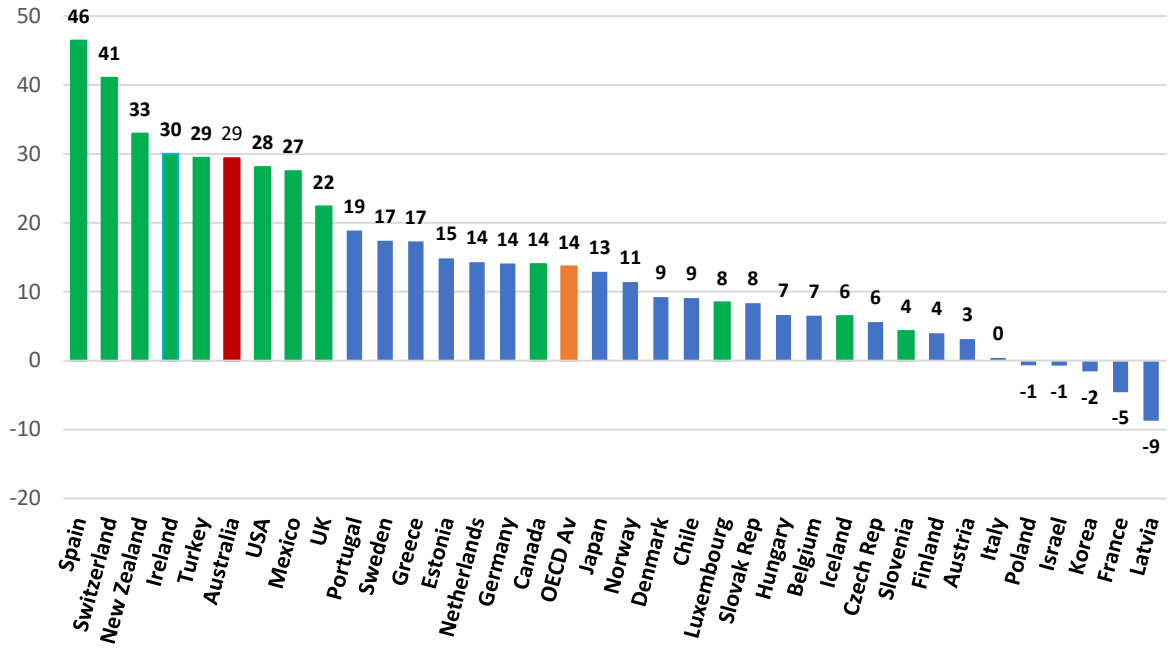
2.2 Teacher shortages

There is also a huge gap in the shortage of teachers between disadvantaged and advantaged schools in Australia. Some 35.6% of students in disadvantaged schools are in schools whose principal reported a shortage of teaching staff compared to only 6.3% of students in the most advantaged schools. The difference of 29.4 percentage points is the equal 5th largest in the OECD [Chart 3]. It is also the 5th largest of the 73 countries/economies participating in PISA 2015. The gap is even larger when private independent schools are excluded and is the 3rd largest in the OECD.

Some 26% of science teachers in disadvantaged schools in Australia reported a shortage of teaching staff compared to only 7% in advantaged schools. The difference of 19 percentage points was the 2nd largest of nine OECD countries reporting this information. In addition, 29% of non-science teachers in disadvantaged schools reported a shortage of teaching staff compared to 9% in advantaged schools.

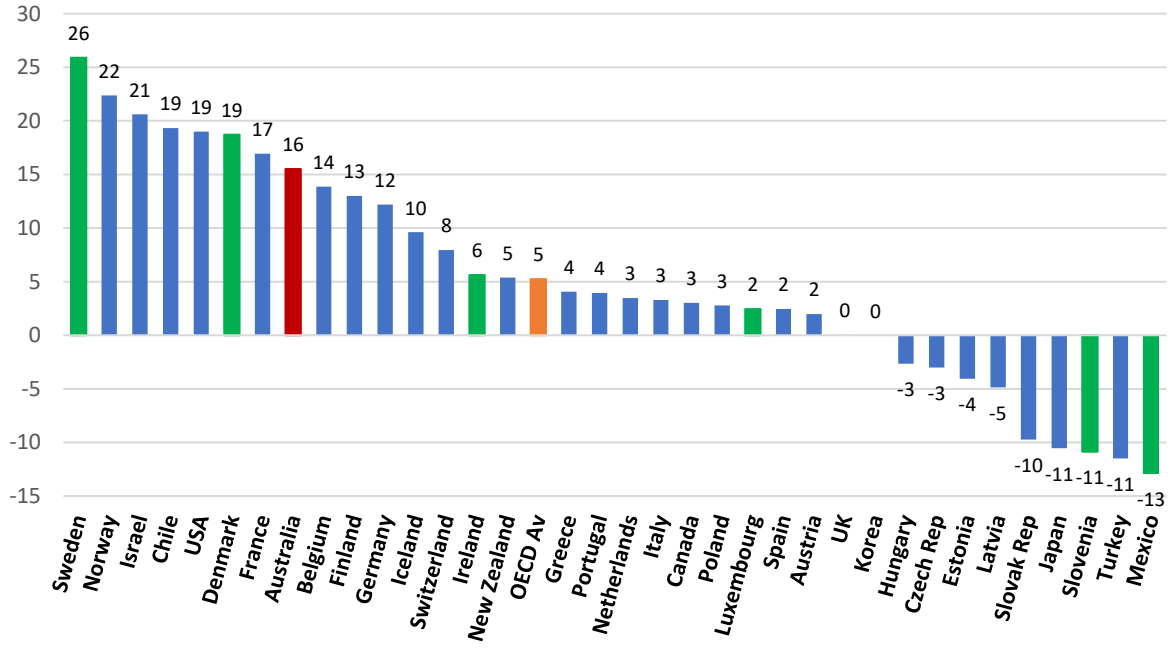
Teacher absenteeism is a temporary form of teacher shortage and there is a large gap between disadvantaged and advantaged schools in Australia. In disadvantaged schools, 21.1% of students are in schools where the principal reported student learning is hindered by teacher absenteeism compared to only 5.6% of students in the most advantaged schools. Australia is one of only four OECD countries where teacher absenteeism is significantly higher in disadvantaged schools than advantaged schools [Chart 4]. However, teacher absenteeism in Australia in both disadvantaged and advantaged schools is much lower than in many OECD countries. For example, 41.6% of students in disadvantaged schools in the Netherlands and 38.1% in advantaged schools have their learning hindered by teacher absenteeism.

Chart 3: Gap Between Proportion of Students in Disadvantaged & Advantaged Schools With a Shortage of Teachers



Source: OECD, *Effective Teacher Policies: Insights from PISA*, 2018, Online table 3.5.
Note: The gaps are in percentage points and the gaps for Australia, the countries in green and the OECD average are statistically significant. The gaps for the countries in blue are not statistically significant.

Chart 4: Gap Between Proportion of Students in Disadvantaged & Advantaged Schools Affected by Teacher Absenteeism



Source: OECD, *Effective Teacher Policies: Insights from PISA*, 2018, Online table 3.9.
Note: The gaps are in percentage points and the gaps for Australia, the countries in green and the OECD average are statistically significant. The gaps for the countries in blue are not statistically significant.

3. Teacher quality

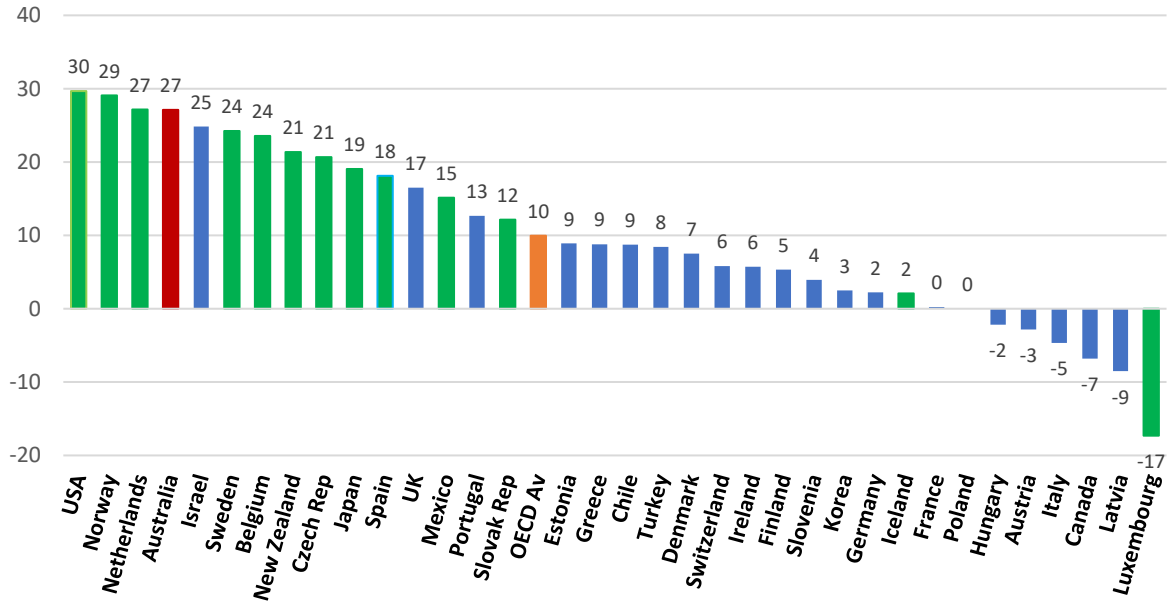
While many OECD countries provide more teachers in disadvantaged schools than in advantaged schools, most do not invest in better teacher quality in disadvantaged schools. Australia fails in both. Not only does it provide greater teacher quantity in advantaged schools compared to disadvantaged schools it also provides better teacher quality in advantaged schools. The gaps in teacher quality between disadvantaged and advantaged schools in Australia are amongst the largest in the OECD.

3.1 Teacher qualifications

The report shows that Australia tends to allocate more qualified teachers to advantaged schools. Some 90.7% of science teachers in disadvantaged schools in Australia have a university degree with a major in science compared to 96.1% in advantaged schools. However, these percentages are amongst the highest in the OECD and are very much higher than the averages for the OECD – 69.3% and 75% respectively. Also, the gap in Australia is the smallest of the ten countries where it is statistically significant. In most OECD countries, the gaps in the proportion of well-qualified teachers between disadvantaged and advantaged schools are not statistically significant.

However, surveys of principals and teachers views in PISA 2015 indicate that disadvantaged schools in Australia have more inadequately or poorly qualified teachers than advantaged schools. There are over six times more students in disadvantaged schools than in advantaged schools where the principal reported that the school's capacity to provide instruction is hindered by inadequately or poorly qualified teaching staff – 31.9% of students in disadvantaged schools compared to 4.8% in advantaged schools. The difference of 27 percentage points is the equal third largest in the OECD, exceeded only in Norway and the United States [Chart 5].

Chart 5: Gap Between the Proportion of Students in Disadvantaged & Advantaged Schools with Poorly Qualified Teachers



Source: OECD, *Effective Teacher Policies: Insights from PISA*, 2018, Online table 3.25.
Note: The gaps are in percentage points and the gaps for Australia, the countries in green and the OECD average are statistically significant. The gaps for the countries in blue are not statistically significant.

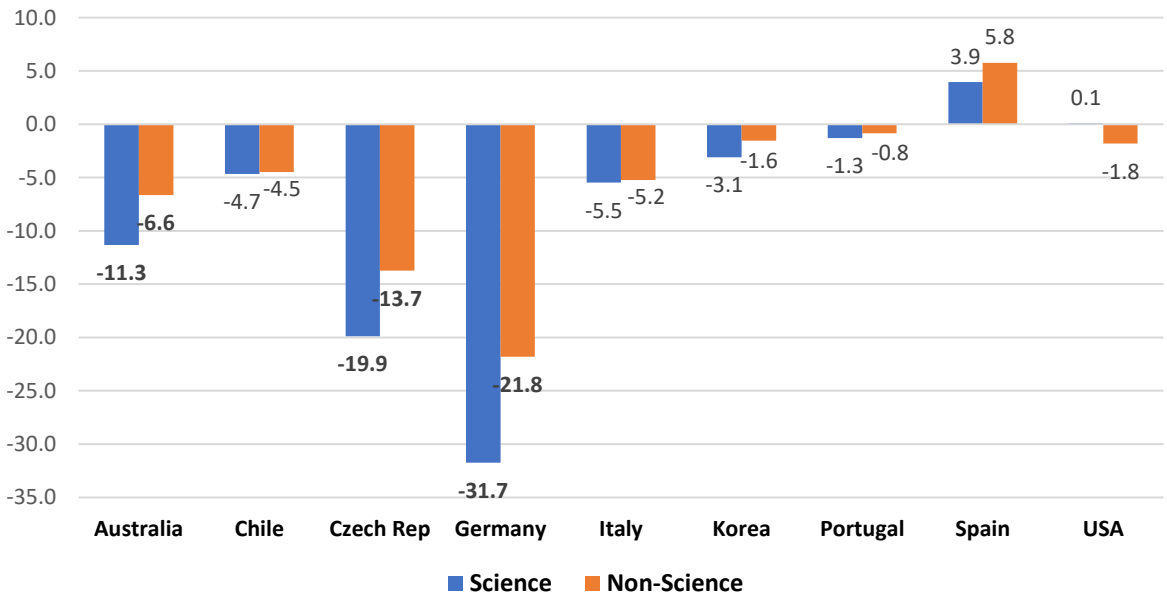
Teacher views are similar to those of principals. Some 28.5% of students are in disadvantaged schools where science teachers said that the school's capacity to provide instruction is hindered by

inadequately or poorly qualified teaching staff compared to 8.2% in advantaged schools. Also, 27.4% of students are in disadvantaged schools where non-science teachers said teaching is hindered by poorly qualified staff compared to 9.3% in advantaged schools. These differences of 20 and 18 percentage points, respectively, are the largest of the nine OECD countries reporting this data. There is also a much higher proportion of students in disadvantaged schools in Australia than in advantaged schools where principals report that teachers are not well prepared for classes – 20.7% of students in disadvantaged schools compared to 5.8% in advantaged schools. Australia is one of only a few OECD countries where the difference is statistically significant.

There also appears to be more out-of-field teaching in disadvantaged schools than in advantaged schools in Australia. The report shows a big difference in the proportion of science teachers who are trained in all subjects they teach. Only 75% of science teachers in disadvantaged schools are trained in all subjects they teach compared to 84.6% in advantaged schools, a difference of 11 percentage points [Chart 6]. Also, 78.3% of non-science teachers in disadvantaged schools are trained in all the subjects they teach compared to 84.5% in advantaged schools, a difference of nearly 7 percentage points. Australia is one of only three OECD countries out of nine reporting this information where there is a statistically significant difference in the proportion of teachers in disadvantaged and advantaged schools who are trained in all subjects they teach.

The report also shows that the proportions of Australian teachers in all schools who are trained in all subjects they teach are lower than most of the nine OECD countries reporting this information, indicating that out-of-field teaching in Australia is greater than in those countries. Only 79% of science teachers and 82% of non-science teachers across all schools are trained in all subjects they teach. These are the equal 2nd lowest proportions of the nine countries. Around 90% or more of science and non-science teachers in Chile, Italy, Korea and Portugal are trained in all subjects they teach.

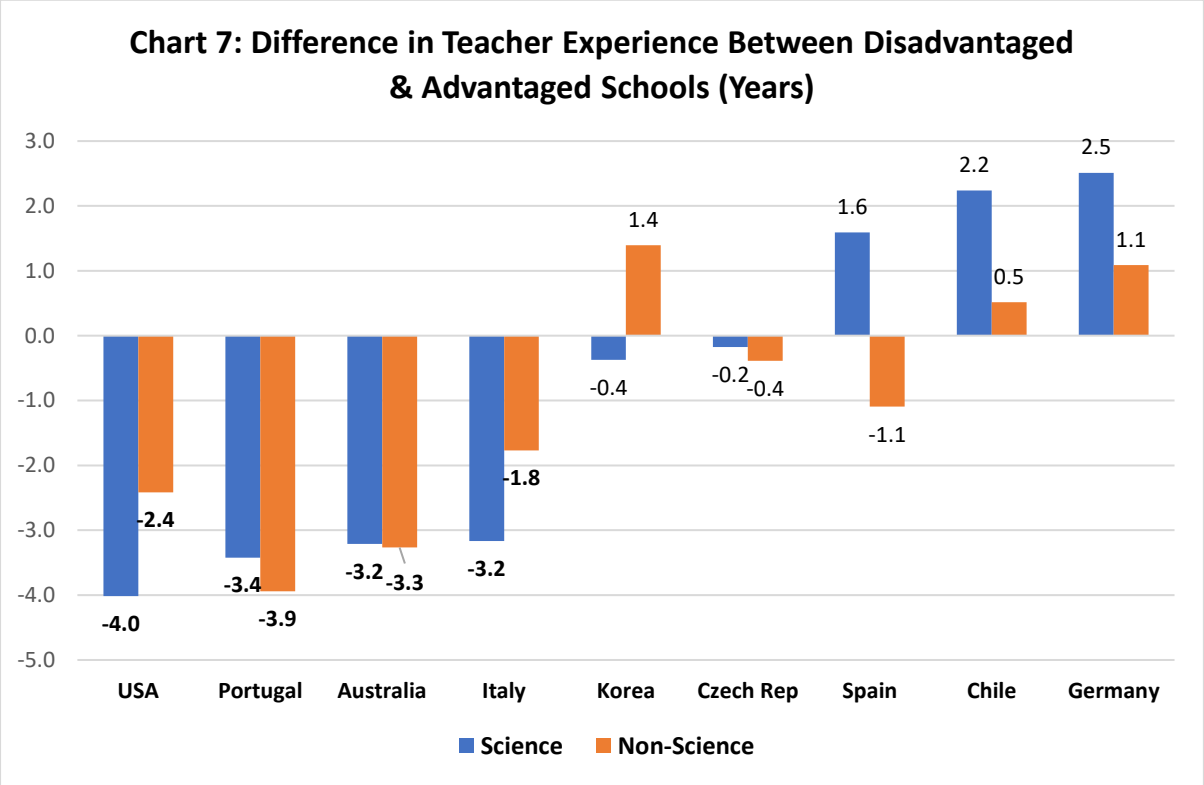
Chart 6: Difference Between Disadvantaged & Advantaged Schools in the Proportion of Teachers Who Are Trained in all Subjects They Teach



Source: OECD, *Effective Teacher Policies: Insights from PISA*, 2018, Online tables 3.23 & 3.24.
Note: The differences are in percentage points. Figures in bold are statistically significant.

3.2 Teacher experience and turnover

Teachers in advantaged schools in Australia are more experienced than those in disadvantaged schools. Teachers in disadvantaged schools have three years less experience than those in advantaged schools [Chart 7]. The average teaching experience of science teachers in disadvantaged schools is 14.3 years compared to 17.5 years in advantaged schools. The average teaching experience of non-science teachers in disadvantaged schools is 15.1 years compared to 18.4 years in advantaged schools. Australia is one of four OECD countries out nine reporting this information where teachers are less experienced in disadvantaged schools. There is no statistically significant difference in teacher experience in disadvantaged and advantaged schools in the other countries.



Source: OECD, *Effective Teacher Policies: Insights from PISA*, 2018, Online tables 3.17 & 3.18.
Note: Figures in bold are statistically significant.

Disadvantaged schools in Australia also experience higher turnover rates among non-science teachers than advantaged schools. The report shows that, on average, non-science teachers in disadvantaged schools spend fewer years in a school compared those in advantaged schools – 8.4 years compared to 9.3 years. Australia is one of four OECD countries out of nine reporting this information where there is a significant difference in teacher turnover between disadvantaged and advantaged schools, although the rate in Australia is lower than the other countries. The report notes an extensive literature indicating that disadvantaged schools suffer from higher teacher turnover rates than advantaged schools [pp. 77, 84, 102]. As a result, disadvantaged schools often have to rely on short-term staffing to fill vacancies. There is no significant difference in the turnover rate of science teachers between disadvantaged and advantaged schools in Australia.

Disadvantaged schools in Australia have more novice teachers (teachers with five years of experience or less) than advantaged schools. Novice teachers comprise 26.5% of science teachers in disadvantaged schools compared to 17.4% in advantaged schools. They comprise 22.8% of non-science teachers in disadvantaged schools compared to 14.6% in advantaged schools. Australia has the 2nd highest proportion of novice science teachers in disadvantaged schools out of nine OECD

countries reporting this information. The proportion of novice non-science teachers in disadvantaged schools in Australia is the 3rd highest of the nine countries. Australia is one of only three countries out of the nine where there is a statistically significant gap between disadvantaged and advantaged schools. There is no statistically significant difference in the other countries.

There are also more teachers on a fixed-term contract of one school year or less in disadvantaged schools than in advantaged schools in Australia. Some 12.5% of non-science teachers in disadvantaged schools are on a short-term contract compared to 9.7% of teachers in advantaged schools. Twelve per cent of science teachers in disadvantaged schools are on a short-term contract compared to 8.9% in advantaged schools.

4. Teaching resources and student achievement

The report examined the relationships between indicators of inequity in teacher resources and inequality in student performance. It found little relationship between smaller class sizes and lower student-teacher ratios and achievement gaps between disadvantaged and advantaged students. However, disadvantaged schools in the countries with the lowest average achievement gaps across reading, mathematics and science in the OECD have significantly lower class sizes and student-teacher ratios than advantaged schools. For example, the average class size in disadvantaged schools in Latvia is 16.6 compared to 24.4 in advantaged schools while in Estonia the respective class sizes are 19.8 and 29.6. By comparison, average class sizes in Australia are 24-25 in both disadvantaged and advantaged schools.

On the other hand, class sizes and student-teacher ratios in several other countries are also much smaller in disadvantaged schools than advantaged schools, but the achievement gaps are as large or larger than Australia's 88 points, which is equivalent to about three years of learning. For example, the Netherlands has significantly lower class sizes and student-teacher ratios in disadvantaged schools compared to advantaged schools, but its average achievement gap is similar to Australia's.

The report suggests that a possible reason for this is that some countries that compensate disadvantaged schools with smaller classes or lower student-teacher ratios end up, as an unintended consequence, having less qualified teachers in the most disadvantaged schools. This is the case in the Netherlands where only 75% of teachers are fully certified compared to 95% in advantaged schools. In contrast, in Estonia the proportion of fully certified teachers is similar in disadvantaged and advantaged schools and in Latvia there is a much higher proportion in disadvantaged than advantaged schools. As the OECD report observes:

> The combined effect may then explain why policies that focus on the quantity of teachers alone, without considering the quality of teachers, are ineffective in closing performance gaps between advantaged and disadvantaged students. [p. 113]

Differences in teacher shortages between disadvantaged and advantaged schools appear to be a factor contributing to achievement gaps between disadvantaged and advantaged students. The report found larger achievement gaps in reading between disadvantaged and advantaged students in countries where disadvantaged schools have greater shortage of qualified teachers. Australia is one such country. On the other hand, there was no significant difference in teacher shortages between disadvantaged and advantaged schools in most countries where the average achievement gaps between disadvantaged and advantaged students are relatively low. For example, this is the case in Estonia, Denmark, Finland, Iceland, Japan, Korea, Latvia and Norway.

Differences in teacher qualifications, experience and turnover between disadvantaged and advantaged schools also appear to be significant factors contributing to achievement gaps between disadvantaged and advantaged students.

The report found that differences in teacher qualifications are related to socio-economic gaps in performance. On average across all participating countries and economies, wider gaps between socio-economically disadvantaged and advantaged schools in science teachers' qualifications (as measured by having a university degree with a major in science) are associated with wider gaps in science performance between disadvantaged and advantaged students. However, the gap in teacher qualifications in Australia is relatively small and it may not be as significant as other differences in contributing to the achievement gap.

As noted above, teachers in disadvantaged schools in Australia are, on average, less experienced that those in advantaged schools and the difference is larger than in many countries. This is likely to be a factor contributing to the achievement gap as the OECD report found that the wider the difference between advantaged and disadvantaged schools in teachers' experience, the larger the difference in reading performance between disadvantaged and advantaged students.

The report found a strong association between low teacher turnover and student performance in science after accounting for teacher and student composition and differences in teacher experience. Australia is one of only three countries out of 18 where the association between teacher turnover and school performance is negative and statistically significant.

Another finding of the report is that countries also tend to have wider gaps in reading performance related to socio-economic status if teachers in disadvantaged schools are more likely than teachers in advantaged schools to be inadequately or poorly qualified. This also appears to be a strong factor in Australia where the difference is one of the largest in the OECD.

Thus, unequal distribution of teaching quality across disadvantaged and advantaged schools appears to be associated with differences in performance by disadvantaged and advantaged students. Teacher shortages, qualifications, experience and turnover are strongly associated with student performance. Countries in which teacher qualifications and experience are significantly better in advantaged schools than in disadvantaged schools tend to have larger achievement gaps between advantaged and disadvantaged students. There are also larger achievement gaps between disadvantaged and advantaged students in countries where teacher shortages and turnover are higher in disadvantaged than advantaged schools. Australia is a stand-out example on all counts.

5. Conclusion

The new OECD data reveals a shocking mis-allocation of teaching resources between disadvantaged and advantaged schools in Australia that ranks alongside the worst in the OECD. Advantaged schools in Australia have first call on quality teachers while disadvantaged schools face severe shortages of quality teachers. It represents a major policy failure. Governments are effectively discriminating against disadvantaged schools in terms of their access to quality teaching resources.

The analysis of the data by the OECD shows that the unequal distribution of quality teachers between disadvantaged and advantaged schools contributes to achievement gaps between disadvantaged and advantaged students. The report concludes:

> While all countries have disparities in student performance related to socio-economic status, countries in which teachers' qualifications and experience are significantly better in

> advantaged schools than in disadvantaged schools tend to have larger performance gaps related to students' socio-economic status and therefore less equitable outcomes. [p. 27]

As described above, there are large differences in teacher resources between disadvantaged and advantaged schools in Australia. These resource differences very likely contribute to the large gaps in achievement between disadvantaged and advantaged students.

The impact is felt most heavily in the public sector because almost all disadvantaged schools in Australia are public schools. The My School website shows that there are some 2,578 schools in Australia with 40% or more students in the lowest socio-economic status quartile. Of these, 94.8% are public schools and only 3.6% are Catholic schools and 1.6% Independent schools.

Australian governments need to do much more to distribute teaching resources more equitably if progress is to be made in reducing the achievement gaps. It is not just a matter of more teachers for disadvantaged schools. The OECD report says that policies to tackle student disadvantage must include policies to better allocate quality teachers to disadvantaged schools.

> These results imply that most countries could do more to oversee how teachers are allocated to schools. This includes not just monitoring the number of teachers, but also keeping a close eye on their qualifications, experience and effectiveness. Any teacher policy that aims to tackle student disadvantage should strive to allocate quality teachers, and not just more teachers, to underserved students. [p. 13]

It also says that more must be done to better support teachers in disadvantaged schools:

> Much can be done during initial training and, later, through mentoring and bespoke professional-development opportunities, to equip teachers with the skills needed to work in disadvantaged schools and with an understanding of the social contexts of those schools and their students. Supporting teachers in their most challenging tasks could also help ensure that experienced teachers remain in the profession. [p. 13]

The Commonwealth and state and territory governments must take up this challenge.