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Measuring student progress

A state-by-state report card

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This report was written by Dr Peter Goss, Grattan Institute School Education Program Director, Julie Sonnemann, School Education Fellow, and Owain Emslie, Associate.

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Overview

Australia puts too much emphasis on students' achievement at different points of time in their schooling, and not enough on students' progress over the course of their schooling. This report provides a systematic state-by-state comparison of student progress in NAPLAN. The results are surprising and should help policy makers identify the teaching and school policies and practices that produce the best results for students.

NAPLAN does not capture everything that matters in school education, but it is the only test in Australia that enables us to compare student progress across every school. Using Grattan's equivalent year level measure for interpreting NAPLAN, and adjusting for the fact that some states are more advantaged than others, this report reveals important differences in the rates of progress among states and territories.

Queensland is the star performer in primary school. On a like-for-like basis, Queensland primary school students make two months more progress in reading than the national average between Year 3 and 5, and about one month more progress in numeracy.

NSW is great at stretching advantaged students in secondary school, but not so good at supporting disadvantaged students. Victoria is the reverse. Students in disadvantaged Victorian schools make on average four months more progress than the national average from Year 7 to Year 9, while advantaged students could be stretched further.

Northern Territory and Tasmanian schools are perennially labelled as under-performers, but this report shows that their student progress broadly matches student progress in similar schools in other states.

The ACT is the worst performer. On a like-for-like basis, its students make two to three months less progress than the national average in both primary and secondary school.

The most worrying pattern is that students in low-achieving schools make only half the progress in numeracy from Year 7 to Year 9 as students in high-achieving schools, and 30 per cent less progress in reading. Most of these low-achievement, low-progress schools are also disadvantaged. This challenges the idea that high-achieving schools are cruising and make the slowest growth.

While some disadvantaged schools beat the odds, many deliver a lot less than a year's worth of growth each year. States must find a way to boost learning in these schools if Australia is to reach the Gonski 2.0 goal of 'at least a year of growth for every student every year'.

State-to-state differences get less attention than school sector, location or size. Yet these other factors are poor predictors of student progress, once school advantage is taken into account. Knowing whether a student attends a government, Catholic or independent school gives virtually no guidance on how fast they will progress in NAPLAN. Low rates of progress in regional and rural schools are mainly explained by high levels of disadvantaged students. And whether a student goes to a big or small school has little relationship to how well they will learn.

State and territory governments should explore why students make more progress in some states than others, and if specific government policies or programs contribute to these outcomes. Policy makers should collect better data on teaching so they can make the links between government policy, what teachers do in practice, and student progress. States and territories must then learn from one another, while facing up to their own weaknesses and building on their own strengths.

Becoming an adaptive education system means learning from what works best. No state or territory has all the answers to providing the best education for our children.

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Recommendations

Recommendation 1: The Education Council should improve national reporting on state comparisons of student progress

The federal government should improve its annual reporting of NAPLAN (National Assessment Program – Literacy and Numeracy) results so that state comparisons are easier to interpret. NAPLAN gain scores should be replaced by a better measure, for example the 'Years of Learning Progress' metric used in this report. And the impact of educational advantage should be taken into account, so that state comparisons can be made on a like-for-like basis.

Recommendation 2: The Education Council should commission research on why some states make above / below average progress in some areas

Pockets of above- and below-average student progress should be identified and explored to understand the impact of state government policies or programs, and whether they should be adopted or avoided elsewhere.

Key findings to explore are that from 2010 to 2016:

- Queensland is making more student progress at primary level, in both numeracy and reading.
- NSW is stretching secondary students at the top, with very high student progress among more advantaged groups of students, especially in numeracy.
- Victoria is supporting students at the bottom, with higher than expected student progress at less-advantaged schools.
- The ACT is consistently making progress below the national average at both primary and secondary levels on a like-for-like basis.

Recommendation 3: State governments should focus more on lifting progress in low achieving, disadvantaged schools

To deliver on Gonski 2.0's goal that 'every student makes *at least* a year of progress every year', state governments should give priority to low-achieving, disadvantaged schools which make the lowest growth across the system.

Recommendation 4: State governments should collect better information on teaching quality

Outcomes benchmarking is useful, but it doesn't tell us about why outcomes differ. State governments need to more systematically collect data on teaching effectiveness, so they can better understand the links between government policy, what teachers do in the classroom, and student progress.

1 We need to focus more on student progress

Australia puts too much emphasis on student achievement at a point in time, and not enough on students' *progress* over the course of their schooling. This report shows how students are progressing in different states, sectors and locations. The results give policy makers a clearer picture of what's happening in our schools, and what should be done to improve student outcomes.

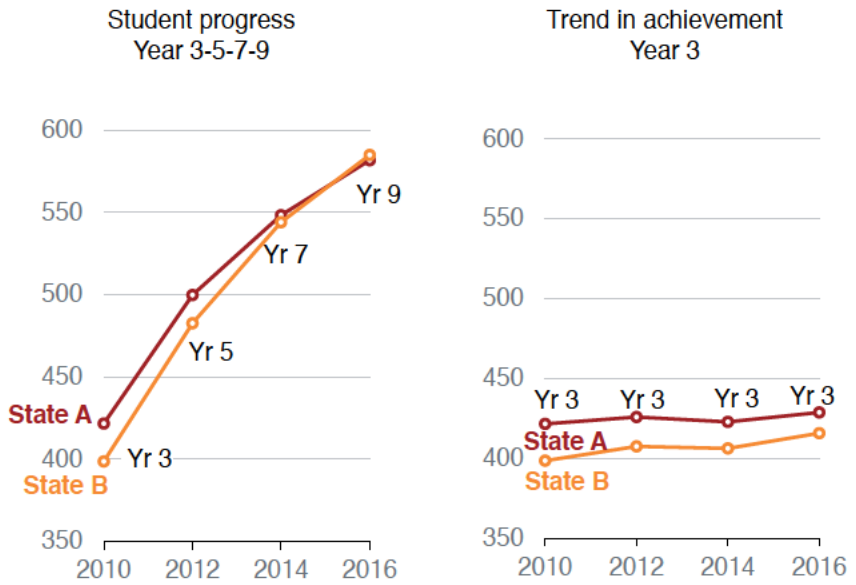
1.1 Progress tells us more about the contribution schools make to student growth

The best schools in Australia are not those with the highest NAPLAN scores. The best schools are those that enable their students to make the greatest progress in learning. Wherever a student starts from on the first day of the year, he or she deserves to have made at least a year's worth of progress by the end of it.[1]

Student progress measures tell us how much the same cohort of students has improved from one point to the next (for example their learning growth from Year 3 through to Year 9), as seen on the left-hand side of Figure 1.1. This should not be confused with trends in student achievement, which simply show how the results of a given year level (for example, Year 3) change over time, as seen on the right-hand side of Figure 1.1.

Progress measures tells us more about the value the school adds, because they indicate what learning takes place in the classroom. Achievement measures are more likely to reflect the influence of a student's family background.[2]

Figure 1.1: Progress shows how much the same students learn as they move through school; achievement trends show year level results over time
NAPLAN scale score



Source: ACARA (2017a).

1. Grattan Institute has published several reports on student progress, see Jensen et al. (2010), Goss and Sonnemann (2016a) and Goss et al. (2015).
2. Jensen et al. (2010, p. 7); Braun (2005); Choi et al. (2005); and McCaffrey et al. (2004).

Student progress can be measured in a variety of ways, with varying degrees of specificity and sophistication, discussed further in Appendix A.

1.2 Progress comparisons matter for good policy making

Student progress data helps governments and system leaders do their jobs better. It shows which groups of students are making adequate progress each year, and which are not. This helps governments target support to where it is needed most, before poor performance becomes entrenched.[3]

Progress comparisons also help governments identify 'what works' in school education. If policy makers know where progress is faster than expected, they can look at what specific practices, policies or programs might be contributing to high rates of student growth.[4]

State and territory progress comparisons – the focus of this report – can prompt questions about state or territory government policies and programs that might be enhancing or impeding student growth.

And state progress comparisons help the public to understand if governments are doing their jobs well. Test results are often used to hold teachers and school leaders to account. Student growth measures can be used to hold governments to account.

1.3 National reporting focuses too little on progress

A great virtue of NAPLAN (the National Assessment Program – Literacy and Numeracy) is that it enables comparisons of student achievement *and* progress. Students sit the test every two years, so their learning can be tracked as they move through school. NAPLAN was introduced in 2008, so several cohorts of students have now completed all four tests (in Years 3, 5, 7 and 9).

It's a rich dataset. But too little attention is paid to student progress. The NAPLAN national reports focus mainly on achievement. Public discussion and media attention also tends to focus on small changes in state achievement results from year to year.

1.4 NAPLAN 'gain scores' are difficult to interpret

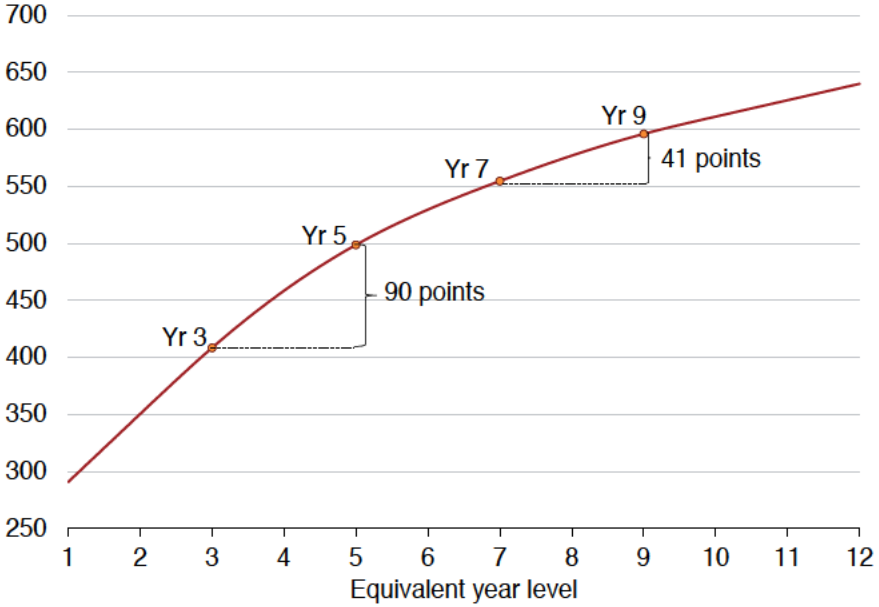
Even where national reporting *does* focus on student progress, it is difficult to interpret and use. The national NAPLAN report uses 'gain scores' and 'student cohort gain' to show progress.[5] NAPLAN gain scores make it hard to compare the progress of groups of students who are at different stages of their learning. This is because students typically learn at different rates at different stages.

This point is shown in Figure 1.2 on the following page. The typical student gains 90 points between Year 3 and Year 5, but 41 points between Year 7 to Year 9. Gain scores are generally higher in the early years of schooling than the later years.[6] For this reason, the non-linear rate at which students progress in NAPLAN should be taken into account when comparing the relative progress of different student groups. If it is not, it can be easy to misinterpret NAPLAN gain scores to mean that students who are behind in their learning are catching up to their peers in NAPLAN points, when in effect they may be falling further behind.

3. Goss and Sonnemann (2016a).
4. Discussed in Goss (2017).
5. ACARA (2017c).
6. The Australian Curriculum, Assessment and Reporting Authority (ACARA) notes that 'Students generally show greater gains in literacy and numeracy in the earlier years than in the later years of schooling, and . . . students who start with lower NAPLAN scores tend to make greater gains over time than those who start with higher NAPLAN scores'. ACARA (2016, p. 5).

Figure 1.2: The typical student learns at different rates at different stages of school

Average NAPLAN score by year level, numeracy, 2010-2017

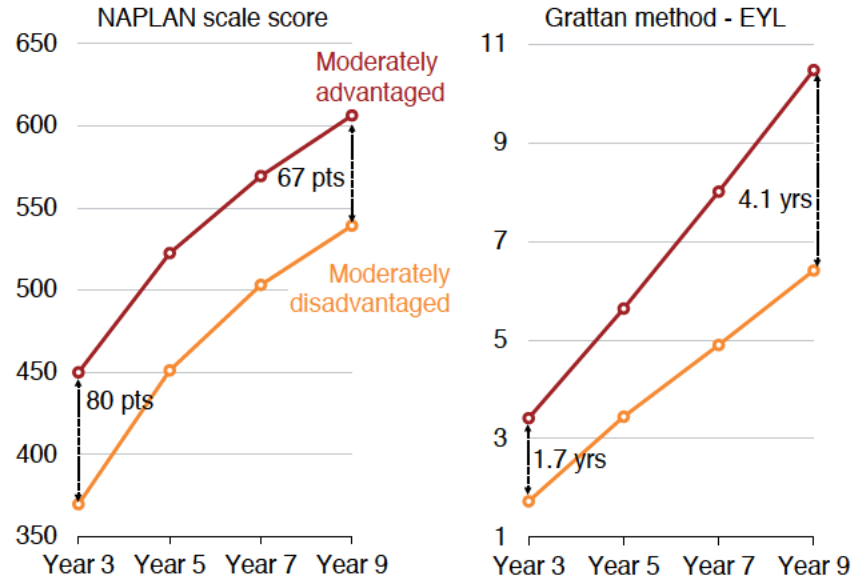


Notes: Curve fitted to NAPLAN mean scores for metropolitan non-indigenous students. Dots represent mean scores.

Source: Grattan analysis of ACARA (2017a).

Figure 1.3: NAPLAN scale scores show student learning gaps are narrowing; but Grattan's EYL measure shows they are widening

Average achievement in NAPLAN scale score (LHS) or Equivalent Year Level (RHS), by year level, reading, 2010-2016



Notes: 'Moderately advantaged' refers to schools with ICSEA between 1075-1124; around one standard deviation above the mean.'Moderately disadvantaged' refers to schools with ICSEA between 875-924; around one standard deviation below the mean. ICSEA is the Index of Community Socio-Educational Advantage.

Source: Grattan analysis of ACARA (2017b).

This point is illustrated in Figure 1.3 on the previous page which compares the progress of students at disadvantaged and advantaged schools between Year 3 and Year 9 using two different methods. The chart on the left-hand side makes the comparison using NAPLAN scale scores, where it can be seen that the gap in NAPLAN points between the two groups narrows between Year 3 and Year 9, giving the impression that disadvantaged schools are catching up to advantaged schools over time.

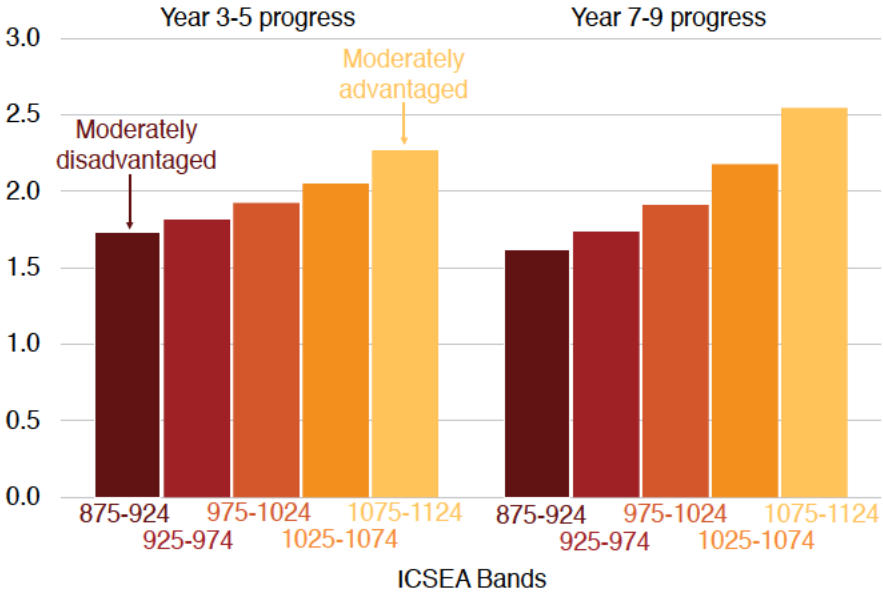
But in the chart on the right-hand side, which takes into account the non-linear rate of student learning (using our 'Equivalent Year Levels' metric, explained below), it can be seen that the gap between disadvantaged and advantaged schools is actually widening. Students at disadvantaged schools fall further behind their peers as they move through school. This interpretation cannot be easily seen when NAPLAN gain scores are used.

While some states and territories have developed specific progress measures to avoid the traps of NAPLAN gain scores, federal public reporting still relies heavily on the gain scores in making state comparisons.[7]

This report compares student progress across Australia in a way that avoids the pitfalls of NAPLAN gain scores. It uses a new measure for interpreting NAPLAN data, 'Equivalent Year Levels', first developed in our 2016 report *Widening Gaps*.[8] Our methodology is explained in Box 1 on page 13, with more detail in the *Measuring student progress Technical Report*.[9]

7. For example, the Victorian Curriculum and Assessment Authority (VCAA) has developed a relative growth measure which helps in understanding if student progress is adequate relative to others with similar levels of prior achievement. The NSW government uses a similar approach with its 'SMART' tool.
8. Goss and Sonnemann (2016a).
9. Goss and Emslie (2018).

Figure 1.4: More advantaged schools tend to make more progress
Progress, numeracy, 2010-12 to 2014-16 cohorts, years



Notes: ICSEA is the Index of Community Socio-Educational Advantage. ICSEA band 975-1024 is the average level of advantage. ICSEA band 1075-1124 is moderately advantaged; around one standard deviation above the mean. ICSEA band 875-924 is moderately disadvantaged; around one standard deviation below the mean.

Source: Grattan analysis of ACARA (2017b).

1.5 State progress comparisons should be like-for-like

Our analysis gives insight on the impact of a student's background on their learning progress. It is well established that student family and socio-economic background has a considerable influence on achievement, but less is known about its influence on progress.[10]

10. The impact of student background on achievement is seen in PISA. OECD (2012a, p. 16). In addition, a number of Australian studies show the link, see ABS (2014) and ABS (2011).

We find that 'school advantage' accounts for about 20-to-30 per cent of the school-level variation in student progress results in NAPLAN.[11] 'School advantage' is defined as a combination of a school's parents' occupation and education levels, remoteness, and the proportion of Indigenous students. In educationally advantaged schools, student progress is typically much higher. As Figure 1.4 on the previous page shows, over a two-year period students at moderately advantaged schools make around six months more progress at primary, and around 11 months more at secondary, than students attending moderately disadvantaged schools.[12]

Federal NAPLAN reporting of state progress does not always account for educational advantage, making comparisons difficult to interpret.[13]

1.6 Focus of this report

Our analysis shows a clear picture of student progress across Australia. To do so, it makes two key adjustments when using NAPLAN data. First, we avoid using NAPLAN gain scores by using a different methodology. And second, we take the influence of student family background into account so that comparisons are on a like-for-like basis (see Box 1 on the following page).

Chapter 2 explains why state progress comparisons matter, and shows that states differences are large compared to other characteristics such as school sector, size or location. Chapter 3 shows the patterns of student progress by state and territory. Chapter 4 shows why improving disadvantaged schools needs to be a national priority.

Chapter 5 discusses the next steps, and calls on state governments to do more work on analysing student progress, including a triangulation of NAPLAN results against other assessments, as well as gathering better information on teaching effectiveness.

11. See Appendix B. Our analysis uses student family background data at a school level.
12. The pattern is consistent across the NAPLAN domains of literacy, numeracy and writing.
13. For example, recent national NAPLAN reports show 'student cohort gain scores' for states and territories without accounting for differences in educational advantage. ACARA (2017c, pp. 326–352).

Box 1: Methodology used in this report

This report compares student progress in each state and territory. We use measures of progress developed in our 2016 report, Widening Gaps. These measures take account of the fact that students typically increase their NAPLAN scores more in the early years of school than in the later years.

Our first measure, 'Equivalent Year Level' (EYL), translates student NAPLAN scores into the year level in which the typical student would be expected to achieve a given NAPLAN score. Our second measure, 'Years of Learning Progress', shows student progress for a given cohort by comparing the difference in EYL over a given time-frame.

To estimate the rate at which the typical student moves through school, we use a reference curve based on national mean score NAPLAN data for metropolitan non-Indigenous students between 2010 and 2017.[a]

Our analysis then compares the results of states and territories to the national average. We use NAPLAN school-level mean scores from 2010 to 2016, and the results of five student cohorts for each school (*i.e.* 2010-12, 2011-13, 2012-14, 2013-15 and 2014-16) to capture consistent findings. The dataset was provided by ACARA. The data includes all students who sat for two successive NAPLAN tests at the same school.[b]

We use a type of value-added modelling which accounts for differences in school educational advantage to better isolate the school contribution.[c] The Index of Community Socio-Educational Advantage (ICSEA) is used to estimate school educational advantage. It is based on four factors: parental education levels, parental occupation, school geographic location, and the proportion of Indigenous students.[d] The ICSEA scale has a mean of 1000, and a standard deviation of 100, with most students attending schools with ICSEA scores from 800 to 1200.

Our analysis includes around 85 per cent of students at schools with ICSEA scores between 875 and 1124; schools with very low or very high ICSEA scores are excluded because they can have very low or very high NAPLAN scores which are hard to translate into EYL with sufficient accuracy to measure student progress.[e]

A key limitation of our analysis is that it does not use student-level NAPLAN data. This is because student-level data and school advantage data cannot be accessed from ACARA at the same time. If student-level data were used, the findings may be different and some bias may be removed. However, our internal analysis shows that comparisons of student learning progress are much less sensitive to a lack of student-level data than comparisons of achievement.

For more detail on our methodology, see the Technical Report.

a. 'Metropolitan non-Indigenous students' were used for two reasons: to make the national benchmark a group of students with no aggregate educational disadvantage; and to increase the reach of our analysis. A different reference curve is estimated for each NAPLAN domain, explained in Chapter 3 of the Technical Report. The national reference curves are available on our website at https://grattan.edu.au/report/measuring-student-progress/.
b. In most states this represents between 75 and 80 per cent of students at both primary and secondary level who participated in NAPLAN. For these groups of students, the data includes the mean NAPLAN score for a school at the start and end of the period.
c. We use a 'two-way' analysis that removes the effect of educational advantage, but does not remove the effect of other confounding factors, for example a higher proportion of students with a non-English speaking background in a given state. As a check, we have confirmed that key results also hold true once the effect of all other factors has been removed, via a multiple regression analysis.
d. ACARA (n.d.[a]).
e. Sensitivity testing shows that our findings still hold if a narrower or wider range of ICSEA scores are used, or a different number of bands.

2 There are big differences between the states on student progress

This chapter shows how student progress varies according to four factors: state, sector, size, and remoteness. After taking account of school advantage (as discussed in Box 1 on the previous page),[14] state matters more than sector, size or remoteness to student progress.

2.1 Student progress varies a lot by state

Figure 2.1 on the following page shows that student progress differs a lot more by state than by the other three factors. The best states make up to four months more progress across two years of schooling compared to the worst at primary level, and up to six months more progress at secondary level. Many of these differences are consistent from year to year (see Box 2 on page 18). Some states do better in some subjects than others. For example, Victoria does better in writing and less well in reading and numeracy.

2.2 School sector, size and remoteness matter less

School sector is commonly thought of as a major source of difference in school performance. But there are only modest differences after allowing for school advantage, as seen in Figure 2.2 on page 16. The average progress made by students in private versus public schools differs by at most only around one month across two years of primary schooling, and no more than two months across two years of secondary schooling, as seen in Figure 2.3 on page 16.

Likewise, there are few differences in student progress between country and city schools once school advantage is taken into account. Metropolitan students make more progress on average, but almost all this difference is explained by socio-economic factors, as seen in Figure 2.4 on page 17.[15] Similarly, school size has little impact in general, although smaller secondary schools appear to do slightly better, as seen in Figure 2.5 on page 17.[16]

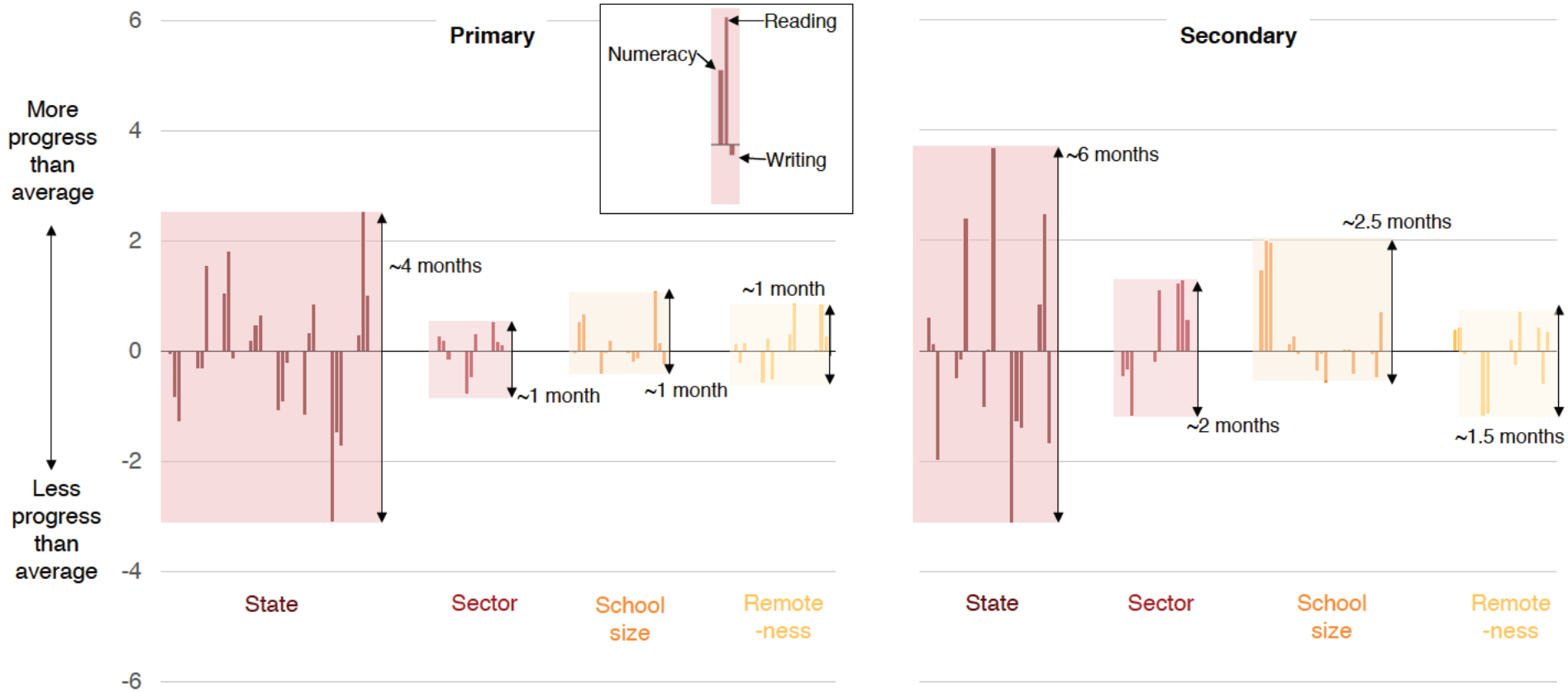
2.3 More research is needed on school-level factors

Specific school-level factors could be driving differences in student progress, but are not analysed in this report given data limitations. School-level factors include better teaching, leadership, or simply a more motivated student cohort. They could also involve school characteristics arising from state government policies, for example curriculum materials.

Our preliminary analysis shows school-level factors are twice as important as school advantage to student progress (see Appendix B). More research should be done on what drives school success in Australia.[17] State governments should also collect more information on teaching practices, discussed in Chapter 5.[18] Too little is known about what is happening in schools at present.

14. This approach is conceptually similar to the 'like-schools' comparisons available on the My School website (ACARA (n.d.[b])). However, our approach enables groups of schools to be compared, rather than just school-by-school comparisons.
15. There is a risk of over-correcting for rurality in the remoteness analysis, because rurality appears in both the ICSEA measure and our remoteness grouping. However the risk is small given remoteness makes only a small contribution in the ICSEA calculation, adding less than 0.1 per cent to the power of ICSEA to explain student achievement. Barnes (2010, p. 18).
16. At secondary level, schools with less than 50 Year 7 students consistently make around two months more progress across two years than the national average, in numeracy, reading and writing.
17. For example, the NSW Centre for Evaluation Statistics and Evaluation (CESE) used school value-add modelling to identify outperforming schools and then studied them to observe school practices. CESE (2015).
18. Goss and Sonnemann (2016b).

Figure 2.1: State has a bigger impact on student progress than sector, school size, or remoteness
Relative progress, adjusted for ICSEA, vs national average, numeracy, reading and writing, multiple cohorts, months

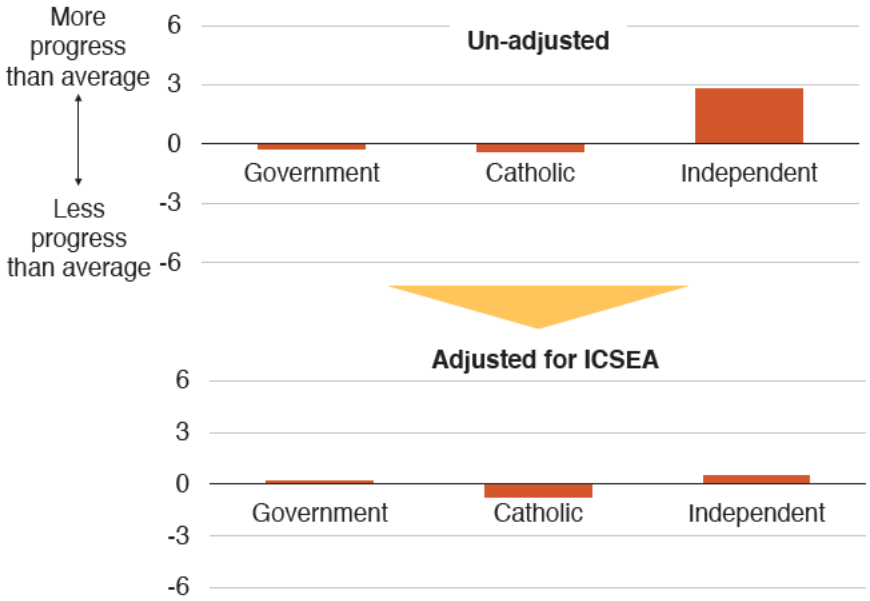


Notes: Each bar represents a given sector and subject area, e.g. *NSW numeracy. Each set of three bars represents numeracy, reading and writing progress for that group of schools. Numeracy and reading include the 2010-12 to 2014-16 cohorts. Writing includes the 2011-13 to 2014-16 cohorts. Differences between a category's* (i.e. *a state, sector, school size band or remoteness level) mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the category. For secondary, only five jurisdictions are shown, because Year 7 was part of primary school in Queensland, Western Australia and South Australia for the period of our analysis.*

Source: Grattan analysis of ACARA (2017b).

Figure 2.2: Taking school advantage into account, student progress in independent primary schools' in numeracy is marginally higher than average

Relative progress from Year 3 to Year 5, unadjusted and adjusted for ICSEA, vs national average, numeracy, 2010-12 to 2014-16 cohorts, months

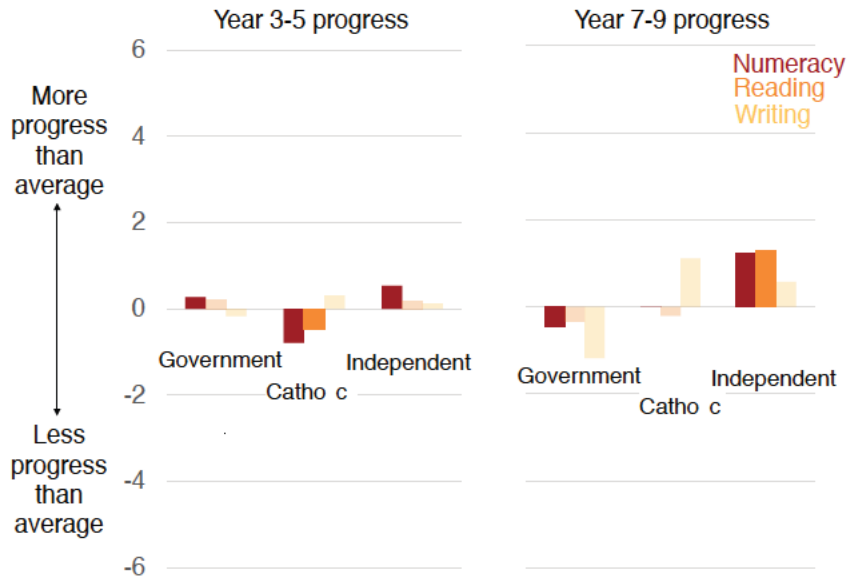


Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Differences between a sector's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the sector. Comparisons of student progress by school sector include only three ICSEA bands: 975-1024, 1025-1074 and 1075-1124, because very few Catholic and independent schools have ICSEA lower than 975.

Source: Grattan analysis of ACARA (2017b).

Figure 2.3: After adjusting for school advantage, students make similar rates of progress in all three sectors

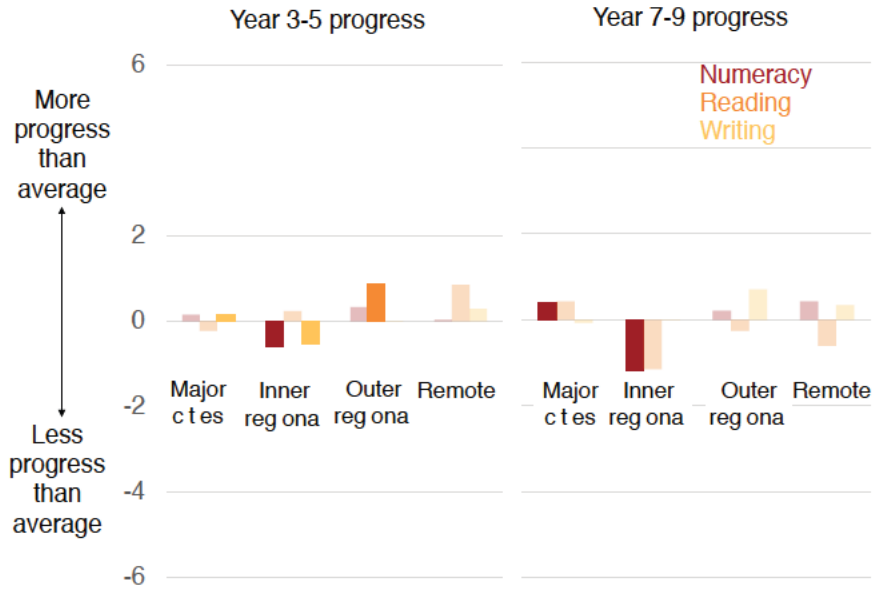
Relative progress, adjusted for ICSEA, vs national average, multiple cohorts, months



Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Numeracy and reading include the 2010-12 to 2014-16 cohorts. Writing includes the 2011-13 to 2014-16 cohorts. Differences between a sector's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the sector. Comparisons of student progress by school sector include only three ICSEA bands: 975-1024, 1025-1074 and 1075-1124, because very few Catholic and independent schools have ICSEA lower than 975.

Source: Grattan analysis of ACARA (ibid.).

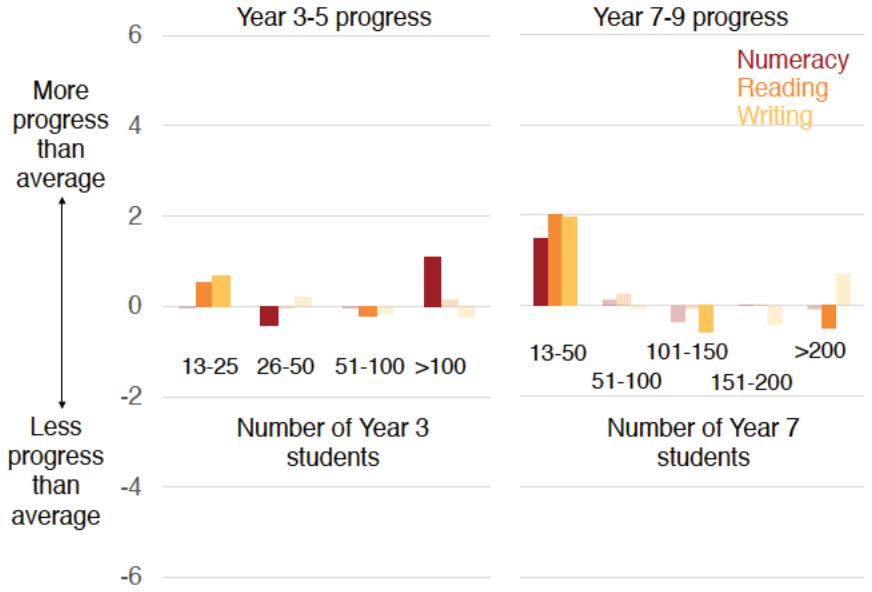
Figure 2.4: Country school students make similar progress to students in city schools
Relative progress, adjusted for ICSEA, vs national average, multiple cohorts, months



Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Numeracy and reading include the 2010-12 to 2014-16 cohorts. Writing includes the 2011-13 to 2014-16 cohorts. 'Very remote' schools are excluded from this analysis, as student numbers are very small, so results are volatile. Differences between a remoteness level's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the remoteness level. Note there is a small risk of over-correcting for rurality in the above analysis given rurality appears in both the ICSEA measure and our remoteness grouping.

Source: Grattan analysis of ACARA (2017b).

Figure 2.5: Whether a student goes to a big school or a small school has little relationship to how well they will learn
Relative progress, adjusted for ICSEA, vs national average, multiple cohorts, months



Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Numeracy and reading include the 2010-12 to 2014-16 cohorts. Writing includes the 2011-13 to 2014-16 cohorts. Differences between a school size band's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the school size band. Excludes schools with less than 13 sitting the NAPLAN test in year 3 and year 5, or year 7 and 9, due to volatility in mean NAPLAN scores for these schools.

Source: Grattan analysis of ACARA (ibid.).

3 The picture of progress by states and territories

No one state or territory excels in all subjects; all can learn from each other. But there are some pockets of high and low performance, which could provide lessons for policy makers on what does and does not work in schools.

3.1 Key results

No one state or territory has significantly above-average progress in all three areas of numeracy, reading and writing, at either primary (Figure 3.1 on the following page) or secondary level (Figure 3.2 on the next page). But some states excel in specific areas.

At primary level, Queensland schools have significantly above-average rates of student progress in both numeracy and reading, once student background is taken into account.

By contrast, the ACT consistently makes the least progress of all states and territories, at both primary and secondary level, compared to similar schools in other states.[19]

Victoria generally does a better job of supporting less-advantaged students, while NSW does a better job of stretching more-advantaged students.

Contrary to common perceptions, Tasmania or Northern Territory do not under-perform, once school advantage is taken into account.[20]

How we identified key findings is explained in Box 2.

19. Our analysis does not cover very advantaged schools which educate around one third of students in the ACT. However, Appendix D suggests that the low relative progress continues to hold true for ACT schools with higher ICSEA.
20. Our analysis does not cover highly disadvantaged schools (schools with an ICSEA of less than 875), which represents around 34 percent of students in Northern Territory compared with 2 per cent nationwide.

Box 2: How key findings are identified

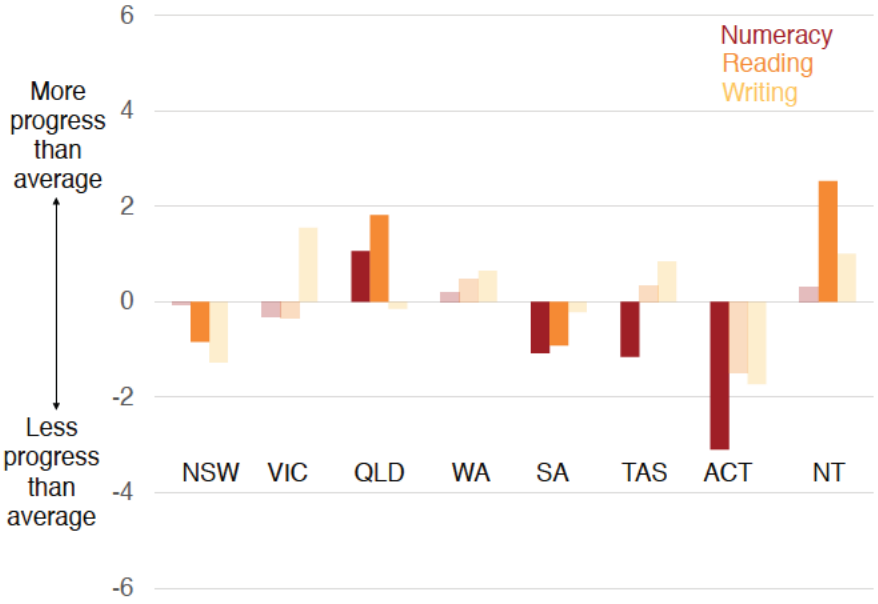
This chapter highlights findings that are consistent over time and reliable. We report results that are statistically significant, meaning they are unlikely to occur by chance.

We apply a statistical test to confirm that the average student progress for a state is significantly different from the national average, based on pattern of over- or under-performance across five student cohorts. We define a high standard for 'significant'; a state will usually have student progress rates that are higher (or lower) than the national average in *every* one of the five student cohorts examined between 2010 and 2016.

In addition, weight is given to findings that fall just short of the significance standard but have clear patterns which imply they are unlikely to be happening by chance. For example, a meaningful pattern could involve a state having insignificant results that are consistently below average at all levels of advantage, school sectors, subject areas, or year levels. Results must also hold true once the effect of all other factors has been removed.[a]

a. The effect of other factors is tested through a multiple regression analysis explained further in the Technical Report.

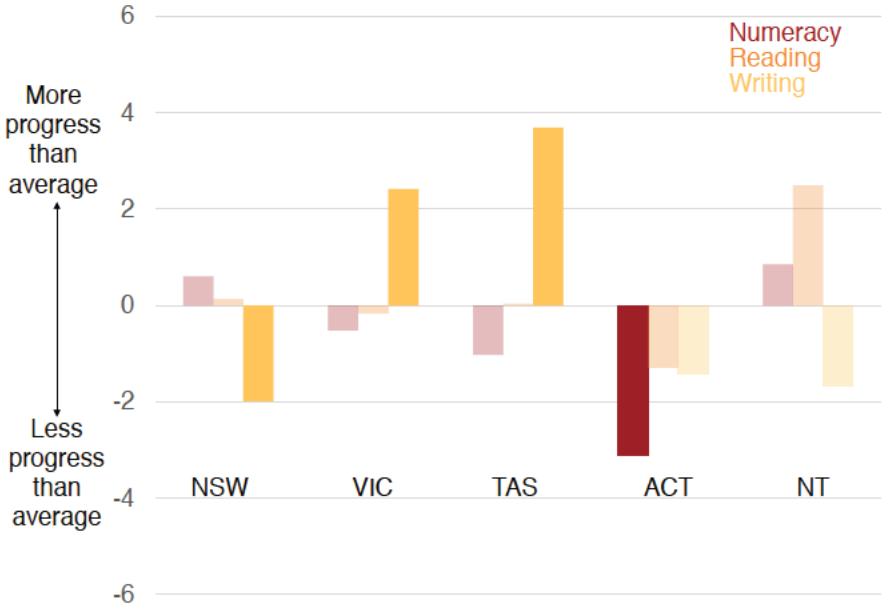
Figure 3.1: At primary schools, no one state excels in numeracy, reading and writing progress
Relative progress from Year 3 to Year 5, adjusted for ICSEA, vs national average, multiple cohorts, months



Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Numeracy and reading include the 2010-12 to 2014-16 cohorts. Writing includes the 2011-13 to 2014-16 cohorts. Differences between a state's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the state. Schools with ICSEA below 875 and above 1124 are not covered in our analysis, which represent around one third of schools in the ACT and NT.

Source: Grattan analysis of ACARA (2017b).

Figure 3.2: At secondary schools, no one state excels in all domains
Relative progress from Year 7 to Year 9, adjusted for ICSEA, vs national average, multiple cohorts, months



Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Numeracy and reading includes the 2010-12 to 2014-16 cohorts. Writing includes the 2011-13 to 2014-16 cohorts. Differences between a state's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the state. For secondary, Queensland, Western Australia and South Australia are excluded, because in those states Year 7 was part of primary school for the period of our analysis. Schools with ICSEA below 875 and above 1124 are not covered in our analysis, which represent around one third of schools in the ACT and NT.

Source: Grattan analysis of ACARA (ibid.).

3.2 At primary, Queensland consistently makes more progress in reading and numeracy

Queensland primary schools make above-average progress in numeracy and reading, once student background is taken into account. Figure 3.1 on the previous page shows Queensland primary schools make, on average, one month more progress than the national average in numeracy, and two months in reading, across the two years of schooling between Year 3 and Year 5.[21]

This is true for schools at varying levels of educational advantage (*i.e.* across the five ICSEA bands), as shown in Figure 3.3 on the following page. Queensland students also made above-average progress in each of the five cohorts, as shown in Figure 3.4 on the next page. This story is consistent across all school sectors (government, Catholic and independent), although it is most obvious for government schools.

The distinctive features of the Queensland primary system should be studied to identify policies or programs that could be contributing to these high rates of progress. As a starting point, the biggest drivers of student outcomes outside of the home should be explored, including the teaching practices, curriculum and school leadership. Some specific areas to explore are discussed in Box 3. Queensland's high rates of progress were consistently above the national average from 2010-2016, as seen in Figure 3.4 on the next page, which suggests that any contributing factors are likely to have been in place before 2010.

Queensland made major reforms to early childhood education and prep in 2007/08, although these are unlikely to explain the state's above-average primary-level student progress given their timing. They were gradually phased in and not fully implemented in time to impact

21. The Northern Territory has even higher rates of primary-level student progress in reading, but not in numeracy. This report gives more emphasis to findings seen in both subjects.

Box 3: Why do Queensland primary students make stronger progress?

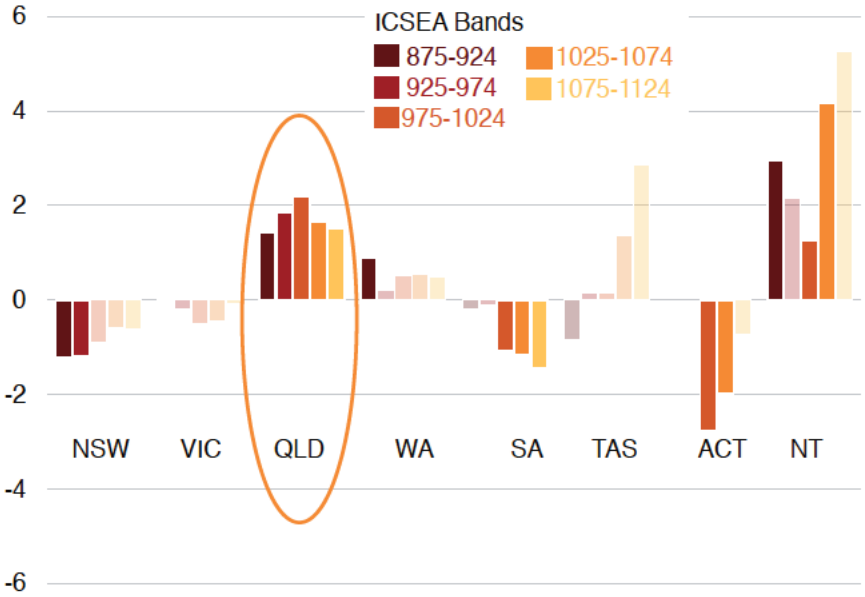
Researchers should start by exploring the big drivers of student outcomes, such as teaching, curriculum, and school leadership, alongside the distinctive features of Queensland's system, which include but are not limited to:

- **A focus on NAPLAN following the 2008 shock.** The first NAPLAN tests in 2008 gave a big shock: they showed Queensland as the second lowest achieving state behind the Northern Territory. Since then there has been a heavy public focus on improving the state's NAPLAN results. This may have flowed through to schools, teachers and students.
- **Strategy to lift primary literacy and numeracy, 2009**. Following the 2008 NAPLAN shock, the Queensland Government commissioned a major review of primary literacy and numeracy. Changes included lifting standards for teacher professional development and new specialist coaches.[a]
- **Teacher collaboration on student assessment**. Queensland has unique opportunities for teachers to work together on grading student work, known as 'moderation'. Queensland puts greater focus on internal assessment at senior secondary schools than do other states and territories[b]
- **Initial teacher education**. Queensland's higher rates of progress are seen in all three sectors. Initial teacher education prepares teachers who work in all sectors. Queensland's initial teacher education should be studied to identify any outstanding program practices.

a. Masters (2009).
b. 'Moderation' mainly happens at senior secondary, but it may influence teachers to focus on student assessment at other year levels.

Figure 3.3: Queensland primary schools make strong reading progress on average in Year 3-5

Relative progress from Year 3 to Year 5, vs national average within ICSEA bands, reading, 2010-12 to 2014-16 cohorts, months

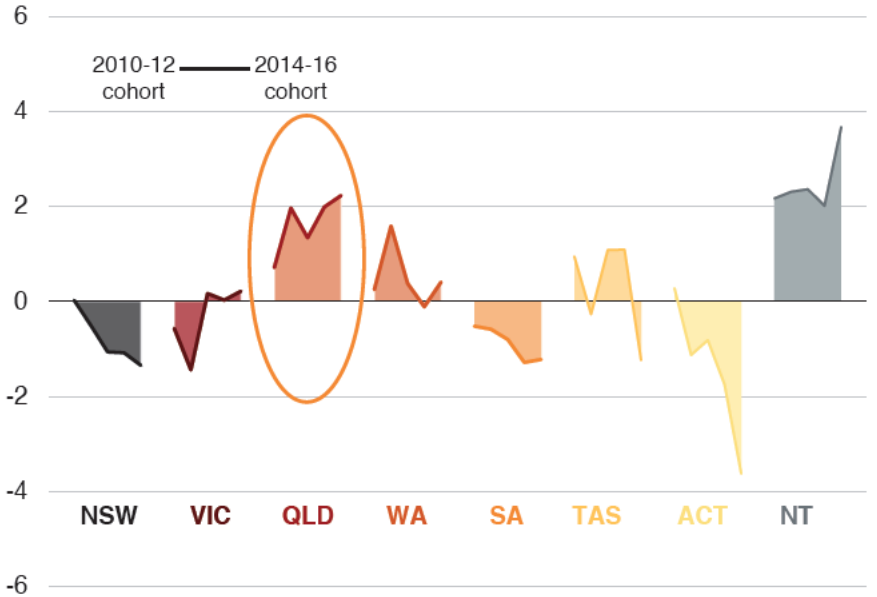


Note: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. ICSEA is the Index of Community Socio-Educational Advantage. ICSEA band 975-1024 is the average level of advantage; ICSEA band 1075-1124 is moderately advantaged; ICSEA band 875-924 is moderately disadvantaged.

Source: Grattan analysis of ACARA (2017b).

Figure 3.4: Queensland's strong progress in primary reading is consistent across multiple student cohorts from 2010 to 2016

Relative progress from Year 3 to Year 5 , adjusted for ICSEA, vs national average, reading, 2010-12 to 2014-16 cohorts, months



Notes: Differences between a state's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the state.

Source: Grattan analysis of ACARA (ibid.).

students reaching Year 3 in 2010 (when Queensland's above average rates of progress were first seen). This issue is further discussed in Appendix C.

3.2.1 ACT and South Australian primary schools make the least progress

Students at ACT and South Australian primary schools consistently make less progress in numeracy and reading compared to similar schools in other states, as seen in Figure 3.1 on page 19.[22]

Figure 3.5 on the next page and Figure 3.6 on the following page show the spread of ACT and South Australian schools in average rates of student progress for numeracy, compared to the spread of all schools in Australia. The ACT and South Australia are consistently at the lower end of the national spread. They have very few high-performing schools, even among educationally advantaged schools.[23]

On average, ACT primary students made around three months less progress than the national average in numeracy, and about 1.5 months less progress in reading, compared to similar schools in other states, between Year 3 and Year 5.

And the ACT has fallen further behind the national average in recent years. The 2010-12 cohort made around two months less progress than the national average in numeracy, and close to the national average in reading. But the 2014-16 cohort made five months less progress than the national average in numeracy, and four months less in reading. The reading trend is seen in Figure 3.4 on the previous page.

There is a similar worrying trend for the ACT in Year 3 and Year 5 achievement reading results, which sharply declined over the 2010-2016 period, seen in Figure C.1 on page 41 and Figure C.2 on page 41.

It should be noted that our results show only a part of the ACT performance, because very advantaged schools (which educate around one third of students in the ACT) are excluded.[24] However, Appendix D suggests that the low relative progress continues to hold true for ACT primary schools with ICSEA higher than 1124.

South Australian primary students made around one month less progress than the national average in numeracy and reading, as seen in Figure 3.1 on page 19. This was consistent across the five cohorts.

3.3 At secondary, no one state excels

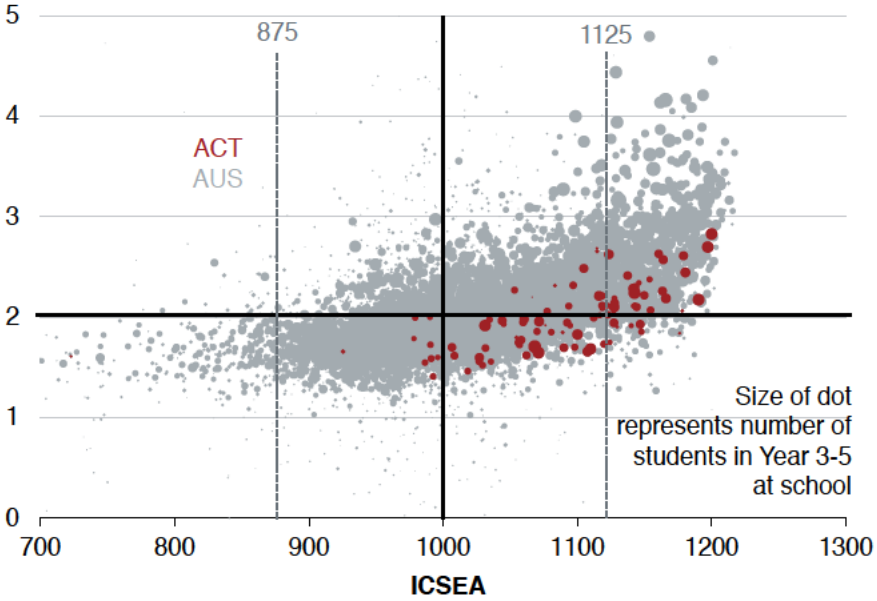
Our analysis at secondary level includes only NSW, Victoria, Tasmania, the ACT and the Northern Territory (see Figure 3.2 on page 19). In these states and territories, Year 7 has been part of secondary school during the period of our study.

The other three states – Queensland, Western Australia and South Australia – are excluded from the analysis at secondary level because they do not have sufficiently representative data for students who attended the same school for two consecutive NAPLAN tests in Year

22. The ACT reading result is not statistically significant (meaning significantly below the national average based on cohort-to-cohort analysis). But the ACT is consistently below average for each band of school advantage studied in this report, as shown in Figure 3.3 on the previous page for Year 3-5 reading. Figure 3.4 on the preceding page shows that ACT made less student progress than the national average on a like-for-like basis by a large amount for Year 3-5 reading in each of the last four student cohorts in our analysis.
23. The spread of progress for all states is shown in Appendix D.
24. Our analysis generally covers schools with ICSEA between 875 and 1124. 32 per cent of ACT students are at schools outside this ICSEA range, compared with 19 per cent in NSW, 17 per cent in Victoria, 13 per cent in Queensland, 15 per cent in Western Australia, 12 per cent in South Australia, 10 per cent in Tasmania and 35 per cent in the Northern Territory.

Figure 3.5: ACT primary students typically make less progress than students in similar schools in other states

Progress from Year 3 to Year 5, by school, numeracy, average across 2010-12 to 2014-16 cohorts, years

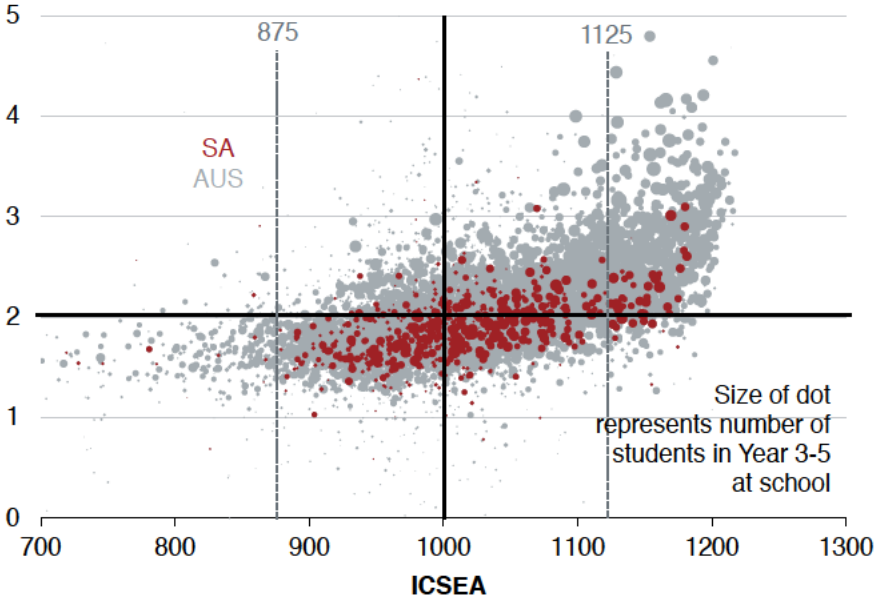


Notes: Each dot represents the average across all available cohorts for which we can accurately estimate student progress for one school. Size of dot represents the number of students sitting both Year 3 and Year 5 NAPLAN tests at the school, across all available cohorts. Includes all ICSEA ranges (analysis elsewhere in this report includes the range between 875 and 1124). A small number of schools are not shown because they are outside the range of this chart. That is, their ICSEA is below 700; or their average student progress is more than five years, or negative.

Source: Grattan analysis of ACARA (2017b).

Figure 3.6: South Australian primary schools sit in the lower part of the national spread of school performance

Progress between Year 3-5, by school, numeracy, average across 2010-12 to 2014-16 cohorts, years



Notes: Each dot represents the average across all available cohorts for which we can accurately estimate student progress for one school. Size of dot represents the number of students sitting both Year 3 and Year 5 NAPLAN tests at the school, across all available cohorts. Includes all ICSEA ranges (analysis elsewhere in this report includes the range between 875 and 1124). A small number of schools are not shown because they are outside the range of this chart. That is, their ICSEA is below 700; or their average student progress is more than five years, or negative.

Source: Grattan analysis of ACARA (ibid.).

7 and 9. In these states, year 7 was generally part of primary school, rather than secondary school, during the period of our study. This issue is discussed further in the Technical Report.

3.3.1 ACT secondary students make the least progress in numeracy compared to similar schools in other states

Before educational advantage is taken into account, ACT students have high achievement results and generally make better-than-average student progress. But ACT students are, on average, more socio-economically advantaged than students from any other state or territory. There are no remote schools in the ACT and none with high proportions of Indigenous students.

Once this relative advantage is taken into account, the ACT trails the national average considerably in student progress at both primary and secondary levels compared to similar schools in other states.[25]

Figure 3.7 on the following page shows how the picture changes once student background is taken into account. In absolute terms, ACT secondary students make the most progress in numeracy: two months more progress than the national average over two years of schooling. But compared to similar schools in other states, ACT secondary students make three months less numeracy progress than the national average over two years of schooling.[26]

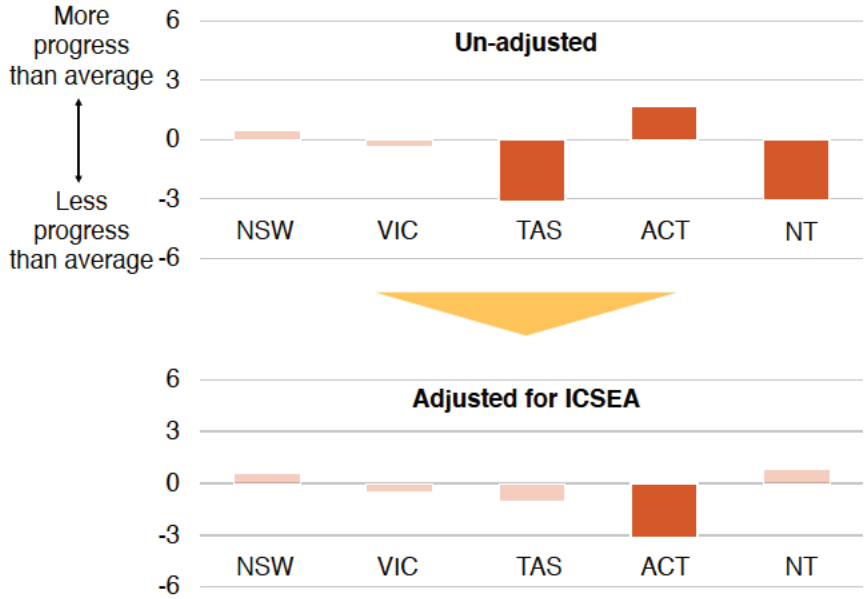
The low rates of progress in ACT secondary schools are evident across the different levels of school advantage examined in our analysis (see Figure 3.8 on the next page), and in all three sectors – government, Catholic and independent schools.

Box 4 on page 26 suggests areas that should be explored to better understand what might be driving poor performance of ACT schools.[27] These poor progress results should be a wake-up call for the ACT.

25. A similar trend emerges when looking at achievement: ACT schools achieve higher than the national average overall, but lower on an ICSEA-adjusted basis, for all three subject areas, at Year 3, 5, 7 and 9. This result is broadly consistent with previously-published results in Lamb (2017), ACT Auditor-General (2017) and Macintosh and Wilkinson (2018).
26. The story is similar at primary level, and for secondary reading.
27. We have explored the possibility of mis-measurement of ICSEA values in our analysis. Our investigation found no evidence of a significant bias in ICSEA as a measure of school advantage. It is unlikely that such a bias in ICSEA could materially influence our findings, because bias in the ICSEA values of ACT schools would need to be of the order of 20 to 40 points to cancel out our finding of low relative progress in the ACT. This is explained further in the Technical Report.

Figure 3.7: After accounting for advantage, ACT secondary schools make the least progress on numeracy

Relative progress from Year 7 to Year 9, unadjusted and adjusted for ICSEA, vs national average, numeracy, 2010-12 to 2014-16 cohorts, months

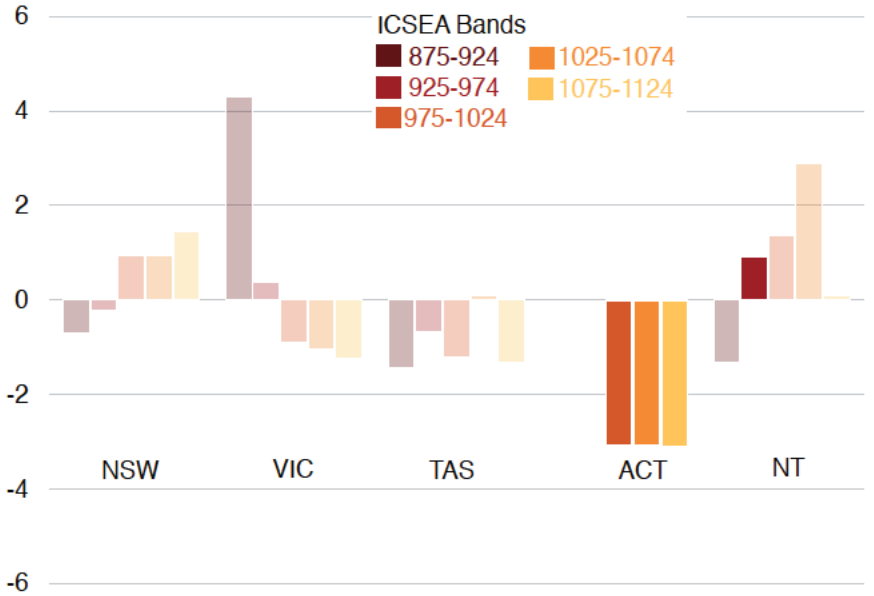


Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Differences between a state's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the state.

Source: Grattan analysis of ACARA (2017b).

Figure 3.8: The relative under performance of ACT secondary schools in numeracy occurs across a range of ICSEA bands

Relative progress from Year 7 to Year 9, vs national average within ICSEA bands, numeracy, 2010-12 to 2014-16 cohorts, months



Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. ICSEA is the Index of Community Socio-Educational Advantage. ICSEA band 975-1024 is the average level of advantage; ICSEA band 1075-1124 is moderately advantaged; ICSEA band 875-924 is moderately disadvantaged. The ACT has very few students in 875-924 and 925-974 ICSEA bands, so these bars are not shown for the ACT.

Source: Grattan analysis of ACARA (ibid.).

Box 4: Why do ACT students make less progress?

Policy makers should explore the following factors as a starting point:

- **School autonomy and school support.** The ACT, like most states and territories, have increased school autonomy. The ACT Auditor-General report (2017) recommended a better balance between individual school autonomy and consistency across schools, which should be explored further.[a]
- **Teachers' use of student data.** The ACT Auditor-General report (2017) found that many government schools are not using student performance information to adequately inform teaching and intervention strategies.[b]
- **Teaching and school leadership practices.** There is little comparative information on schooling practices, but some data show that the ACT fares less well than other Australian jurisdictions on a number of metrics, such as principal perceptions of teachers meeting individual students' needs; teachers being open to change; teacher absenteeism; and educational leadership by school principals.[c]

a. ACT Auditor-General (2017).
b. Ibid.
c. Thomson et al. (2017, Chapter 8).

3.4 Victoria better supports the bottom, NSW the top

In Australia's two largest states, Victoria does a better job of supporting less-advantaged students in their learning, while NSW does a better job of stretching advantaged students to excel.[28]

Figure 3.9 shows that in numeracy between Year 7 and Year 9, students at less-advantaged Victorian schools generally make more progress than students at less-advantaged NSW schools. But at more-advantaged schools, NSW students generally make more progress than students at more-advantaged schools in Victoria. Similar trends are evident for numeracy 3-5, reading 7-9 and writing 7-9.

This pattern is also visible when we look at student achievement levels. Students in Victoria whose parents did not complete Year 12 are around five months ahead of similar students in NSW by Year 9 in numeracy. By contrast, Victorian students from highly educated families (parents have a bachelor degree or higher) are about ten months behind their NSW peers by Year 9.

Our results are similar to findings from international data. The different social gradients for NSW and Victoria are also observed in the Program for International Student Assessment (PISA) reports for both mathematical and scientific literacy.[29]

Figure 3.9: NSW is better at stretching students in high-advantage schools, while Victoria is better at supporting students in low-advantage schools

Progress from Year 7 to Year 9, numeracy, 2010-12 to 2014-16 cohorts, years

Notes: The trendlines are lines of best fit across the five data points shown on each chart. ICSEA is the Index of Community Socio-Educational Advantage. ICSEA band 975-1024 is the average level of advantage; ICSEA band 1075-1124 is moderately advantaged; ICSEA band 875-924 is moderately disadvantaged.

Source: Grattan analysis of ACARA (2017b).

28. For other states, the social gradient is not clearly different to the national average, which could be partly due to smaller volumes of data.
29. Thomson et al. (2017, p. 211) and Thomson et al. (2013, p. 274). The 2009 PISA report found similar social gradients for NSW and Victoria in reading. Thomson et al. (2011).

Box 5: Possible reasons Victoria outperforms at the bottom, and NSW outperforms at the top

Victoria

- **School policies for disadvantaged students**. Victoria has a history of supporting disadvantaged and disengaged students, and the success of these policies should be explored. For example, Victoria was the first state to integrate needs-based funding into its schooling formula, and the Victorian Smarter Schools National Partnerships program (2009-2013) was highly targeted toward disadvantaged schools and showed positive results.[a]
- **Early childhood learning**. Victoria has increased participation in early learning, which has been shown to be especially beneficial for vulnerable children. In 2015, Victoria had one of the lowest rates in Australia of children who are developmentally vulnerable when they start school.[b]
- **Health, social and welfare policies**. Disadvantaged students tend to have complex needs across schooling, health, social and other domains. Non-education related interventions can boost development, and in turn increase student learning.

NSW

- **School policies for high achieving and gifted students**. In NSW, talented students are systematically identified, grouped and accelerated. NSW teachers receive extra support on how to teach gifted students, including specific teaching materials and professional learning.[c]

  There are two major programs for high performing students:

  - About 70 NSW schools have since the 1990s offered specialised teaching in 'opportunity classes' for high-achieving Year 5 and Year 6 students.
  - About 50 semi-selective or fully selective NSW schools provide a tailored curriculum for high-achieving secondary students. This suggests a greater focus than in Victoria on high performance.[d]

a. Victorian Department of Education and Early Childhood Development (n.d.).
b. Australian Early Development Census (n.d.).
c. See Scott (2017).
d. All NSW fully selective schools, and about a third of the partially selective schools, are excluded from the analysis in this report because they have ICSEA above 1124 or have average achievement at Year 9 higher than EYL 13.

3.5 Tasmania and the Northern Territory are not severe under-performers

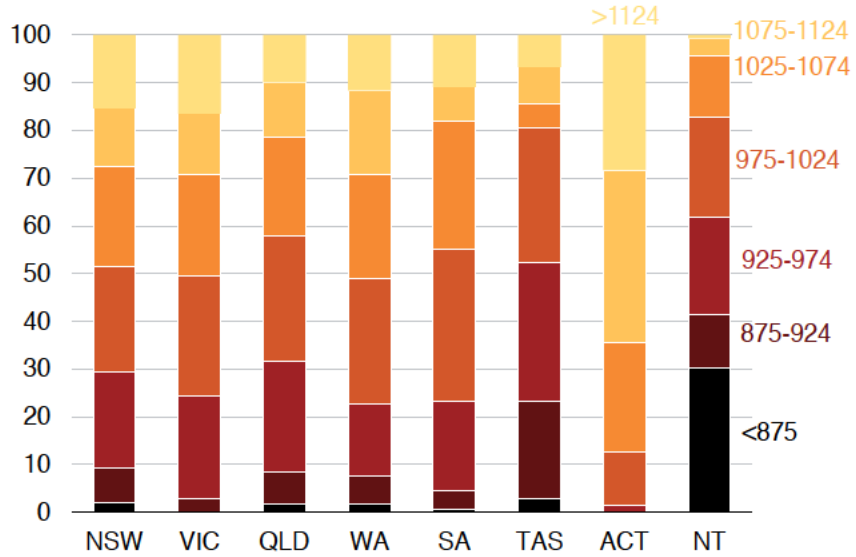
Tasmania and the Northern Territory are often thought of as Australia's education under-performers.[30] But when school advantage is taken into account, this is not the case. This result suggests their schools are not, on average, doing a bad job. Rather, they are doing a tough job reasonably well.

The Northern Territory and Tasmania have much lower average socio-economic status than the other states and territories. The Northern Territory also has larger Indigenous populations and more population in remote and regional areas. Figure 3.10 shows that the Northern Territory and Tasmania have much higher proportions of students at lower-ICSEA schools.

Figure 3.11 and Figure 3.12 on the next page show that, before adjusting for ICSEA, schools in Tasmania and Northern Territory make less student progress than the national average in all subjects and year levels (except for Tasmania in Year 7-9 writing). But after adjusting for ICSEA, student progress is generally similar to the national average. In fact, each makes significantly above-average student progress in one area (Tasmania in secondary-level writing, the Northern Territory in primary-level reading). While both have areas to work on, they are not persistent under-performers.

In should be noted that our analysis excludes a significant number of very disadvantaged schools in the Northern Territory.[31] These schools, typically remote and with high indigenous populations, face complex challenges.

Figure 3.10: Northern Territory and Tasmania have the highest proportions of disadvantaged schools (ICSEA)
Proportion of students sitting year 9 numeracy NAPLAN test, by state and school ICSEA band, average from 2010 to 2016, per cent



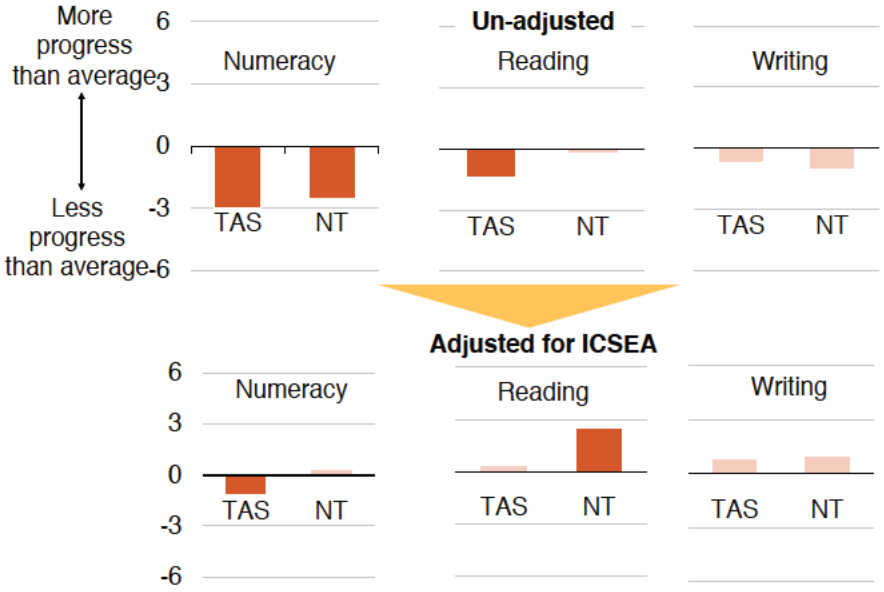
Notes: ICSEA is the Index of Community Socio-Educational Advantage. ICSEA band 975-1024 is the average level of advantage; ICSEA band 1075-1124 is moderately advantaged; ICSEA band 875-924 is moderately disadvantaged.

Source: ACARA (2017b).

In many of these schools, literacy and numeracy capabilities are so low that NAPLAN testing is a poor way to assess student learning.

30. Savage et al. (2018).
31. Our analysis generally excludes schools with ICSEA lower than 875. 34 per cent of Northern Territory students are at schools with ICSEA less than 875, compared with 2 per cent nationwide.

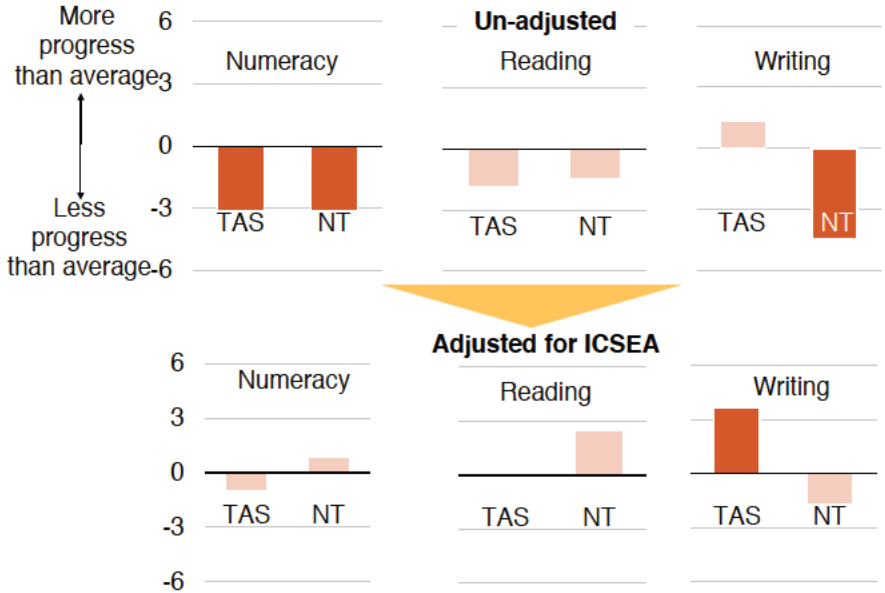
Figure 3.11: Taking ICSEA into account, primary school progress in the Northern Territory and Tasmania is not too bad
Relative progress from Year 3 to Year 5, unadjusted and adjusted for ICSEA, vs national average, 2010-12 to 2014-16 cohorts, months



Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Differences between a state's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the state.

Source: Grattan analysis of ACARA (2017b).

Figure 3.12: Taking ICSEA into account, secondary school progress in the Northern Territory and Tasmania is not too bad
Relative progress from Year 7 to Year 9, unadjusted and adjusted for ICSEA, vs national average, 2010-12 to 2014-16 cohorts, months



Notes: Lightly-shaded bars indicate measures that are not statistically significantly different from zero, based on cohort-to-cohort variation. Differences between a state's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the state.

Source: Grattan analysis of ACARA (ibid.).

3.6 Writing results are a national concern

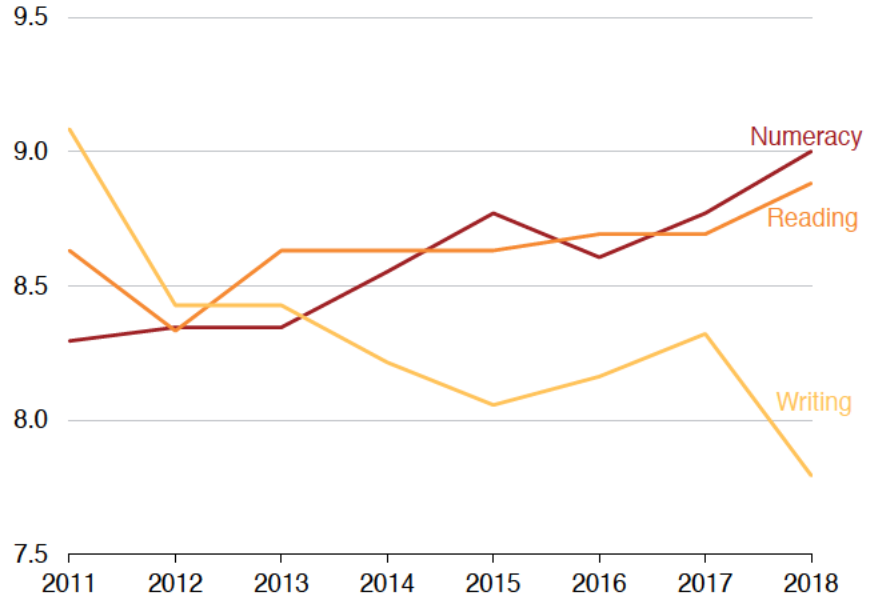
The NAPLAN writing test has been publicly criticised.[32] We nonetheless present the findings in this report, because NAPLAN is still the best indicator of student writing capabilities across the country.

Overall NAPLAN writing results are more variable than reading and numeracy; that is they are not as consistent across the five observed annual student cohorts. But there is an observable and worrying trend. Writing achievement results declined substantially between 2011 and 2018 (see Figure 3.13). In 2018, an average Year 9 student was over 15 months behind what an average Year 9 student could do in 2011.

Two states have significantly above-average student progress in writing. Tasmanian and Victorian secondary students make significantly more progress than the national average, as seen in Figure 3.2 on page 19; NSW students significantly less.[33]

NAPLAN reading and numeracy results tend to gain a lot of public attention; writing less so. The writing results highlight the need for further research and investigation to understand why the writing outcomes are getting worse.

Figure 3.13: Year 9 writing achievement has dropped since 2011
National average NAPLAN achievement, Equivalent Year Level, 2011 to 2018



Source: Grattan analysis of ACARA (2017b).

32. In particular a report by Les Perelman. Perelman (2018).
33. While similar patterns for states and territories in writing are apparent at primary level, no state's student progress is statistically significantly different from the national average.

4 A national priority: disadvantaged schools make the least progress

There has been growing public attention on 'cruising' high-achieving schools, based on a misconception that these schools make less progress than other schools. Our analysis shows the opposite is true: high-achieving schools make *much more* progress than disadvantaged schools. If governments are to deliver on Gonski 2.0's vision of 'at least one year's growth in learning for every student every year', then disadvantaged schools must be a big priority.

4.1 High-achieving schools make more progress than others

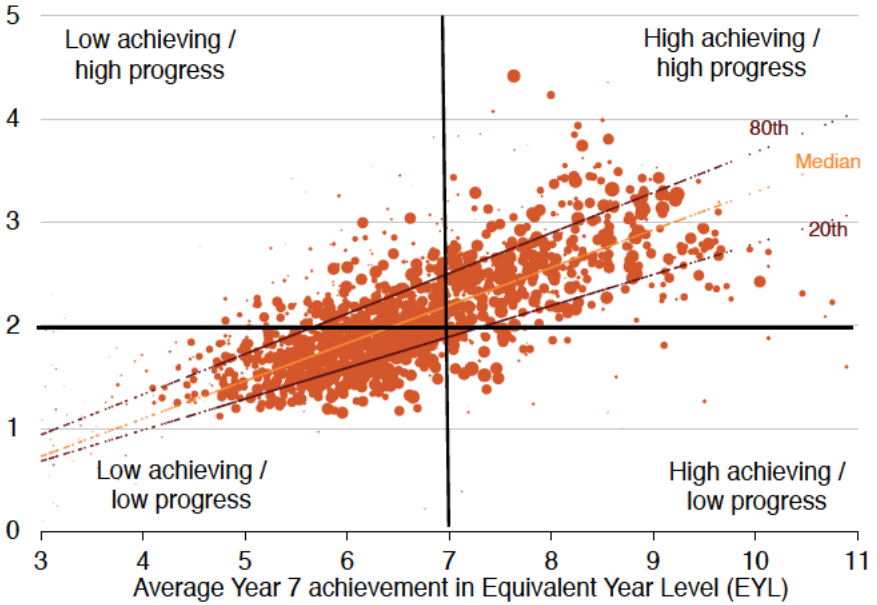
A misconception gaining traction in Australia is that high-achieving schools are 'cruising' and making lower rates of growth than low-achieving schools.[34] This interpretation appears to be based on an observation that students at high-achieving schools have larger NAPLAN gain scores than low-achieving schools.[35] But this interpretation overlooks the fact that it typically takes students longer to improve by, for example, 20 NAPLAN points at a higher achievement level than a lower level, explained earlier in Section 1.4 on page 9.

Our analysis here examines student progress taking into account the non-linear growth rate of the typical student in NAPLAN. Figure 4.1 illustrates the relationship between prior achievement and progress at school level for Year 7-9 numeracy. It shows that schools where students display above-average achievement in Year 7 numeracy are more likely to make above-average progress between Years 7 and 9. These schools are in the top right quadrant of Figure 4.1.

Likewise, schools with low student achievement in Year 7 are more likely to make below-average progress between Years 7 and 9. These

Figure 4.1: Schools with high Year 7 achievement make the most Year 7-9 progress

Progress from Year 7 to Year 9, by school, numeracy, average across 2010-12 to 2014-16 cohorts, years



Notes: Each dot represents the average across all available cohorts for which we can accurately estimate student progress for one school. Size of dot represents the number of students sitting both Year 7 and Year 9 NAPLAN tests at the school, across all available cohorts. Includes all ICSEA ranges (analysis elsewhere in this report includes the range between 875 and 1124). A small number of schools are not shown because they are outside the range of this chart. That is, their average achievement at Year 7 is higher than EYL 11 or lower than EYL 3; or their average student progress is more than five years, or negative.

Source: Grattan analysis of ACARA (2017b).

34. Balogh (2017).
35. Hattie (2016, p. 15); and Balogh (2017).

schools are in the bottom left quadrant of Figure 4.1 on the previous page. The same trend is evident in other domain areas, and at primary level.

Schools with low average achievement tend to have a high proportion of disadvantaged students.[36] A student whose parents are have limited education, are unemployed or have low-status occupations is less likely to do well at school.[37]

This issue can be seen in Figure 4.2 which shows that disadvantaged schools tend to make lower progress than advantaged schools. This makes the challenge of turning around low-achieving, disadvantaged schools especially hard.

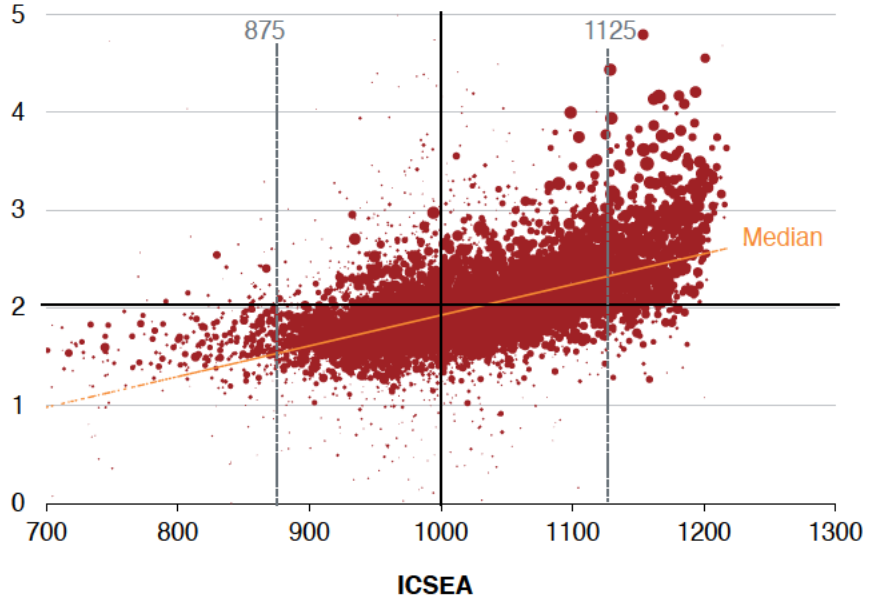
4.2 Many low-achieving, disadvantaged schools make much less than a year's progress each year

The Gonski 2.0 Review sets a goal to 'deliver at least one year's growth in learning for every student every year'.[38] But the data shows that many low-achieving, disadvantaged schools are making much less than a year of progress each year on average.

As seen in Figure 4.1 on the previous page, a typical student in a low-achieving school makes around 1.5 years of progress over the two years from Year 7 to Year 9 (this is less than a year of growth each year).[39] By contrast, a typical student in a high-achieving school makes

Figure 4.2: Many disadvantaged schools make less than a year of growth every year

Progress from Year 3 to Year 5, by school, numeracy, average across 2010-12 to 2014-16 cohorts, years



Notes: Each dot represents the average across all available cohorts for which we can accurately estimate student progress for one school. Size of dot represents the number of students sitting both Year 3 and Year 5 NAPLAN tests at the school, across all available cohorts. Includes all ICSEA ranges (analysis elsewhere in this report includes the range between 875 and 1124). A small number of schools are not shown because they are outside the range of this chart. That is, their ICSEA is below 700; or their average student progress is more than five years, or negative. The median line shown is weighted by the number of Year 3-5 students sitting the NAPLAN test across the five student cohorts at each school.

Source: Grattan analysis of ACARA (2017b).

36. See Goss and Sonnemann (2016a). Our analysis finds that school advantage, rather than school prior achievement, is generally a more powerful predictor of student progress, except for Year 7-9 progress in numeracy, discussed in Chapter 5 of the Technical Report.
37. This effect is seen in a study of NAPLAN data for Tasmanian students. ABS (2014).
38. Gonski et al. (2018).
39. A low-achieving school here is defined as around two years behind the national average.

around three years of progress over the same two years of school (well over a year of growth each year).[40]

This means students in disadvantaged secondary schools are making around half the progress in numeracy compared to students in high achieving, advantaged schools. And in many cases, students in disadvantaged schools are making a lot less than a year of growth each year.

This is not to deny that students in high-achieving schools could be stretched further, as discussed in Box 6. But if the priority is to ensure *at least* adequate growth for every student, then we must be clear on where the challenge lies. Struggling low-achieving, disadvantaged schools are the main game, not 'cruising' high-achieving schools.

4.3 Why disadvantaged schools make less progress

A disadvantaged school with low student achievement and slow student growth could be a sign that something is very wrong with the teaching or school leadership. But this should not be assumed; there are many complex reasons some students make slower progress.

Students with low achievement early on at school often face an ongoing struggle. If concepts are missed in early learning, it can be hard to develop new skills down the track (this is known as the 'Matthew Effect').[41] This may be especially important for the later years of numeracy. Our analysis shows that schools with higher than expected numeracy achievement in Year 7 make better than expected progress from Year 7 to Year 9, even after accounting for school advantage. This is not the case in reading, writing, or primary numeracy, where

Box 6: High-achieving schools can do better too

This chapter highlights that many students in low-achieving, disadvantaged schools are typically making less than a year of growth on average.

But the learning potential of students at the top end should not be cast aside by a single focus on the bottom. Both are important.

Some high-achieving, advantaged schools can stretch their students further. Figure 4.1 on page 32 shows that among schools with high student achievement at Year 7 (at EYL 9), some make around 2.3 years of progress between Year 7 and Year 9, while other make around 3.5 years of progress.

We should not stop at a 'year of growth' where students have the potential to do much more.

40. A high-achieving school here is defined as around two years in front the national average.
41. Goss and Sonnemann (2016a); Masters (2005, p. 17); Allington (2008); Dougherty and Fleming (2012); and Hanson and Farrell (1995).

prior achievement does not give any additional predictive power above ICSEA.[42]

In addition, disadvantaged students often have much more complex learning needs, along with poorer physical and mental health, higher rates of trauma, and a low sense of belonging to school.[43] This makes the task of teaching more difficult.

However there are some signs that state governments and schools could be doing more to improve learning in disadvantaged schools. About half of students in disadvantaged schools in Australia reported that in most or every class there was noise and disorder, that students didn't listen to what the teacher said, and that students found it difficult to learn. By contrast, in advantaged schools, only one-third of the students reported this as a problem. Australia scores significantly lower than the OECD average on this index.[44]

Disadvantaged schools in Australia also find it harder to attract and retain teachers. Australia has the largest gap in the shortage of teachers between disadvantaged and advantaged schools among all OECD countries.[45] Our disadvantaged schools also report having far fewer educational materials (books, facilities, laboratories) than advantaged schools, according to principal perception surveys.[46]

Given it is harder to attract teachers, and the challenge of teaching is much harder, it is no surprise that disadvantaged schools in Australia struggle to deliver at least one year's growth for every student every year.

42. See the Technical Report for more detail.
43. OECD (2012b); and Goodsell et al. (2017).
44. Thomson et al. (2017, p. xxxi). This issue is discussed in the Grattan Institute report, *Engaging Students*. Goss and Sonnemann (2017, p. 11).
45. Thomson et al. (2017, p. 263).
46. Ibid. (p. 266).

4.3.1 Overcoming disadvantage is possible

Disadvantaged schools have more hurdles to jump. But they can still deliver solid learning progress. Our analysis shows a proportion of disadvantaged schools consistently achieve high rates of progress, as seen in the top left quadrant of Figure 4.1 on page 32.

For example, of schools achieving one to two years below the national average at Year 7, around 20 per cent make *more* than two years of student progress over the two years from Year 7 to Year 9.[47] Their students are generally catching up.

Making high rates of progress is hard for disadvantaged schools, but not impossible.

47. These higher-progress schools are smaller on average, so the proportion represents only around 14 per cent of the students attending schools achieving one to two years below the national average at Year 7.

5 How to use our student progress findings

This report provides a clearer picture of student progress by state and territory, giving policy makers a better understanding of where the pockets of success lie. But how should this information be used by policy makers?

First, policy makers and researchers should triangulate our progress findings from NAPLAN against other student assessments widely used in Australian schools.[48] NAPLAN is the best standardised student learning data readily available at scale, but it also has limitations, as discussed in Box 7. Triangulating our progress findings with other tests, where they exist, will increase confidence in the results.

Second, our progress findings should be considered alongside student achievement data in each state and territory. Both pieces of information are important. This report has only shown student progress data, part of the outcomes picture.

Third, having identified pockets of outstanding performance and under-performance, work should be commissioned to examine whether state government policies or programs are contributing to these outcomes, and whether they should be adopted or avoided elsewhere.

Fourth, Australia urgently needs better information that goes beyond outcomes data. Outcomes data doesn't shed much light on *why* states, regions or other groups of schools are under-performing or out-performing. Collecting more information on inputs and outputs, in particular teaching effectiveness, would help to establish the links between government actions, teaching practices, and student learning outcomes.

48. For example 'PAT M' or 'PAT R' tests are widely used; this dataset is held by the Australian Council for Educational Research.

Box 7: NAPLAN has limitations but is the best dataset available at scale

NAPLAN is a valuable research tool for policy makers to understand student learning in key areas. But it does have limitations. Student participation rates vary between states, which can make state comparisons difficult.[a] NAPLAN is also a low-stakes test; some students may take it less seriously because there are few consequences for them personally, and this can cause bias in results.[b]

Further, NAPLAN results are less reliable for low-performing and high-performing students. A NAPLAN scale score in reading or numeracy is determined solely by how many of about 40 questions a student answers correctly. The shift to NAPLAN Online will help to address this issue.[c]

Policy makers should keep improving NAPLAN, so it is more reliable and accurate. In the meantime, the NAPLAN analysis in this report should be triangulated against other assessments and other measures where available.

NAPLAN may be imperfect, but it is a vital navigation tool for policy makers. Dropping it would be a mistake.

a. For schools with ICSEA between 875 and 1124 (as per our analysis), participation rates at a state level vary between 91 per cent and 96 per cent at Year 3, 5 and 7, and between 88 per cent and 93 per cent at Year 9.
b. Akyol et al. (2018).
c. NAPLAN Online has adaptive 'branch testing': the difficulty of questions is adjusted depending on whether students are doing well or struggling. This helps elicit more accurate information on what students can do.

Governments already collect some information on inputs and outputs, such school attendance or school completion. But we have too little data on the quality of teaching,[49] which is the biggest influence on student learning.

There is a lot of academic research on teaching quality, but it is not often rigorous or systematically undertaken at scale. International survey data, such as the Program for International Student Assessment (PISA) and Teaching and Learning International Survey (TALIS), provide increasing amounts of information on teaching quality, for example the frequency and type of teacher professional learning. But more depth and nuance is needed for such data to be valuable to system-level policy makers.

Collecting better information on current teaching practices must be a priority for every state and territory. They could, for example, routinely sample the quality of teaching practices in schools, or empower a central body to give independent expert ratings, as happens in the UK. In doing so, states and territories should look beyond generic high impact teaching practices, such as the use of feedback, and focus on the specific teaching approaches that make the most difference in each subject.[50]

Student feedback surveys can also give an indication of teaching effectiveness.[51] In NSW, the Centre for Education Statistics and Evaluation (CESE) uses the student survey 'Tell Them From Me' to identify variation in teaching practice.

Benchmarking is important. But we can't benchmark our way to a better education system. Where there is poor performance, practices must change. Where students learn more, practices should spread. This continuous improvement should happen by design, not by chance. That is the nature of an adaptive education system.[52]

49. This issue was raised by the Auditor-General Victoria (Victorian Auditor-General (2010)) and discussed in the Grattan Institute submission to the National Evidence Base (Goss and Sonnemann (2016b, p. 12)).
50. We could learn from some East Asian countries that put much higher emphasis on pedagogical content knowledge. See our 2012 report, Catching up: Learning from the best school systems in East Asia. Jensen et al. (2012).
51. A study by the Bill and Melinda Gates Foundation showed that student surveys are a valid and reliable measure of teacher effectiveness under certain conditions. Bill and Melinda Gates Foundation (2010).
52. See our 2017 report, Towards an Adaptive Education System, for further details. Goss (2017).

Appendix A: Measures of student progress

Simply put, student progress measures the difference in what students know and can do at the end of a period with what they knew and could do at the start of the period.

There are a variety of ways to measure progress. Some measures attempt to isolate the contribution of the school to student learning more than others, by taking into account student background characteristics or prior ability.

- **Gain.** The difference in test scores at two points in time. An example of this type of measure is NAPLAN gain, the difference in point scores between two consecutive NAPLAN tests (for example, Year 3 and Year 5).
- **Gain from a similar starting point.** Compares final achievement results of students with a similar starting point. An example is the comparison of student gain against students with the same starting scores on the My School website.[53]
- **Relative growth measures.** Compares student growth to what was typical for a student with the same level of achievement. For example, the Victorian Curriculum and Assessment Authority (VCAA) has developed a relative growth measure which helps in understanding if student progress is adequate relative to others with similar levels of prior achievement. The NSW government uses a similar approach with its 'SMART' tool.
- **Value-added models.** Compares student growth to what was typical for a student with the same level of achievement, while taking account of other factors such as family background. In NSW, CESE has done some work using value-added measures to identify school contributions to student learning.[54]

In addition, student growth can be measured against curriculum goals in a subject. This can be based on 'criterion reference measurement', based on testing composed of items, each of which is designed to assess an articulated educational aim.[55] An overall amount of student progress is derived by summing the proportion of learning objectives which have been achieved over a period. These objectives can be gaps from lower levels, or competencies from higher levels.[56]

53. ACARA (n.d.[b]).

54. CESE (2014).
55. Goldstein (1979, p. 218).
56. Maths Pathway (2018).

Appendix B: Student progress is driven more by school-level factors than by school advantage

Figure B.1 shows that, at a school level, student progress (the right-hand side) is more likely to be driven by school-level factors and less influenced by school advantage (measured by ICSEA). By contrast, student achievement (the left-hand side) is more influenced by ICSEA than any factor at the individual school level.

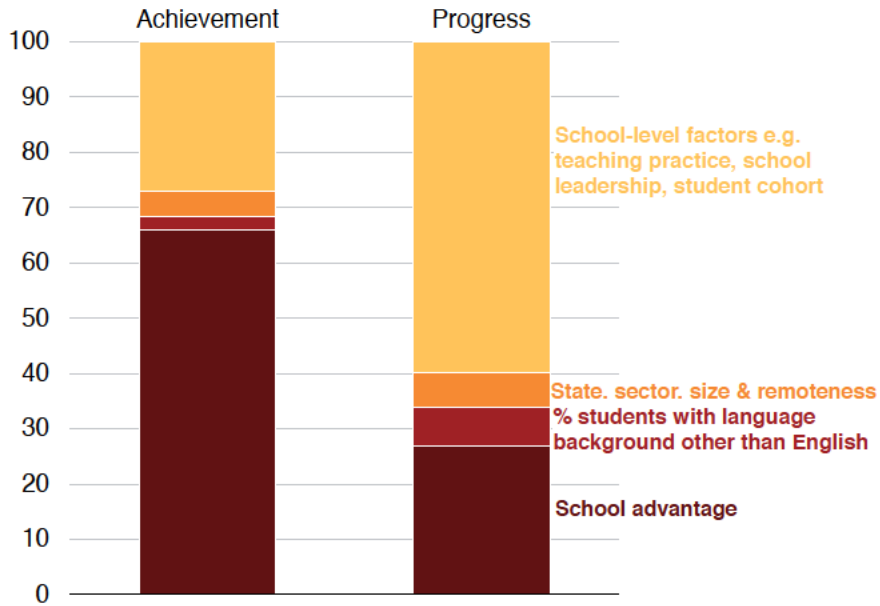
In part, this is because progress measures automatically take prior student achievement into account, while achievement measures do not. Nonetheless, this finding should have a big influence on the way policy makers think about schooling.

Using achievement as the main lens for judging whether schools are effective suggests a strong degree of social determinism; socio-economic factors are more important than anything the school does. But if progress is used as the main lens, socio-economic factors play a smaller role, explaining less than half as much of the variation among schools as factors at the school level. This means it may be possible to identify what enables some schools to routinely add more value to students learning, and to apply the lessons to all schools.

A key limitation of this analysis is that 'school-level factors' does not disentangle differences related to what a school actually does (the quality of teaching, leadership and so on) from other factors such as the nature of students at the school. This should be kept in mind when examining contributing causes for school differences in student progress.

Figure B.1: School advantage has a bigger impact on student achievement than on student progress

Proportion of school-level variation explained by school factors, per cent



Notes: 'School-level' factors may include school practices or consistent patterns in each school's student cohort. 'School advantage' is measured by the Index of Community and School Socio-Economic Advantage (ICSEA). Data shown are R-squared values from multiple regressions of school-level performance in NAPLAN (in Equivalent Year Levels), averaged across relevant year levels and domains. The progress dataset includes 5 cohorts (2010-12 to 2014-16) for numeracy and reading, and 4 cohorts (2011-13 to 2014-16) for writing. The achievement dataset includes 7 cohorts (2010 to 2016) for numeracy and reading, and 6 cohorts (2011 to 2016) for writing.

Source: Grattan analysis of ACARA (2017b).

Appendix C: The impact of early childhood reforms in Queensland

Queensland has made major reforms to early learning over the past decade, including the introduction of a prep year in 2007 and large increases in enrolments in the year before formal schooling from 2008 onwards. As a result, fewer children in Queensland are developmentally vulnerable when they start school.[57]

C.0.1 Likely impact on achievement results

The early learning changes are likely to explain large increases in achievement results in Year 3 and Year 5 NAPLAN from 2011 onwards. The first student cohorts who benefited from these reforms were likely to reach Year 3 around 2010 or 2011.

There are clear improvements in Queensland Year 3 achievement results from 2010 onwards; they moved from around four months behind the national average to in line with the national average, as seen in Figure C.1 on the next page.

There is also improvements in Year 5 achievement from 2012, the first Year 5 cohort in Queensland to have had a prep year. In 2010 and 2011, Queensland's Year 5 students were achieving around four months behind their peers in other states. By 2015, Queensland's Year 5 students were slightly outperforming the national average, after taking school advantage into account (see Figure C.2 on the following page). This is a substantial improvement.

Another contributing factor to rising achievement in Year 3 and Year 5 could have been the increase in the compulsory school starting age for Year 1 by six months in 2008.[58] This meant Queensland students were now older than before, on average, when they took the Year 3 and Year 5 NAPLAN.

C.1 But no clear impact on progress rates

While Queensland's early childhood changes are likely to have boosted achievement results, they seem to have had less impact on student progress.

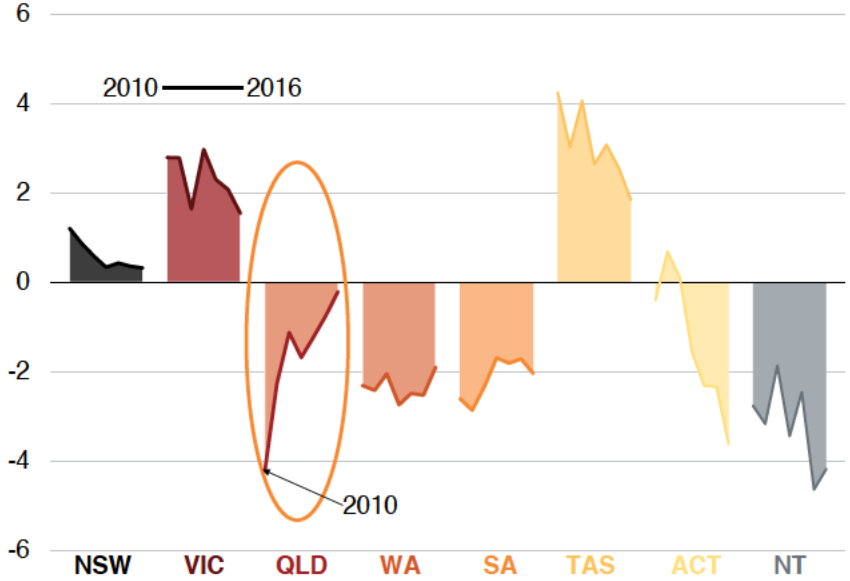
Student progress in Queensland was above the national average in 2010, and has stayed that way, as seen in Figure 3.4 on page 21. For the early learning reforms to have been a major influence on Queensland's above-average progress, they would have needed to have been fully implemented from the moment they were introduced in 2007 and 2008.[59] But we know this was not the case; the reforms were phased in.

The prep year was introduced in 2007, but it was not made compulsory for all students until 2017. Enrolments in the official prep year gradually increased since 2007. For example total Queensland prep enrolments increased by around 13 per cent between 2009 and 2012.[60] Similarly, Queensland enrolment rates in new early learning the year before school gradually increased from 2008 onwards.

It is highly unlikely that the gradual introduction of the early learning reforms has been the main driver of the consistently high rates of student progress in Queensland since 2010. Therefore, policy makers should be looking at other key drivers.

57. For more information on the introduction of prep see Queensland Department of Education and Training (2010).
58. Queensland Government (2015).
59. The first students benefiting from the early learning reforms in 2007 and 2008 would have been in Year 3 in 2010 or 2011.
60. ACARA (2017b).

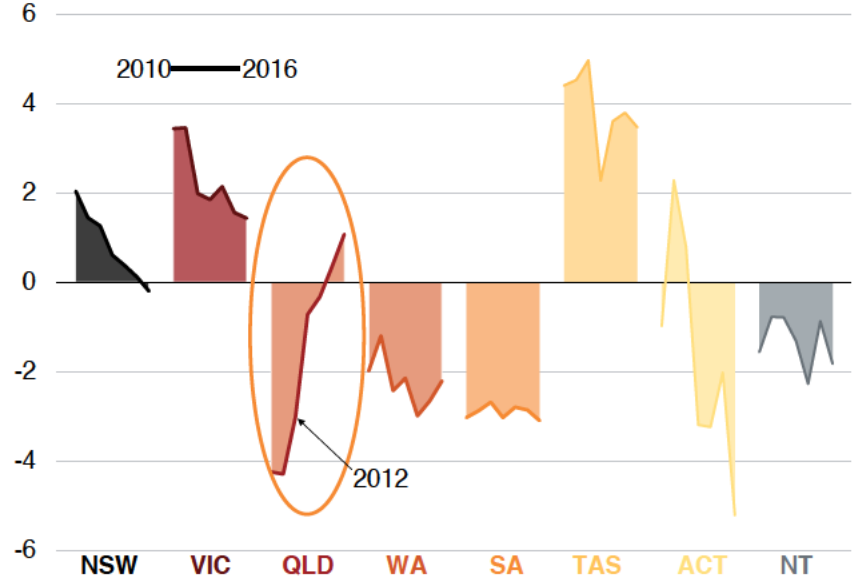
Figure C.1: Queensland significantly improved Year 3 reading achievement results from 2010
Relative NAPLAN achievement, Year 3, adjusted for ICSEA, vs national average, reading, 2010-2016, months



Notes: Differences between a state's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the state.

Source: Grattan analysis of ACARA (2017b).

Figure C.2: Queensland significantly improved Year 5 reading achievement results after 2011
Relative NAPLAN achievement, Year 5, adjusted for ICSEA, vs national average, reading, 2010-2016, months

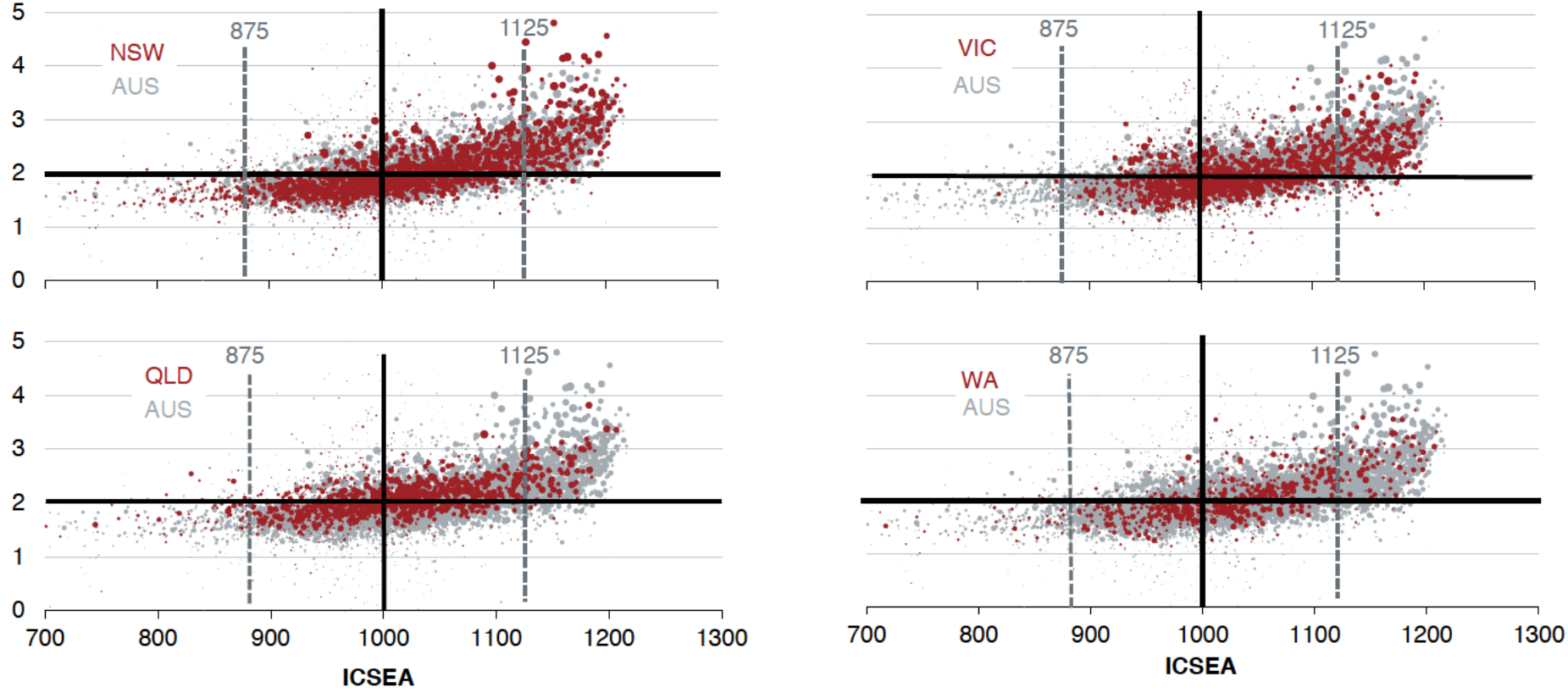


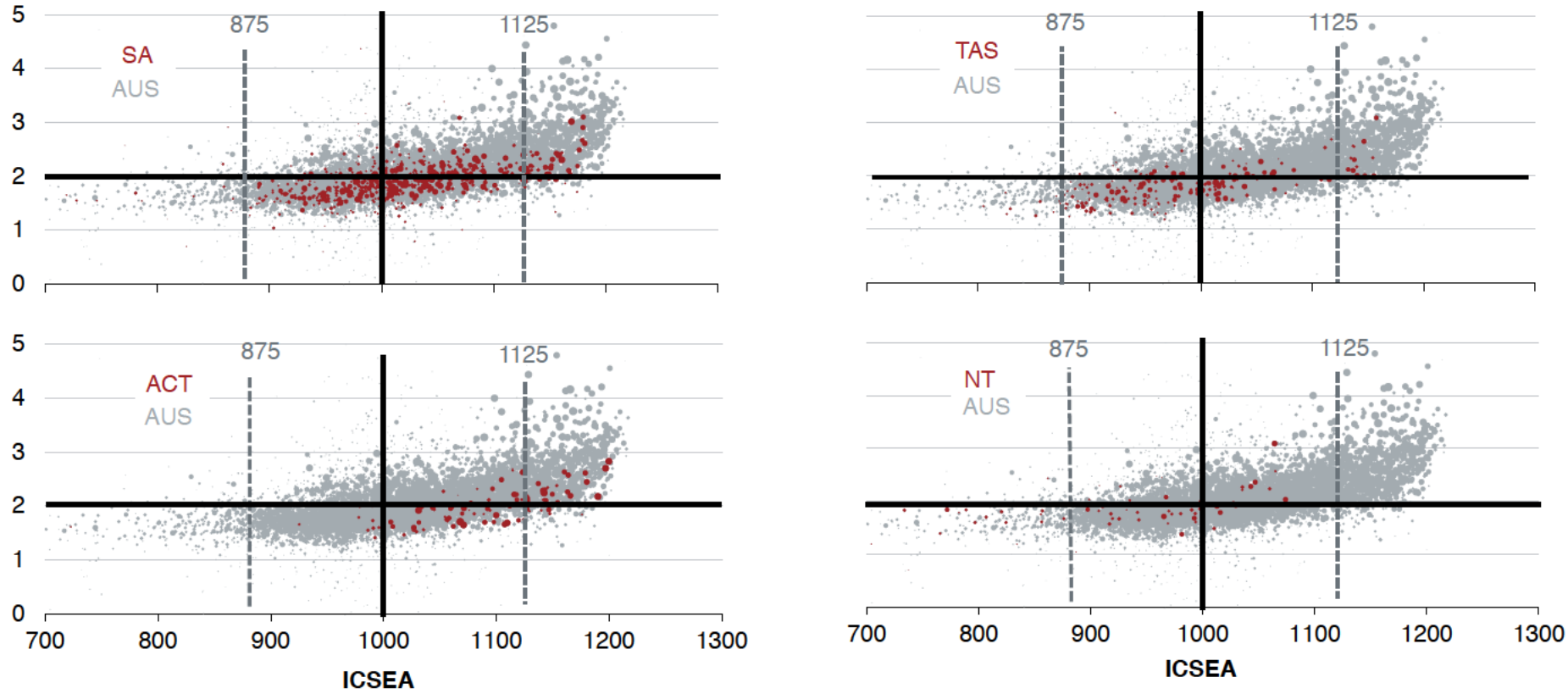
Notes: Differences between a state's mean progress and the national average are calculated within each ICSEA band. These results are then weighted by student numbers to calculate a single measure for the state.

Source: Grattan analysis of ACARA (ibid.).

Appendix D: State spread of school progress against the national distribution

Figure D.1: In every state, students in more advantaged schools make the most progress for Year 3-5 numeracy
Progress from Year 3 to Year 5, by school, numeracy, average across 2010-12 to 2014-16 cohorts, years

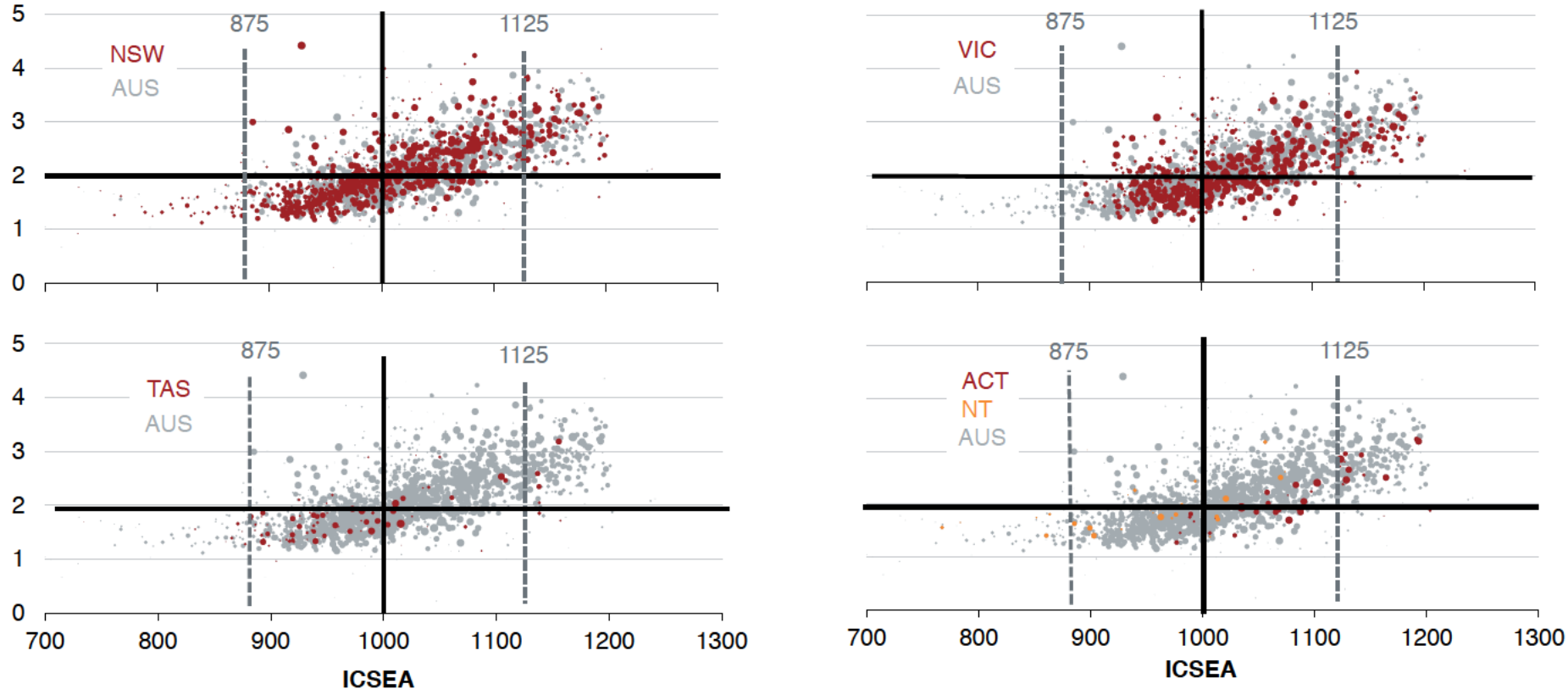




Notes: Each dot represents the average across all available cohorts for which we can accurately estimate student progress for one school. Size of dot represents the number of students sitting both Year 3 and Year 5 NAPLAN tests at the school, across all available cohorts. Includes all ICSEA ranges (analysis elsewhere in this report includes the range between 875 and 1124). A small number of schools are not shown because they are outside the range of this chart. That is, their ICSEA is below 700; or their average student progress is more than five years, or negative.

Source: Grattan analysis of ACARA (2017b).

Figure D.2: In every state, students in more advantaged schools make the most progress for Year 7-9 numeracy
Progress from Year 7 to Year 9, by school, numeracy, average across 2010-12 to 2014-16 cohorts, years



Notes: Each dot represents the average across all available cohorts for which we can accurately estimate student progress for one school. Size of dot represents the number of students sitting both Year 7 and Year 9 NAPLAN tests at the school, across all available cohorts. Includes all ICSEA ranges (analysis elsewhere in this report includes the range between 875 and 1124). A small number of schools are not shown because they are outside the range of this chart. That is, their ICSEA is below 700; or their average student progress is more than five years, or negative. Queensland, Western Australia and South Australia are not shown, because Year 7 was part of primary school in those states for the period of our analysis.

Source: Grattan analysis of ACARA (2017b).

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