

August 2019

Risks and rewards

When is vocational education
a good alternative to higher education?

Andrew Norton and Ittima Cherastidtham



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Overview

Over the past 20 years, higher education in Australia has expanded rapidly. By contrast, vocational education attainment rates have fluctuated without much long-term change.

There are concerns that students are encouraged to enrol in higher education, overlooking potentially better-paid vocational education alternatives in areas of labour-market need. These concerns are greatest for low-ATAR university students, whose numbers have increased significantly.

This report contains a detailed analysis of academic and employment outcomes which suggests that these fears are only partly justified. Low-ATAR university students are vulnerable, but only sometimes have clearly better vocational education alternatives.

Low-ATAR students don't do as well as other higher education students. They are more likely to fail subjects and get low marks, and when they finish their courses are less likely to find professional jobs or earn high salaries.

Especially for men, vocational education offers courses that typically lead to higher lifetime incomes than many low-ATAR university graduates are likely to earn, especially with degrees in fields such as humanities. Vocational diplomas in construction, engineering, and commerce are in this category.

But often, realistic vocational education choices are limited. Students take courses within their interests and aptitudes, ruling out some

options. Few low-ATAR humanities students show interest in construction or engineering. A commerce diploma might suit them, although some related occupations are being automated or now require a degree.

Lower-ATAR male students taking science at university might do better with a vocational engineering or construction diploma, especially as lifetime science bachelor-degree earnings are expected to decline.

For women, vocational education alternatives are less attractive. Few women enrol in vocational education engineering, and those who do often have poor outcomes. Engineering occupations are male-dominated, often deny women employment, and are inflexible in providing part-time work.

Teaching and nursing are popular university courses for low-ATAR women. They deliver good employment outcomes to students across the ATAR range. These students are unlikely to do better in a vocational education course.

Especially for low-ATAR men, some vocational alternatives to university are worth considering. Better career advice would alert them to these possibilities. Funding biases against vocational education should end.

But most low-ATAR higher education students are not giving up big opportunities in vocational education. Like higher education, vocational education has risks as well as potential rewards.

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Glossary

AQF	Australian Qualifications Framework, which defines formal post-school qualifications.
Advanced Diploma	In the AQF, the advanced diploma is an upper-level vocational qualification and lower-level higher education qualification. Advanced diplomas are included in our analysis of vocational education.
ATAR	Australian Tertiary Admission Rank
Attrition	A student leaving without completing a course.
Certificate I/II	The lowest two levels of the AQF. Not included in our analysis of vocational qualifications.
Certificate III/IV	The third and fourth levels of the AQF. Most trade qualifications are in Certificate III courses. Included in our analysis of vocational qualifications.
Diploma	In the AQF, the diploma is an upper-level vocational qualification and lower-level higher education qualification. Diplomas are included in our analysis of vocational education.
Graduate	A person with a bachelor degree or above.
HELP	Higher Education Loan Program
Higher education qualifications	In the AQF, higher education diplomas and above, including bachelor degree, masters degree, and doctoral degree.
Lifetime earnings	Expected earnings between the ages of 18-65.
LSAY	Longitudinal Survey of Australian Youth
NCVER	National Centre for Vocational Education Research
Post-secondary education	A higher education or vocational education course taken after leaving high school.
TAFE	Technical and further education
Upper-level vocational qualifications	Certificate III, Certificate IV, diploma and advanced diploma
Vocational education	Training for an occupation, usually with an emphasis on practical skills.
VET	Vocational education and training
VET FEE-HELP	HELP for vocational students (now replaced with VET Student Loans)
VET in Schools program	Vocational courses undertaken by school students as part of their senior secondary certificate of education.
VET Student Loans (VSL)	A loan scheme for VET students in some diploma level courses.

1 Higher education and risk

Over recent decades post-school education has become the norm in Australia. While vocational education remains popular, much greater higher education participation has increased attainment rates to record levels.

Most higher education students benefit from their choice, but their risk of poor outcomes has increased: compared to a decade ago more young people drop out of university, new graduates are less likely to get a full-time job and fewer recent graduates find professional employment.

Because these risks have increased, this report examines which higher education students are at greatest risk. It then explores whether they could improve their career prospects by pursuing vocational instead of higher education.

1.1 Growth in post-school education

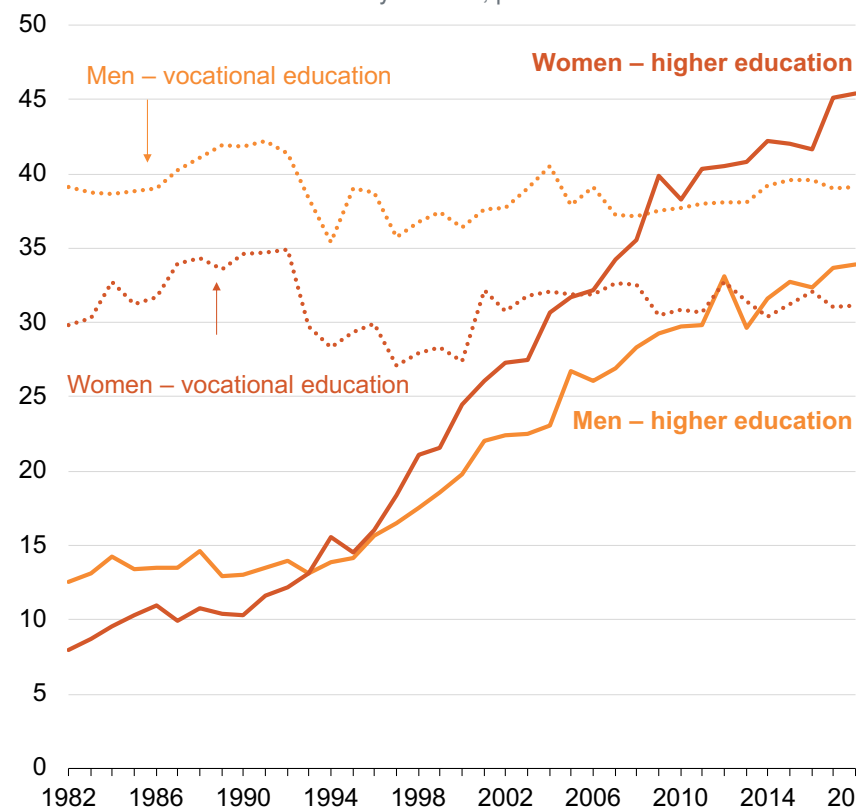
Australia is part of a global trend towards increased educational attainment.¹ In 1982, half of 25-34 year-old Australian men and 38 per cent of 25-34 year-old women held a post-school qualification. By 2018, the figures were 73 per cent of men and 76 per cent of women. For women, attainment doubled in a generation.

Growth has been dominated by higher education (Figure 1.1). In 1982, just 8 per cent of women aged 25-34 had a bachelor or postgraduate degree. By 2018, it was 45 per cent of women. The change for men is also large, up from 13 per cent to 34 per cent, although men in this age group are still more likely to hold a vocational than a higher education qualification.

1. Cantwell et al. (2018); Daley et al. (2019, Chapter 9).

Figure 1.1: Higher education attainment has grown while vocational education is stable

Post-school attainment of 25-34 year-olds, per cent



Notes: 'Vocational' calculated by deducting the ABS time series of 'bachelor degree or above' from 'non-school qualification'. This incorrectly classifies some higher education diplomas as vocational education, but most diplomas are vocational education. See Box 1 on page 15 for more detail on course classifications. Some fluctuations are due to reporting or definitional changes.

Source: ABS (2018a).

Higher education attainment rates are influenced by migration and higher education policy.² From 2008 to 2017, funding caps on domestic bachelor-degree student numbers were eased and then abolished, driving the 19-year-old higher education participation rate up 10 percentage points.³ Reimposed funding caps will push these rates down in the 2020s, unless there is policy change in the next few years.⁴ But in the short-to-medium term, rising domestic undergraduate course completions will cause attainment rates to increase.⁵

While higher education has grown, the proportion of 25-34 year-olds with vocational qualifications has not changed greatly over decades. It has fluctuated, but typically in a narrow range. As Figure 1.1 shows, for men the range is 35 to 42 per cent of the cohort, and for women it is 27 to 35 per cent. In 2018, each was roughly in the middle of the historical range. Like higher education, young adult vocational education enrolments boomed in the later years of the last decade. But student numbers have since declined significantly, with government-funded enrolments of students aged 19 or younger back to where they were in 2004.⁶ Given population increases since the last decade, sustained enrolments at current levels would eventually flow through into lower vocational education attainment.

2. More than a third of degree holders aged 25-34 in 2018 had a degree from overseas or were non-citizen holders of Australian qualifications. Among Certificate III and above qualification holders 13 per cent are in these categories: ABS (2018a).
3. To 42 per cent overall; 50 per cent for women and 35 per cent for men: Norton et al. (2018a, p. 22).
4. Daley et al. (2019, Chapter 9).
5. See Figure 6.2 on page 49.
6. Certificate III and above, domestic students only: NCVER (VOCSTATS, 2019a). Some of the enrolment increase was wasteful due to education-provider malpractice. See Section 5.2.

1.2 The risks of poor outcomes from higher education have gone up

Overall, higher education brings benefits to students. It opens up jobs for which a degree is required or a significant advantage. Most people with a bachelor degree earn more than someone of the same gender who has a vocational qualification or finished their education in Year 12. Further study can also provide non-career benefits. People often enjoy their studies and find friends among other students. Graduates usually do better on a range of social indicators, including health.⁷

But not all higher education students get the hoped-for outcomes from higher education, and this group has grown in recent years.

Dropping out

About a quarter of students who start a bachelor degree leave university without a qualification.⁸ Rates of dropping out have only increased slightly (Figure 1.2), but with increased enrolments the total number of people who drop out is going up. In 2015, an ABS survey estimated that 800,000 people had an incomplete bachelor degree.⁹ That number would now be approaching 1 million.

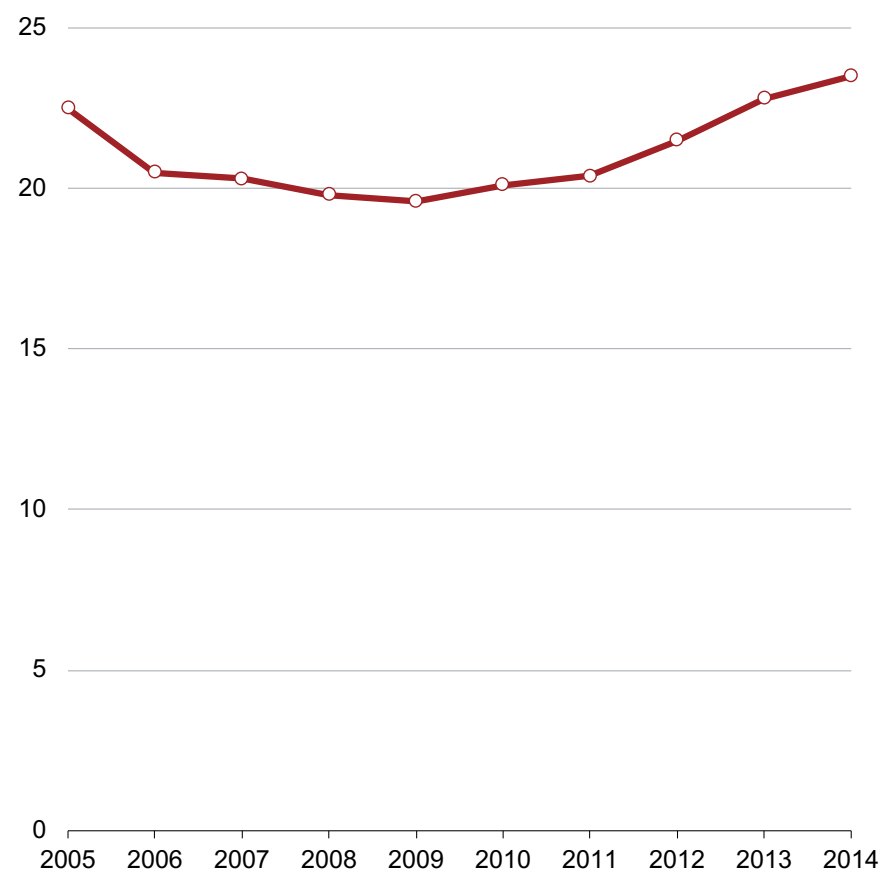
Employment

A university education has multiple potential benefits. It cannot be judged solely on its employment outcomes. But most students give employment-related considerations as their main reason for study.¹⁰

7. Norton (2012, pp. 58–62); and Norton et al. (2018b, Chapter 2).
8. Department of Education and Training (2018a, Table 1); and Norton et al. (2018b, p. 13).
9. People with an incomplete degree excluding the degree in which they are still enrolled: ABS (2016a).
10. In 2017, 65 per cent of bachelor-degree students indicated that improving their job prospects or changing their career was their main reason for study. When people

Figure 1.2: Higher education attrition rates have increased slightly since 2009

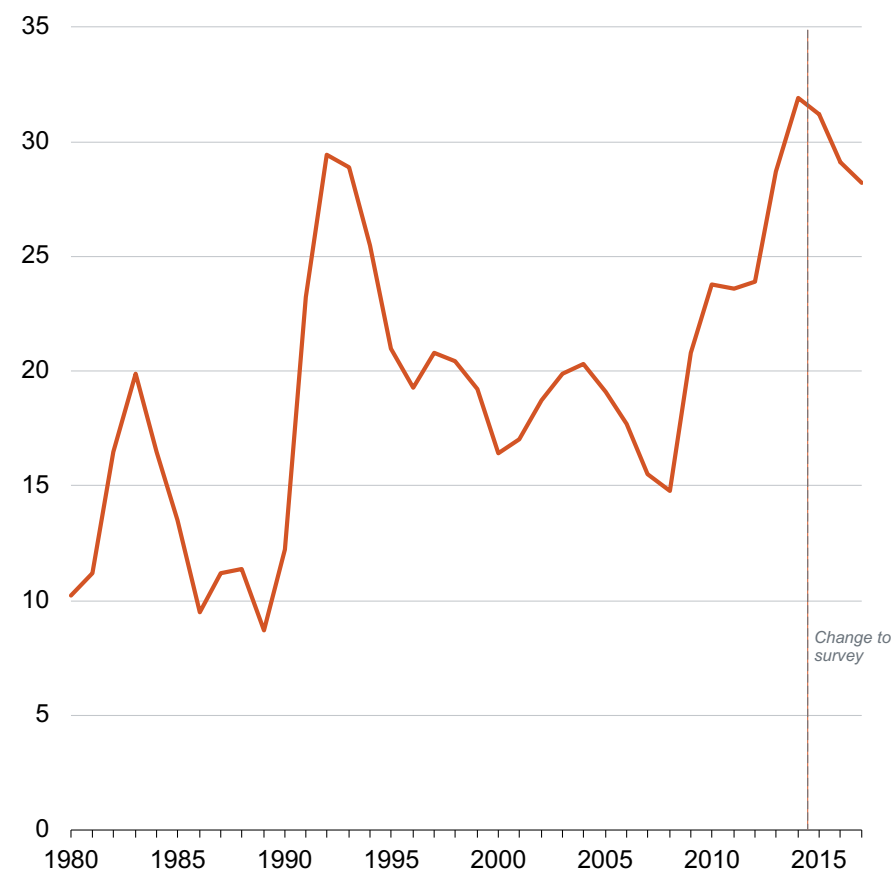
Proportion of bachelor-degree students not enrolled four years after commencing, by year of starting course, per cent



Source: Department of Education and Training (2018a).

Figure 1.3: More graduates are still looking for full-time work four months after completing

Proportion of bachelor-degree graduates available for full-time employment but yet to find it four months after graduation, per cent



Sources: Department of Education and Training (2018b) and GCA (GradStats, various years).

Graduate employment outcomes are less favourable now than in the past. New graduates are less likely to quickly find a full-time job than they were a decade ago (Figure 1.3), despite a positive trend in recent years.¹¹

Over the longer term, university graduates still have higher rates of employment than other people.¹² But high-skill professional and managerial jobs are more difficult to find than they were previously. As Figure 1.4 shows, this is especially the case for men. In 2016, just over half of male graduates aged 20-24 were in these occupations. Men aged 25-34 are doing better, but still trending down between 2006 and 2016. Rates of holding sales, service and administration positions or not working have increased. For women, high-skill employment rates are better, falling only for 20-24 year-olds and by less than men.

The problem for graduates is not that high-skill job numbers are declining. With occasional interruptions, professional jobs keep increasing, both in their absolute numbers and as a share of the workforce.¹³ But high-skill jobs are not growing as quickly as graduate numbers.

The costs of not achieving career goals are more than just financial. Workers in jobs mismatched with their skills are often significantly less satisfied with their work than people in jobs with a better match between their skills and occupation.¹⁴

saying their main reason for study was to increase skills in their current job are added, 83 per cent of respondents gave an employment-related reason: ABS (2018b).

11. Norton (2019a).

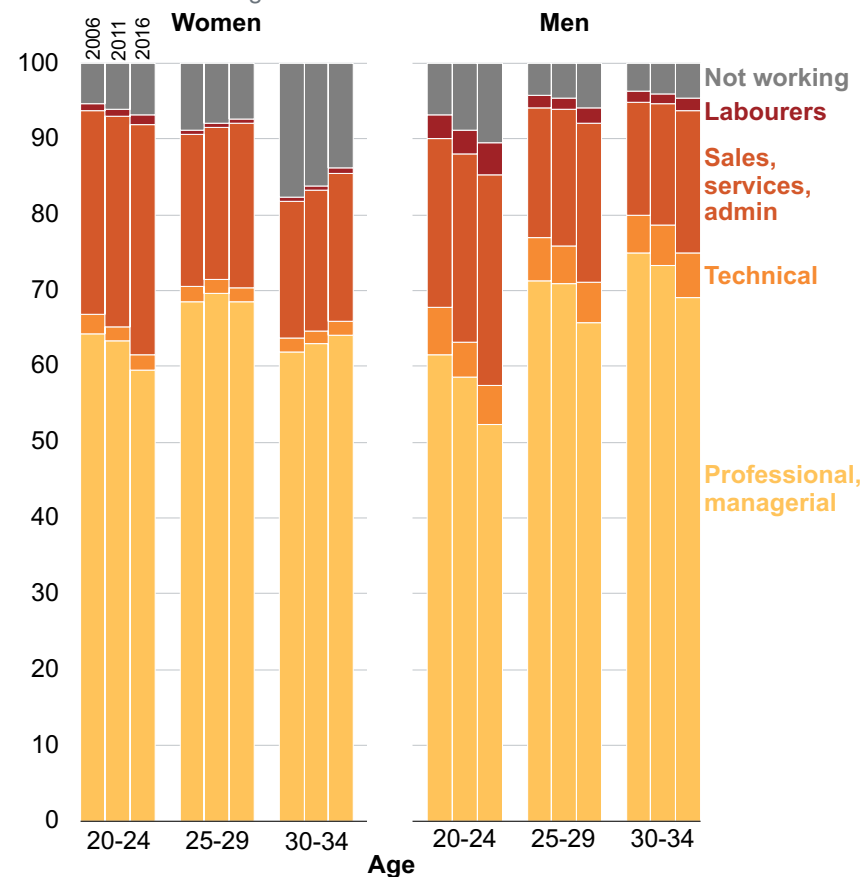
12. Norton et al. (2018a, p. 93).

13. ABS (Labour force, 2019a).

14. Mavromaras et al. (2013). This research usefully distinguishes between over-education (holding a job that typically requires a lower qualification than the person holds) and over-skilling, measured by self-reported use of skills and abilities. A person may be over-educated but not over-skilled because the skill level of jobs may be understated using general ABS classifications, or because

Figure 1.4: High-skill employment rates are declining for young graduates, especially for men

Per cent of bachelor graduates



Source: Grattan analysis of ABS (Census, 2016b).

Income

Bachelor-degree graduates usually earn more than people who finish their education at Year 12. In their early-career years (that is, aged 25 to 34), male graduates earned about \$13,000 more a year than men with Year 12 only. For women the graduate premium was \$14,000 (Figure 1.5).

But slower transitions to employment and lower rates of high-skill employment affect the financial benefits of higher education. In early career, the annual premium for a bachelor degree was lower in 2016 than it had been in either 2006 or 2011 (Figure 1.5). For men in older age groups, the premium was up over the decade but fell between 2011 and 2016. For women, maternity leave and childcare policy changes led to increased labour force participation, which partly offset other negative trends.¹⁵

Especially for men, much of the premium is earned at older ages. This is because average salaries for managers and professionals keep increasing and peak in the final decade of their careers. For lower-skill sales and administrative occupations, wages peak aged 35-44 and often decline after that.¹⁶ Graduates who can't move to professional or managerial work risk being stuck permanently below their earnings potential.

1.2.1 At-risk students

There is some bad luck in recent trends. Between the 2006 and 2016 censuses, graduates were hit by the global financial crisis and then, more seriously, by the end of the mining boom. These economic events

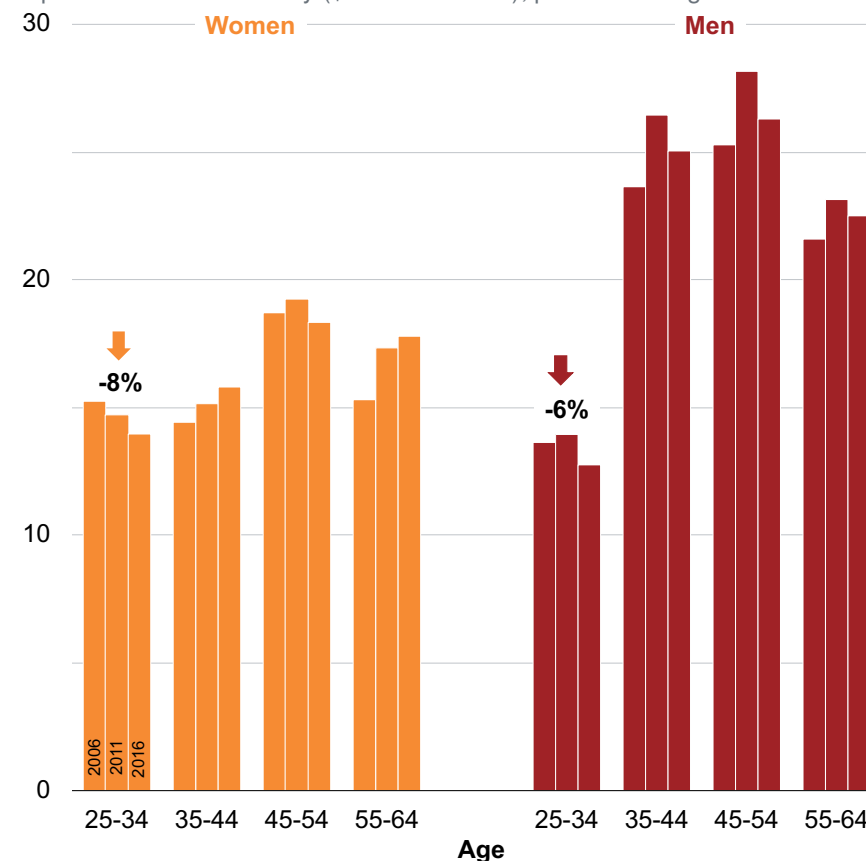
the person recognises that their skills and abilities are lower than expected from a university degree. Although there is significant overlap between the two categories, the negative effects are greatest for the over-skilled.

15. Norton et al. (2018a, Chapter 10).

16. ABS (2019b, Data Cube 6, Table 2).

Figure 1.5: In early career the graduate premium has declined

Average annual income premium of a bachelor-degree graduate compared to a person with Year 12 only (\$2016 thousand); per cent change 2006-2016



Notes: Based on median income after tax and estimated course costs. Australian citizens with a bachelor degree as their highest qualification.

Source: Norton et al. (2018a, Figure 10.17).

would have affected graduate outcomes irrespective of student choices or education policy. But as Section 1.1 reports, student and graduate numbers expanded significantly in this period. This exacerbated the deterioration in graduate outcomes that would have occurred anyway.

Chapter 2 shows that some of this expansion came from students with weaker school results, who have an elevated risk of failing university subjects, getting lower marks, and not finishing their course.

Chapter 3 shows that if these students do finish their courses, their problems do not finish on graduation day. They are less likely to quickly find full-time work or a professional job, and therefore more likely to have below-average earnings.

1.3 The potential vocational education alternative

If some higher education students are getting poor employment outcomes, could they do better in vocational education? This is a theme of recent commentary on the post-school education system. The Joyce review of vocational education, commissioned by the Commonwealth Government and released in early 2019, noted that 'stakeholders were concerned that students who would otherwise thrive in VET [vocational education and training] careers are being directed towards higher education options where they may not succeed'.¹⁷ The federal Skills Minister said that 'many tradies are increasingly earning more than those with university degrees'.¹⁸

In recent years, skills shortages have been more common in occupations served by vocational than higher education.¹⁹ An electrical trades-related industry organisation experiencing skills shortages in its field has urged young people to understand that 'there are alternatives

to university, and they are rewarding, challenging and very well-paid alternatives'.²⁰

In a recent report, the Productivity Commission compared outcomes for young people who might have gone down either the vocational or higher education path. It found that at age 25, those with vocational qualifications were more likely to be employed full-time and earning more than those who went to university, while noting that this was early in their careers.²¹

For people making course choices, the earnings differences between vocational and higher education are better expressed as a range. This shows that there are higher and lower incomes at each qualification level. As Figure 1.6 on the following page shows, estimated lifetime-income ranges overlap significantly between different education levels for both men and women. Although median earnings are higher for bachelor-degree graduates than people with a Certificate III/IV or a diploma, significant minorities of diploma (30 per cent) and Certificate III/IV (20 per cent) holders earn more.

Similarly, a tail of bachelor-degree graduates earn less than many people with lower qualifications, including Year 12 only. Nearly 40 per cent of bachelor graduates are expected to earn less than the median diploma holder, and for men 30 per cent of bachelor graduates are expected to earn less than the median Certificate III/IV holder. In some cases this is due to factors that would have had an impact regardless of education, such as working part-time. But in other cases graduates cannot find jobs that use their skills (Figure 1.4).²²

17. Joyce (2019, p. 82).

18. Smith (2019).

19. DESSFB (2019).

20. Manickam (2018).

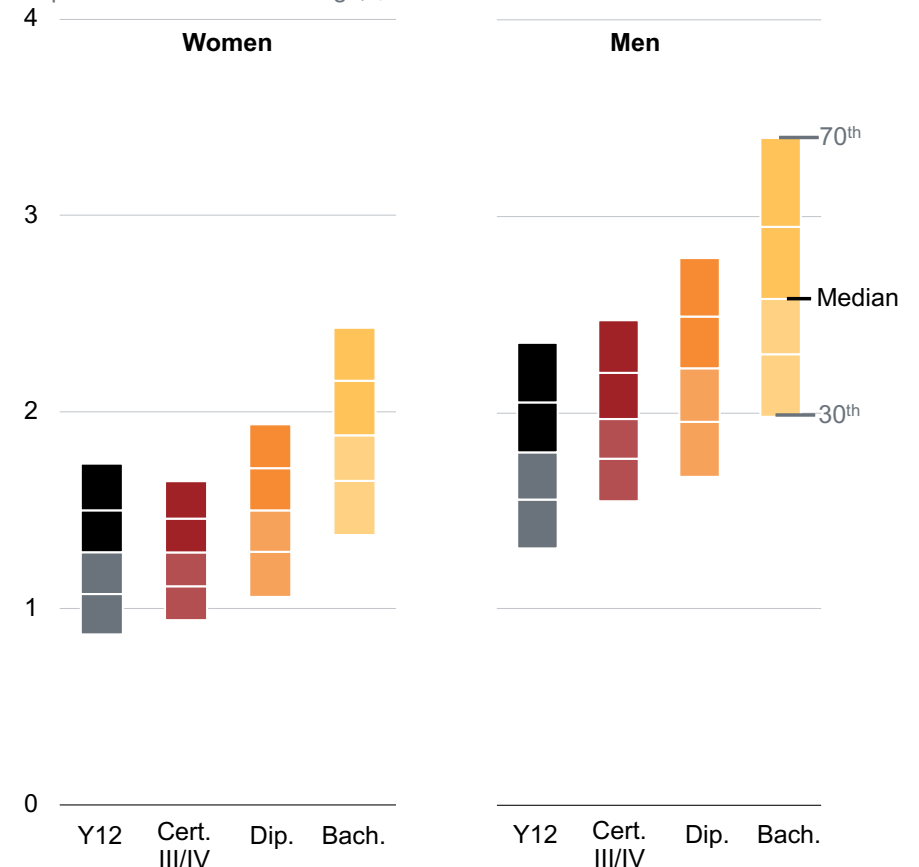
21. Productivity Commission (2019, p. 45). The report noted the difficulty of identifying the individuals to be compared.

22. In a 2018 survey of graduates three years after they had completed their course, 28 per cent of those who said they were not fully using their skills and education gave as their reason 'no suitable jobs in my area of expertise'. A similar proportion cited other labour market factors. The main positive reasons were studying (15 per

The earnings ranges show that not all graduates earn high incomes. Of course, a school leaver cannot easily know in advance what their earnings will be if they complete higher education, vocational education, or do not undertake further study. But there are potential warning signs. The following chapters explore whether students with lower academic ability are likely to earn less than the median earnings of graduates and, if so, what their earnings prospects would be with a vocational qualification.

Figure 1.6: Bachelor and vocational qualifications have overlapping earnings ranges

Expected net lifetime earnings, \$2016 million



Notes: Post-tax lifetime income net of course costs. Australian citizens only. Diploma includes advanced diploma from both higher education and vocational education. Based on highest qualification. Excludes people who were studying.

Source: Grattan Institute analysis of ABS (Census, 2016b).

cent) and satisfaction with existing job (6 per cent): Department of Education and Training (2018c, p. 30).

Box 1: Vocational and higher education courses and careers

Courses leading to qualifications are classified under the Australian Qualifications Framework (AQF).^a Certificates I to IV are always classified as ‘vocational education’. Bachelor, masters, and doctoral degrees are always classified as higher education. Diplomas and advanced diplomas can be classified as vocational or ‘higher’ education, although most diploma students are in the vocational sector.

AQF qualifications differ in the required depth of knowledge, level of skill, capacity to analyse and communicate information, ability to make independent judgments, and proficiency in organising others. A lower-level certificate holder should be competent in a narrow range of routine tasks and usually works under direct supervision. A Certificate I does not necessarily lead directly to a job and may be a pathway or preparatory program. Popular Certificate II programs are aimed at routine jobs in administration, retail, and hospitality. These certificates are less academically demanding than Year 12 and typically do not lead to higher earnings than finishing education at Year 12.^b We do not consider Certificate I or II qualifications in this report.^c Some young people with the academic results needed for university have a Certificate I or II, perhaps for a part-time job, but not as the basis of a career.

Certificates III and IV are often grouped together, as they are in this report. A Certificate III is the second-most-common qualification in

today’s labour force after a bachelor degree, and the most common for men.^d Compared to holders of the other certificates, Certificate III and IV holders have higher technical skills and can deal with a wider range of tasks. People with a Certificate IV are expected to have more skills in analysis and communication than someone with a Certificate III, and to be able to manage more unpredictable problems. But the two certificates often lead to the same or similar occupations.

Vocational education has a sharper gender divide than higher education (they can be compared directly in Figure 1.7 on the next page). Of the top 20 occupations for people who had completed a Certificate III between 2014 and 2017, five were more than 90 per cent male. Another two occupations were more than 90 per cent female.^e For men, traditional trades such as electrician, carpenter, and plumber are some of the most common occupations for Certificate III and IV holders. For women, aged and disabled carers, education aides, nursing support, and sales assistants are the most common occupations for Certificate III and IV holders.^f Recent completions data show fitness instructors, cooks, and general clerical occupations are becoming more common occupations for male and female Certificate III and IV holders. An increasing number of male Certificate III and IV holders are employed as storepersons and security officers.^g

Continued on next page

a. AQF (2013).

b. Griffin (2016).

c. See Table A.4 for how this report classifies AQF qualifications.

d. ABS (Education and Work, 2018c). On a total enrolments basis, in 2017 there were more domestic Certificate III enrolments than bachelor-degree enrolments: NCVER (VOCSTATS, 2019b) and Department of Education and Training (uCube, 2019a). This is not reflected in the population data because Certificate III courses have lower completion rates and because most ABS surveys record only a person’s highest qualification.

e. NCVER (VOCSTATS, 2019c).

f. ABS (Census, 2016b).

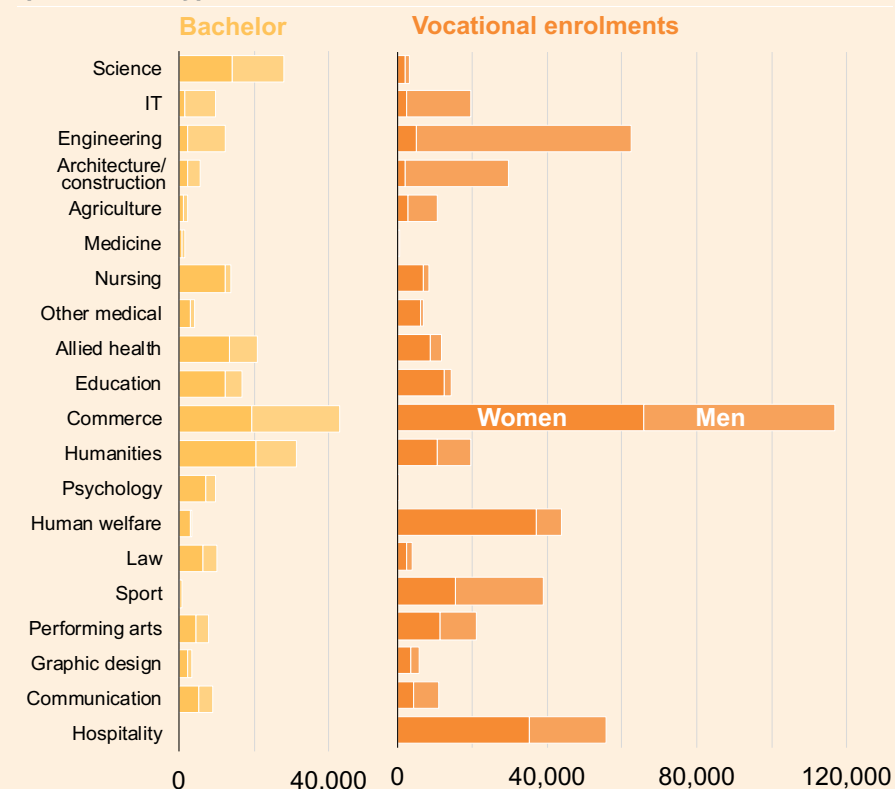
g. NCVER (VOCSTATS, 2019c).

Diplomas and advanced diplomas are often grouped together, as they are in this report. In contrast to vocational diplomas, undergraduate higher education diplomas since the early 1990s have rarely been intended as standalone workforce qualifications.^a In this report, we are interested only in vocational education diplomas. Compared to the upper certificates, diploma holders are expected to be able to design and plan approaches to unpredictable problems and act independently in performing complex tasks. Advanced diploma holders are expected to have more specialised knowledge and solve more complex problems. There are relatively few people with advanced diplomas. The top occupations for diploma holders include managerial positions, child carers, aged and disabled carers, nurses, and police officers.^b For recently completed diploma holders, the gender divisions are less marked than for Certificate III/IV courses, but personal care fields remain female dominated while construction-related fields are male dominated.^c

Compared to a diploma, in the AQF a **bachelor degree** is on a continuum rather than a sharply different qualification. A bachelor degree graduate is expected to have a deeper knowledge of underlying principles, exercise more critical thinking and judgment, and have more responsibility for their own learning. The bachelor degree has more content, usually taking 3-4 years compared to 1-2 years for a diploma. Differences between the vocational and higher education sectors distinguish diplomas and bachelor degrees more sharply than the AQF descriptions. Universities have more prestige, greater resources, more control over what is taught, and attract the most academically-able students.

- a. For the purposes of higher education diplomas see Norton (2019b, pp. 14–15). There are also graduate diplomas in higher education. These are more specialised qualifications that are not usually available to people without a bachelor degree.
- b. ABS (Census, 2016b).
- c. NCVET (VOCSTATS, 2019c).

Figure 1.7: Commencing enrolments of 15 to 24-year-olds by qualification type in 2017



Notes: Vocational includes Certificates III/IV, diploma and advanced diploma.

Source: NCVET (VOCSTATS, 2019b); special data request from the Department of Education and Training (2019).

2 Academic outcomes

Poor outcomes among recent higher education students are not random. Some people are at greater risk than others of not getting the full benefits of higher education. More of these higher-risk students have entered higher education in recent years.

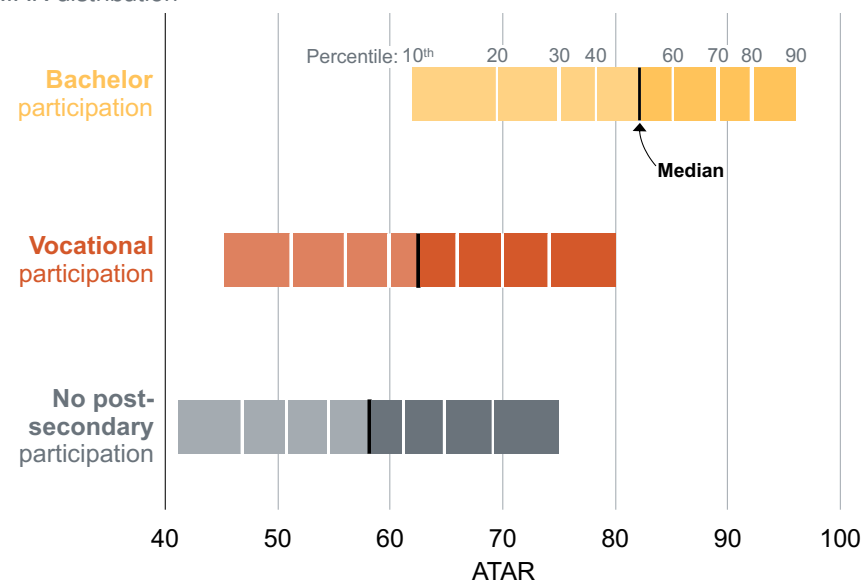
It is easier to get into university now than in the past, especially for low-ATAR students. ATAR reflects academic ability and effort; both are important for successful completion of higher education. Students with lower ATARs are more likely to leave university without a degree. Those who complete typically leave with more fails and worse marks, making them less attractive to employers.

2.1 More students with lower-range academic ability are going to university

In general, vocational and higher education students divide according to school results, although there is an overlap. Figure 2.1 shows their ATAR ranges, using data from the Longitudinal Study of Australian Youth (LSAY) since the mid-1990s. Students in Certificate III or above vocational qualifications typically have a low-to-mid ATAR (in the 50-70 range), while students in bachelor degrees usually have mid-to-high ATARs (70 and above).²³

While most people enrolling in university still have high ATARs, it is easier to get into university than in the past. Most school leavers with very low ATARs don't apply for university, but an increasing number do. Their chances of an offer are much higher than they were. Before 2012,

Figure 2.1: Bachelor-degree students are mostly mid-to-high ATAR; upper-level vocational students are mostly low-to-mid ATAR
ATAR distribution



Notes: LSAY 1995, 1998, 2003, 2006, and 2009 cohorts. Vocational education includes Certificate III to advanced diploma. Respondents who enrolled in both vocational and bachelor qualifications are included in both figures. Includes imputed ATARs, see Appendix A.

Sources: Grattan analysis of NCVET (LSAY, various years).

23. In most states, Year 12 results are measured by an ATAR (Australian Tertiary Admission Rank), which ranks students' school results according to their position in their age cohort, including people who did not finish school or did not complete the academic requirements of Year 12. These students are not individually assigned an ATAR, although their assumed ATAR is part of the overall calculation.

less than 20 per cent of applicants with an ATAR below 50 received an offer of a university place. In 2018, more than half of these applicants received offers. For applicants with ATARs between 50 and 60, offer rates went from less than 60 per cent to 80 per cent. Offer rates were already high in the 60-70 range, and increased slightly to more than 90 per cent.²⁴ The number of lower-ATAR students more than doubled (from a low base) between 2007 and 2016 (Figure 2.2).

For more people there is a practical choice between vocational and higher education. If they apply, they could be accepted into either type of course. In recent years, more than 40,000 school leavers would have received ATARs in the 50 to 70 range annually.²⁵

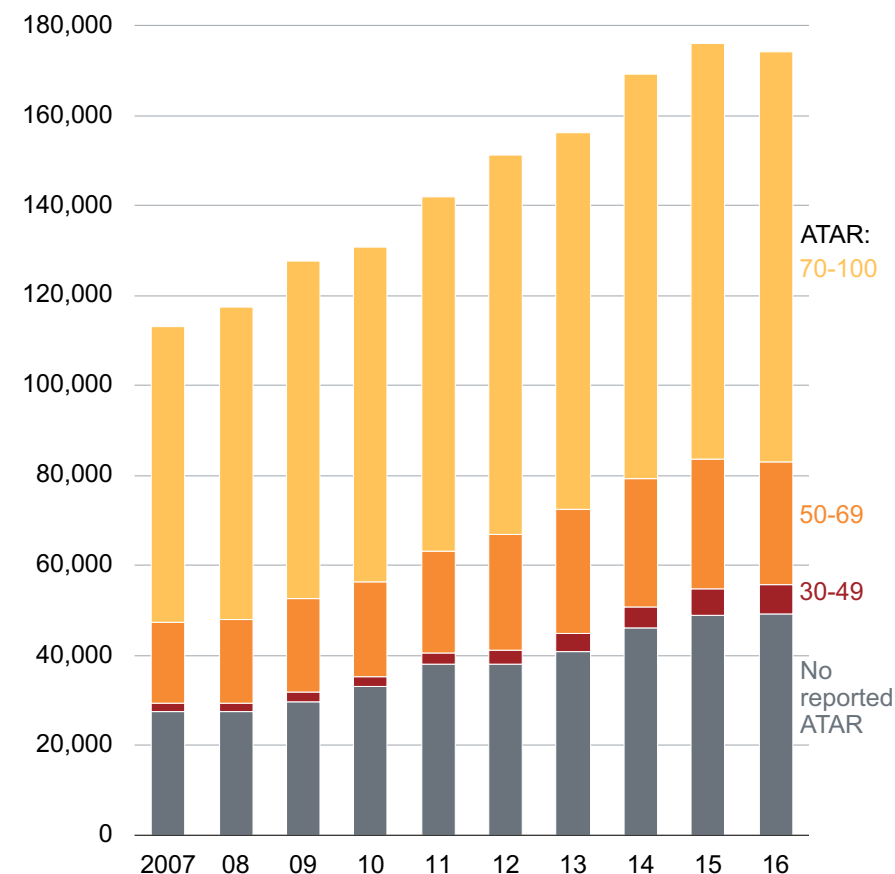
As for students generally, lower-ATAR student enrolments show gender differences. Women outnumber men, with humanities, commerce, education, and nursing their top choices. For men, commerce is their top choice by a substantial margin, with humanities, IT, science, and engineering also popular (Figure 2.3 on the following page).

The number of students admitted with no ATAR also increased significantly; in absolute terms no-ATAR growth was more than twice that of the low-ATAR category (Figure 2.2). The no-ATAR group is of mixed academic ability. ATARs retrieved from applications data shows that it includes high-ATAR students. But universities set alternative entry requirements for prospective students low ATARs or for those

24. Department of Education and Training (2018d, p. 43). If they receive an offer, low-ATAR applicants are less likely than high-ATAR applicants to accept or still be enrolled at the first-semester census date when they become liable to pay their student contributions. About 10 per cent of Year 12 university applicants with an ATAR below 60 who received an offer rejected it: Grattan analysis of the 2013 Year 12 cohort applying for the 2014 commencing year.

25. Based on Grattan analysis of TISC (2017), UAC (2018) and QCAA (2018).

Figure 2.2: Low-ATAR and no-ATAR enrolments have increased
School-leaver domestic bachelor-degree commencing enrolments

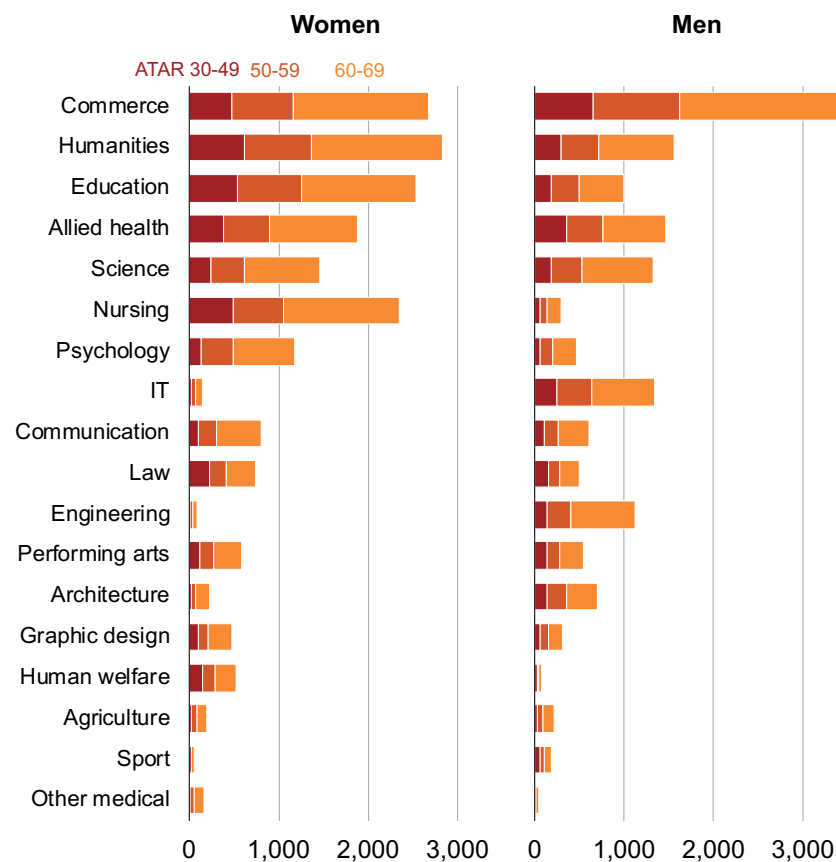


Note: Aged 20 or younger.

Source: Grattan analysis of Department of Education and Training (Student data collection, various years).

Figure 2.3: Lower-ATAR students mostly take commerce, humanities, education, and health-related courses

Domestic commencing bachelor-degree enrolments, 2016

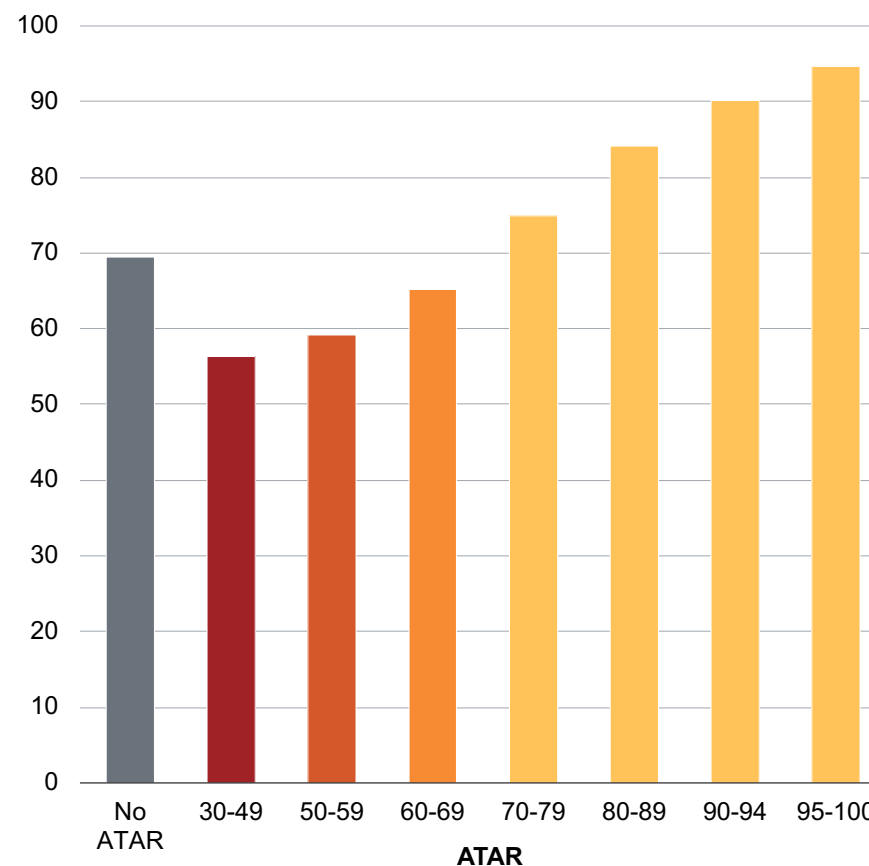


Note: Aged 20 or younger.

Source: Grattan analysis of Department of Education and Training (Student data collection, various years).

Figure 2.4: The lower the ATAR, the lower the course completion rate

Bachelor-degree completion rate after nine years, per cent



Notes: Cohort of students commencing in 2009. Completion of any higher education qualification at any institution, not necessarily the original qualification or institution. Domestic students only.

Source: Department of Education and Training (Cohort analysis, 2018a).

who do not have an ATAR. In these cases, universities frequently do not report ATAR information.²⁶

2.2 Course completion

Higher education

Low-ATAR students are more likely than high-ATAR students to leave university without completing their course. Nine years after enrolment, just over half of students with ATARs below 50 have completed. For students with ATARs between 50 and 59, just under 60 per cent have completed.²⁷ By contrast, more than nine in 10 students with ATARs above 90 have completed (Figure 2.4 on the previous page).

Vocational education

The vocational education system puts less emphasis on school results. Certificate III courses, which can be taken by current school students through the VET in Schools program, do not have strong academic requirements.²⁸ For Certificate IV and diploma courses, admission requirements vary but most students have Year 12 or a prior Certificate III-or-above qualification.²⁹ Historically, students in upper-level vocational courses have tended to have low to mid ATARs (Figure 2.1). But this is not recorded in vocational education enrolment data, and a vocational version of Figure 2.4 is not possible.

Completion rates for higher and vocational education cannot be compared directly. Early drop-outs are excluded for higher education

statistics but not for vocational education statistics.³⁰ A higher education student who moves to another course or university is counted as retained, but a vocational education student who moves to another course or provider is counted as leaving. Higher education completion rates are actual, while vocational rates are projections.

With these caveats, some published vocational completion rates can be cited. For full-time students aged 25 or younger, projected completion rates for government-funded upper-level vocational courses for 2016 commencers range from 62 per cent to 66 per cent.³¹ However, this analysis excludes most apprentices and trainees, who mix work and part-time study. Their completion rates are not reported by age, but most apprentices and trainees are 24 or younger. For the people who started their apprenticeship or traineeship in 2014, the projected completion rate is 57 per cent.³²

It is hard to compare vocational and higher education because of differences in the initial aptitude of students and how completion rates are calculated. Yet from available data, low-to-mid ATAR university students and vocational education students share high non-completion rates compared to the high-ATAR university student group.

26. Cherastidham and Norton (2018) and Norton (2018). In 2016, about 40 per cent of students whose ATARs could be retrieved had ATARs below 70.

27. Department of Education and Training (2018a).

28. NCVER (2018a).

29. NCVER (VOCSTATS, 2019b).

30. The reason for this is that there is no 'census date' in vocational courses. VET students who enrol and quickly decide to leave are counted as non-completers. In higher education, students who leave before the census date about four weeks into semester are not counted as enrolled or as not completing. Previous Grattan research found about 6 per cent of people who accepted a bachelor-level offer were never recorded as 'enrolled', suggesting they may have left university before the census date: Norton et al. (2018b, Figure 1.2).

31. NCVER (VOCSTATS, 2018b). This is an upward trend. The specific qualification projected completions are: diploma 62.5 per cent, Certificate IV 64.9 per cent, Certificate III 65.7 per cent.

32. NCVER (2019d, p. 7). This is a downward trend, with a projected 59.9 per cent completion for people who commenced in 2013. For trade occupations, the projected 2014 completion rate is 54.5 per cent. For non-trade occupations, the projected completion rate is 57.7 per cent.

Significance of non-completion risk

Although relatively high drop-out rates are a risk to career aspirations, they need not have significant other costs. Higher education students and apprentices or trainees who are not going to complete usually leave quickly.³³ This limits the time and money costs involved in trying a course.

Even when students do incur costs from incomplete courses, there are often benefits as well. In a Grattan survey of people who had dropped out of a bachelor degree, these included employment benefits, especially in gaining useful skills, and non-financial benefits such as finding the course interesting and making friends and connections.³⁴ Similarly, students who do not complete upper-level vocational qualifications mostly report some benefits. The most commonly cited benefits were advancing their skills, gaining confidence, making new friends, and improving communication.³⁵

2.3 Academic performance of students who complete a course

Higher education

Most low-ATAR (below 60) students graduate. Some get high marks.³⁶ But more typically, their academic results are worse than the rest of their graduating cohort. This affects their academic transcript and potentially their employment prospects, which are discussed in the next chapter.

In every academic field, low-ATAR graduates fail more subjects than students with higher ATARs (Figure 2.5). Although this broad pattern persists across all fields, absolute fail rates differ significantly. In

33. NCVER (2019d, pp. 12–15); and Norton et al. (2018b, p. 17).

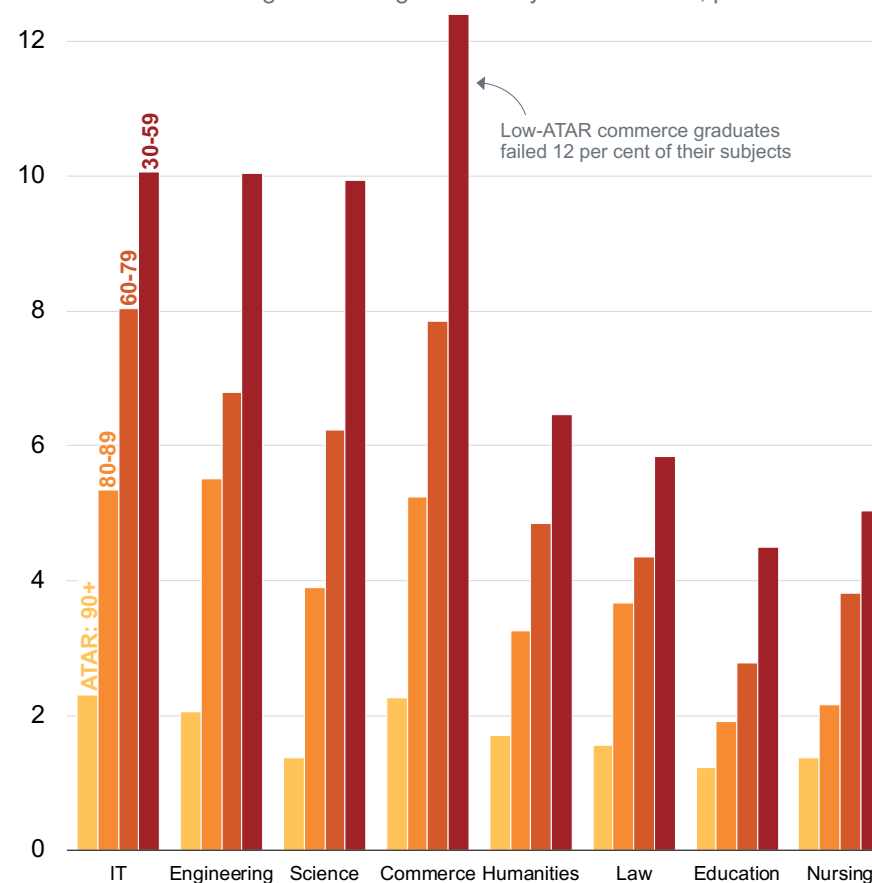
34. Norton et al. (2018b, Chapter 2).

35. Grattan calculations from NCVER (2019e). Students aged 15 to 25 only.

36. Kemp and Norton (2014, p. 18).

Figure 2.5: The lower the ATAR, the higher the fail rate

Fail rates of domestic graduates aged 20-25 by bachelor field, per cent



Notes: Bachelor-degree graduates only. Subjects failed as a proportion of subjects failed and passed. Withdrawn enrolments not included. For discipline classifications, see Table A.5 on page 63.

Sources: Grattan analysis of Department of Education and Training (GOS, 2016-17) and Department of Education and Training (Student data collection, various years).

education and nursing, low-ATAR graduate fail rates are similar to or below higher-ATAR graduates in other fields. In IT, engineering, science, and especially commerce, low-ATAR fail rates are high.

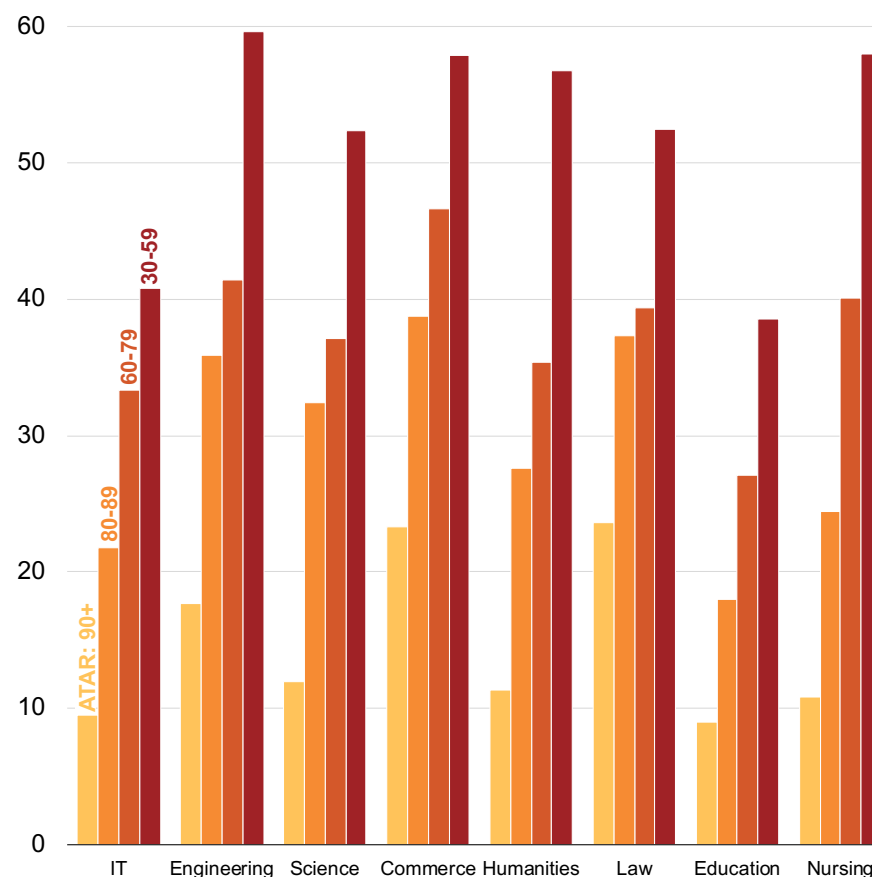
Failed subjects contribute to a graduate's average grades. Figure 2.6 shows that graduate with ATARs of 30-59 finished with lower average self-reported marks. In most fields, more than half of students who subsequently graduated had previously self-reported average marks below 70 per cent.

Vocational education

As with completions, exact academic success comparisons between vocational and higher education are not possible. In vocational courses, students are not given marks; they are assessed as competent or not competent. Lower-ATAR students pursuing the vocational path can avoid low marks appearing on their academic transcript.

Passes and fails are recorded on vocational transcripts. Upper-level vocational students who finished Year 12 and are aged 24 or younger successfully complete 82 per cent of the subjects they start. The main risk is withdrawing from a subject. Students pass 92 per cent of the subjects they complete. As in higher education, upper-level vocational education pass rates tend to be better in health and education than in engineering, IT, or business courses.³⁷

Figure 2.6: Lower-ATAR students are more likely to report low marks
Graduates with average marks below 70, per cent



Notes: Bachelor-degree graduates only. For discipline classifications, see Table A.5 on page 63.

Sources: Grattan analysis of Department of Education and Training (GOS, 2016-17) and Department of Education and Training (Student data collection, various years).

37. NCVER (2019f).

3 Employment outcomes

If low-ATAR students complete their course, they still risk relatively poor employment outcomes. Low-ATAR students typically have weaker employment prospects than their high-ATAR peers.

In higher education, recent graduates with low ATARs are less likely to find work and, if employed, are less likely to be in professional or managerial jobs than high-ATAR graduates. A slow start often has a lasting effect on both employment and earnings later in life.

ATAR is less of a guide to future employment outcomes for vocational education. Occupations served by vocational education typically require practical skills applied to predictable problems, and so academic ability is less of an advantage. But low-ATAR vocational qualification holders still generally earn a little less than those with high ATARs.

The estimated lifetime earnings of low-ATAR graduates are materially below the median for all graduates. For low-ATAR men, bachelor-degree earnings are slightly less than the median earnings from a vocational diploma. For low-ATAR women, however, bachelor degrees still deliver higher incomes than vocational education.

3.1 Human capital and academic ability

Qualifications usually bring labour market advantages, but exactly why is a source of debate. The ‘human capital’ argument is that through education, students acquire specific knowledge and skills that are valuable to employers. The qualification certifies that the student has these knowledge and skills.

The ‘signalling’ argument is that completion of, or even admission to, a course suggests to employers that a person with a qualification has valuable attributes, even if the course content is unrelated to the job.

For example, people who successfully complete a course signal that they are conscientious, conform to set requirements, and are intelligent enough to pass course requirements.

Academic performance is potentially relevant to both theories. Somebody who does well in their studies has more human capital: deeper knowledge and stronger skills directly relevant to specific topics or occupations. But the intelligence and other attributes that contribute to high marks are likely to also be valuable in jobs that are not directly related to the course’s content.³⁸

Although academic performance is likely to influence outcomes, it is still only one factor among many that affect employment and earnings. In a survey of Australian graduate employers, 12 per cent rated university grades as ‘very important’, with another 46 per cent regarding them as ‘quite important’. Communication, teamwork, and interpersonal skills were all rated as very important by clear majorities of employers.³⁹ For some employers, academic results may not be an important criterion for choosing between applicants.

In the occupations served by vocational education certificates, high levels of academic ability are not required (Box 1 on page 15). Students learn how to perform tasks and deal with largely predictable problems and situations, with classroom instruction supported by practice. These occupations are open to people who did not do especially well in school.

38. Caplan (2018).

39. AAGE/McCrindle (2019, p. 48). In another survey, 20 per cent of employers nominated ‘academic results’ in their top three selection criteria, along with interpersonal skills and communication skills: GCA (2016, p. 19).

And in other less-skilled jobs, beyond basic literacy and numeracy, academic results may not matter at all. Personality or physical strength may be more important than academic results. Skill is increased by practice rather than classroom learning.

3.2 ATAR and employment risk

The courses students take have different risk profiles that apply to some extent across ATAR levels. But within most fields, a lower ATAR adds to the risks of poor employment outcomes.

3.2.1 Short-term unemployment and under-employment

Consistent with expectations, Figure 3.1 shows that lower-ATAR graduates are more likely to be unemployed or under-employed (that is, working part-time but wanting longer hours) soon after they graduate.⁴⁰ In most fields, graduates compete for entry-level jobs and limited spots in graduate programs. Lower-ATAR graduates typically have weaker academic outcomes (see Chapter 2), and with less impressive CVs they may struggle to find work relative to higher-ATAR contemporaries.

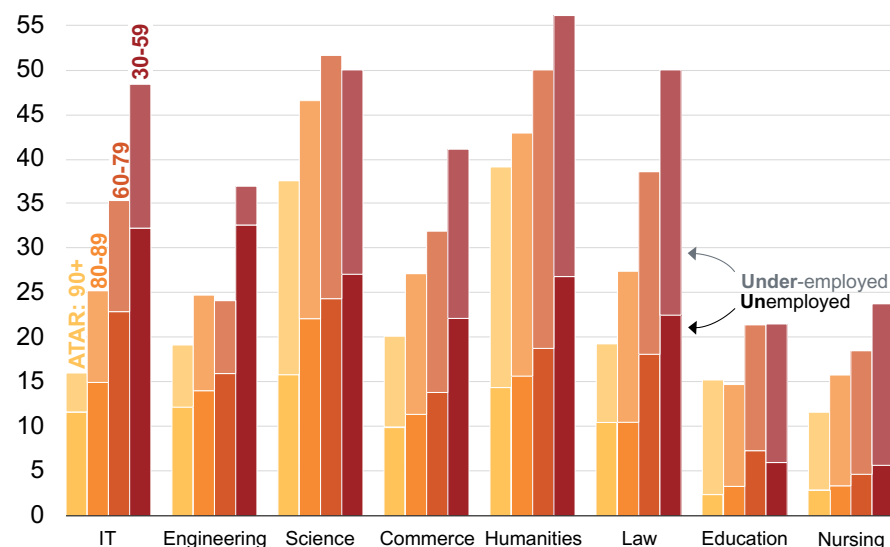
The risks of unemployment and underemployment differ significantly between fields. About one in 10 engineering and IT graduates with an ATAR above 90 were unemployed, compared to one in three IT and engineering graduates with an ATAR below 60. By contrast, few nursing and teaching graduates are unemployed irrespective of ATAR levels, although unemployment is slightly worse for lower-ATAR graduates.

For science and humanities, combined unemployment and under-employment is high across the ATAR range. Although high-ATAR graduates in these fields are better off than their lower-ATAR peers, they are doing worse than mid- and even lower-ATAR graduates in

other fields. Although high-ATAR graduates in science and humanities are likely to have impressive academic transcripts, signalling their intelligence and their diligence as students, too few jobs directly require the knowledge or skills they have acquired in their degrees.⁴¹

Figure 3.1: Lower-ATAR graduates are more likely to be unemployed

Unemployment and under-employment rates for bachelor graduates four months after they graduate, per cent



Notes: 20-25 year-old domestic bachelor graduates four months after graduation. Those pursuing further study are excluded from the analysis. For discipline classifications, see Table A.5 on page 63.

Source: Grattan analysis of Department of Education and Training (2016-17).

40. The data is from a relatively difficult period for new graduates, with unemployment and under-employment rates high by historical standards (Figure 1.3).

41. For a discussion of science-related jobs, see Norton and Cakitaki (2016, Chapter 10).

3.2.2 Professional job attainment

A key benefit of higher education is opening access to professional jobs. In most fields, graduates with higher ATARs find professional jobs more easily than others. Figure 3.2 shows that two in three high-ATAR law graduates are in professional employment soon after finishing their degree, compared to only one in eight low-ATAR law graduates. But even high-ATAR law graduates have less chance of professional employment soon after graduation than lower-ATAR engineering, education, or nursing graduates.

Relatively few recent science and humanities graduates find professional employment even if they have a high ATAR. Only half of employed high-ATAR science graduates and only about 40 per cent of humanities graduates find professional work soon after completing their courses. Among low-ATAR science and humanities graduates, only about 20 per cent find professional employment. Graduates of these popular courses must compete for jobs open to applicants from a wide range of fields.⁴²

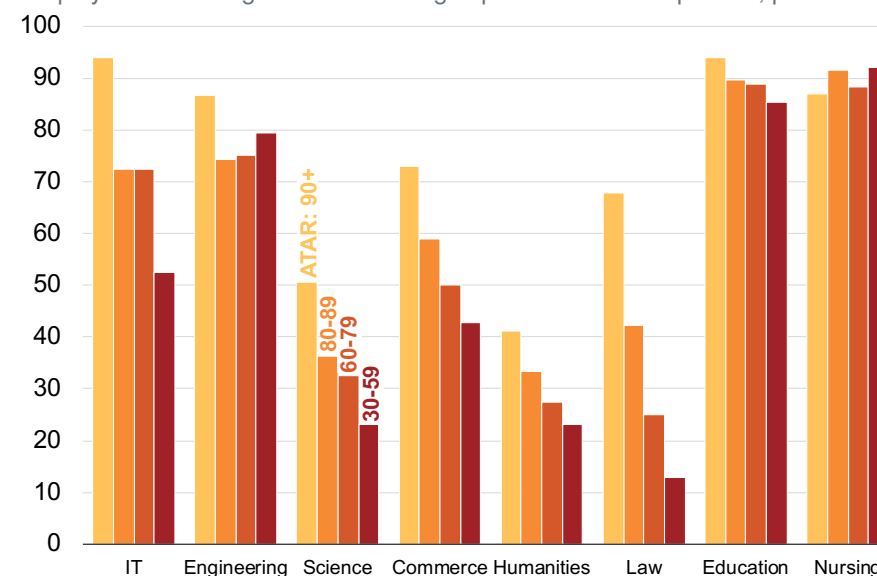
In nursing and education, rates of professional employment are high across all ATAR levels. Engineering graduates also have similar rates of professional employment across ATAR levels. Possessing specific, in-demand ‘human capital’ skills delivers substantial professional employment benefits.

Some fields of education that are less likely to lead to high-skill jobs often expand quickly. In 2017, more than a third of domestic bachelor-degree graduates had science, humanities, psychology, or creative arts degrees.⁴³ Employer demand was overwhelmed by increased numbers of new graduates in these fields. Since 2017, these

fields attracted a large share of enrolment growth, so the risk of their graduates not securing high-skill employment is likely to remain high.

Figure 3.2: Employed lower-ATAR graduates are less likely to be working in professional jobs

Employed bachelor graduates working in professional occupations, per cent



Notes: 20-25 year-old domestic bachelor graduates employed four months after graduation. Those pursuing further study are excluded from the analysis. For discipline classifications, see Table A.5 on page 63.

Source: Grattan analysis of Department of Education and Training (2016-17).

42. Humanities is the second most popular course for commencing bachelor degree students, and science the third most popular: Figure 1.7 on page 16.

43. Special data request to the Department of Education and Training (2019). Creative arts include performing arts, graphic design, and communication.

3.2.3 ATAR and income of early-career graduates

Australian and international research has previously found that people with better school results have higher incomes when they enter the workforce.⁴⁴ One reason is that high-ATAR high-school graduates have more university options and tend to enrol in fields with higher payoffs. For example, a student who achieves an ATAR of 99 is more likely to be accepted into medicine, engineering, or law than a student with a much lower ATAR, and graduates of these fields tend to have high incomes. A student with a low ATAR is more likely to study nursing or humanities, which typically lead to lower incomes.⁴⁵

ATAR affects income within as well as between fields of education. Figure 3.3 shows a relationship between ATAR and an early-career graduate's income.⁴⁶ It shows the percentage increase in income associated with a 10-point increase in ATAR.

For female science graduates, for example, a 10-point increase in ATAR is associated with earning 3.3 per cent more a year, so a 90 ATAR graduate would typically earn about 10 per cent more than a 60 ATAR graduate. For male science graduates the annual premium is 4.3 per cent, so a 90 ATAR graduate would typically earn about 13 per cent more than a 60 ATAR graduate.

44. The Graduate Destination Survey, a predecessor to the short-term employment outcomes survey data used throughout this chapter, was used to show that, on average, a 10-point increase in ATAR was associated with a 3 per cent increase in incomes four months after graduation: Carroll et al. (2018, p. 17). In the United States, longitudinal surveys show strong relationships between final-year high-school grades, university performance and graduate outcomes: Bulman (2017). In the United Kingdom, the Department for Education's Longitudinal Education Outcomes dataset shows that for bachelor degrees there is a strong correlation between high-school performance and median earnings five years after graduation: Department for Education (UK) (2019).

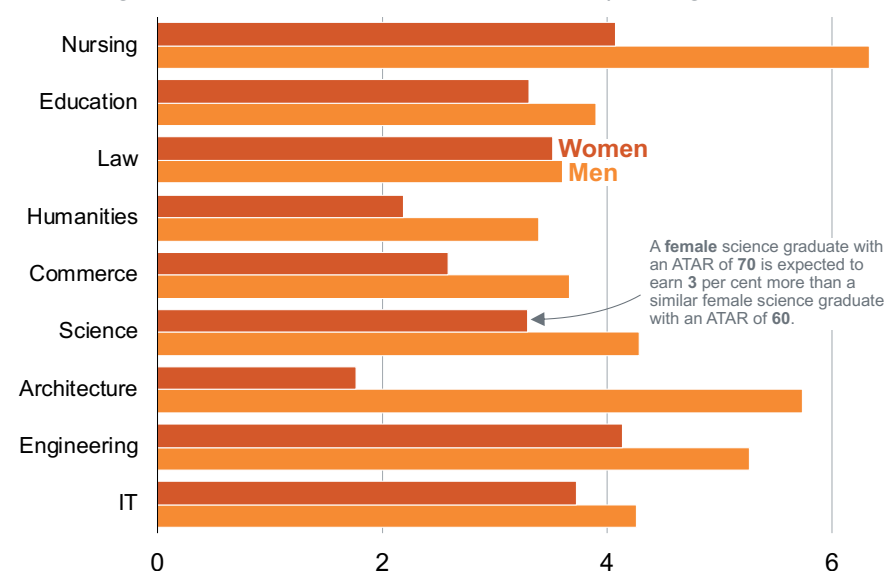
45. Norton et al. (2018a, p. 82).

46. In this section, 'early career' refers to graduates aged 21-25. See Appendices A and B for how this analysis was done.

These outcomes are consistent with the theory that people with higher ATARs typically have stronger academic records and abilities, and these typically lead to better jobs and higher pay. The ATAR effect is larger for men than women across all fields.

Figure 3.3: The higher the ATAR the higher the income for early-career bachelor graduates

Percentage increase in income associated with a 10-point higher ATAR



Notes: 21-25 year-old domestic bachelor graduates one to four years after completing their degree who were working full-time. Only major fields are shown. Excludes those pursuing further study. ATAR was imputed for respondents who did not report their ATAR. For methodology, see Appendix A.

Source: Grattan analysis of NCVER (LSAY, various years).

3.2.4 Poor initial outcomes often persist

The months just after course completion are the most difficult period in the labour market for young graduates. Outcomes usually improve with age. For example, in 2015, about 67 per cent of new graduates looking for full-time work had found it. Three years later, in 2018, nearly 90 per cent of the 2015 cohort looking for full-time work had found it.⁴⁷

But Census data confirms that although most graduates find and keep jobs, not all do, and those who struggle early are more likely to struggle later. Among graduates aged 20-24 in 2011, those who were unemployed in 2011 are four times more likely to be unemployed five years later than those who had full-time work in 2011. Young graduates who had part-time work in 2011 were also more likely to be unemployed five years later than those who had a full-time job in 2011.⁴⁸ The persistence in unemployment also affects older graduates.⁴⁹

Not all bachelor graduates find professional employment as they get older. Low wages, and employment in jobs that don't use their skills, persist at least until mid-career. In 2006, more than a quarter of bachelor-degree graduates aged 20-24 worked in sales and service occupations. Figure 3.4 shows that ten years later only half of these people had found a professional job. About a third remained in sales and services. These graduates are more likely to have studied humanities, commerce, or science.⁵⁰ Most young graduates who were professionally employed in 2006 still held a professional job in 2016.

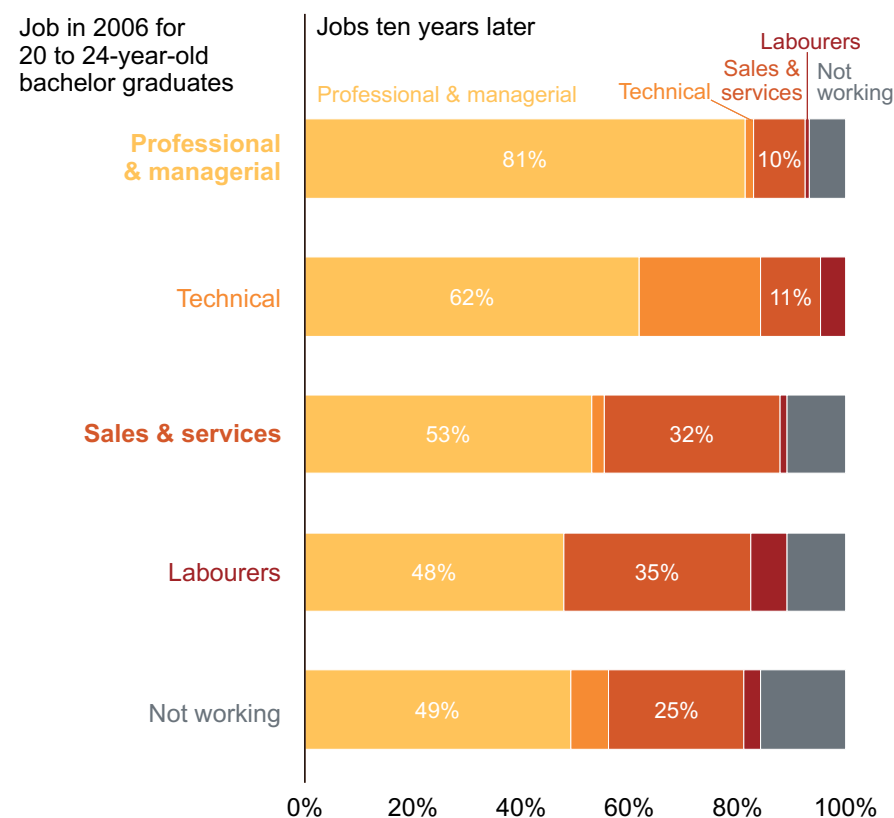
47. Department of Education and Training (2018c, p. 6).

48. Grattan analysis of ABS (ACLD, 2018d). A similar pattern is observed in the three-year-out survey. Of the graduates who were unemployed in 2015, 15 per cent were still unemployed in 2018. Of the graduates who had been employed in 2015, only 4 per cent were unemployed in 2018: Department of Education and Training (2018c, p. 23).

49. Grattan analysis of ABS (ACLD, 2018d).

50. Grattan analysis of ABS (Census, 2016b).

Figure 3.4: Only half of graduates aged 20-24 who worked in lower-skill jobs in 2006 had professional jobs 10 years later



Note: Australian citizens aged 20-24 in 2006 with a bachelor degree as their highest qualification and who did not pursue further study.

Source: Grattan analysis of ABS (ACLD, 2019c).

3.3 Employment outcomes for vocational qualification holders

University graduates with lower ATARs are likely to be less well-rewarded in the labour market than their higher-ATAR peers. However, in thinking about their post-school options this is not necessarily evidence against choosing university. For lower-ATAR school leavers, the question is not whether they will do better than a higher-ATAR student; instead they should weigh-up their own realistic alternatives. One of those alternatives is vocational education.

3.3.1 Unemployment and under-employment

The time immediately after finishing a vocational education qualification can be difficult, as it is for higher education graduates. Like bachelor graduates, young people finishing vocational qualifications have higher rates of unemployment than the national average. The two groups have similar unemployment rates soon after finishing their respective training, as well as significant differences between fields.

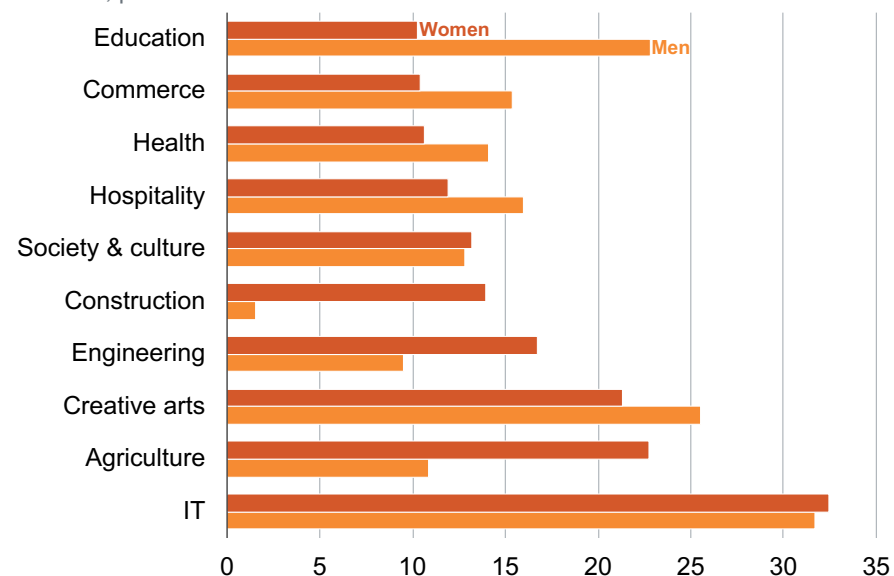
For men pursuing upper-level vocational education, engineering qualifications are most common. About 10 per cent of men were unemployed in May the year after they had completed an engineering qualification in the three years to 2018 (Figure 3.5). Fewer were unemployed than bachelor-degree graduates from engineering (Figure 3.1), although the vocational survey generally allows more time to find a job.⁵¹ People with qualifications in construction, the second-largest source of employment for men with Certificate III and above vocational qualifications, had the lowest unemployment rate.

51. Higher education graduates are surveyed four to six months after completing their course. Vocational qualification holders are surveyed in May the year after completing their course. For people who finished their vocational qualification at the end of the previous year, the time to find employment would be similar to higher education graduates. But other new vocational qualification holders would have longer to find a job.

For women, commerce-related vocational qualifications are the most common, followed by society and culture. Each had unemployment rates averaging between 10 and 13 per cent in the three years to 2018 (Figure 3.5). For lower-ATAR commerce bachelor-degree graduates, early unemployment rates are higher than this, although measured over a shorter period.

Figure 3.5: Unemployment after vocational study varies significantly by field of education

Unemployment rate of people who recently completed upper-level vocational courses, per cent



Notes: Certificate III/IV and diploma completers. Covers the three years to 2018. Domestic students aged 18-24 whose prior highest education was Year 12. Excludes those pursuing further studies. Data is available only at the 2-digit field of education level. See Table A.5 on page 63 for information on how this relates to the classifications used in most other charts in this report.

Source: Grattan analysis of NCVER (2019e).

The largest fields for men and women have relatively low unemployment. By contrast, people who complete creative arts and IT qualifications are much more likely to be unemployed. The number of jobs has grown in IT, but newly-qualified people often have difficulty finding work. Figure 3.5 shows that 30 per cent of people with a vocational IT qualification were unemployed in May the year after they completed their course. Lower-ATAR IT bachelor-degree graduates had similarly high rates of unemployment (Figure 3.1). Mismatches between skills taught and what industry needs, and the labour market exposure to competition from migrants and international outsourcing, are substantial factors in IT.⁵²

Figure 3.5 also shows large gender differences in unemployment, particularly in vocational fields with large gender imbalances in enrolment. Women are more likely to be unemployed than men in male-dominated fields: construction (14 per cent of women compared to 2 per cent of men), engineering (17 per cent compared to 9 per cent), and agriculture (23 per cent compared to 11 per cent). Men entering the female-dominated education industry are twice as likely to be unemployed as women.⁵³

The unemployment figures in Figure 3.5 cannot be compared by ATAR because it is not recorded in the vocational education enrolment data. But the Longitudinal Surveys of Australian Youth (LSAY) data can be used to assess the likelihood of unemployment up to age 25. In most fields, a vocational education student with a lower ATAR is slightly more likely to be unemployed after completing their qualification, as Figure 3.6 shows. But in all fields a 10-point difference in ATAR was associated with higher unemployment of less than 1 percentage point.

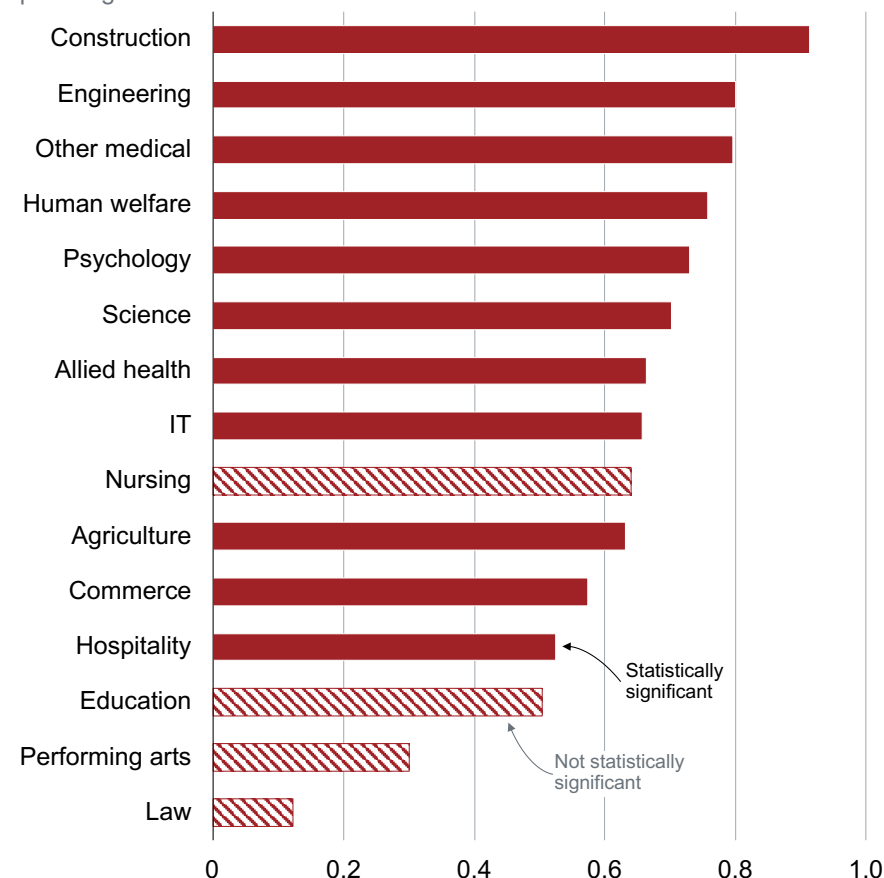
ATAR can predict employment outcomes less for people with vocational compared to higher education qualifications. The academic ability

52. Norton and Cakitaki (2016, pp. 92–95).

53. See also Booth and Leigh (2010).

Figure 3.6: The higher the ATAR, the lower the risk of unemployment in vocational education

Percentage point reduction in the unemployment rate associated with a 10-point higher ATAR



Notes: 21-25 year-old domestic Certificate III/IV and diploma holders. Excludes people pursuing further study. ATAR was imputed for respondents who did not report their ATAR. For methodology, see Appendix A.

Sources: Grattan analysis of NCVER (LSAY, various years).

measured by ATAR is less useful for the occupations served by vocational education (Section 3.1). Vocational education academic transcripts do not have marks, and so above-average proficiency is less clearly signalled to prospective employers. But ATAR appears to have a modest effect in most fields, suggesting that average vocational education statistics understate the likely employment outcomes of mid-ATAR school leavers.

3.3.2 Relevant job attainment

Bachelor graduates expect to find professional work after graduation, and this is the benchmark set for them in Section 3.2.2. Vocational qualification holders pursue jobs in a wider spectrum of occupational classifications, and so a different measure is needed.

Aside from pursuing further study, most vocational education students aim to find relevant work after training. Figure 3.7 shows that most succeed by May in the year after they complete their course. But rates of finding relevant work vary greatly between fields of qualification.

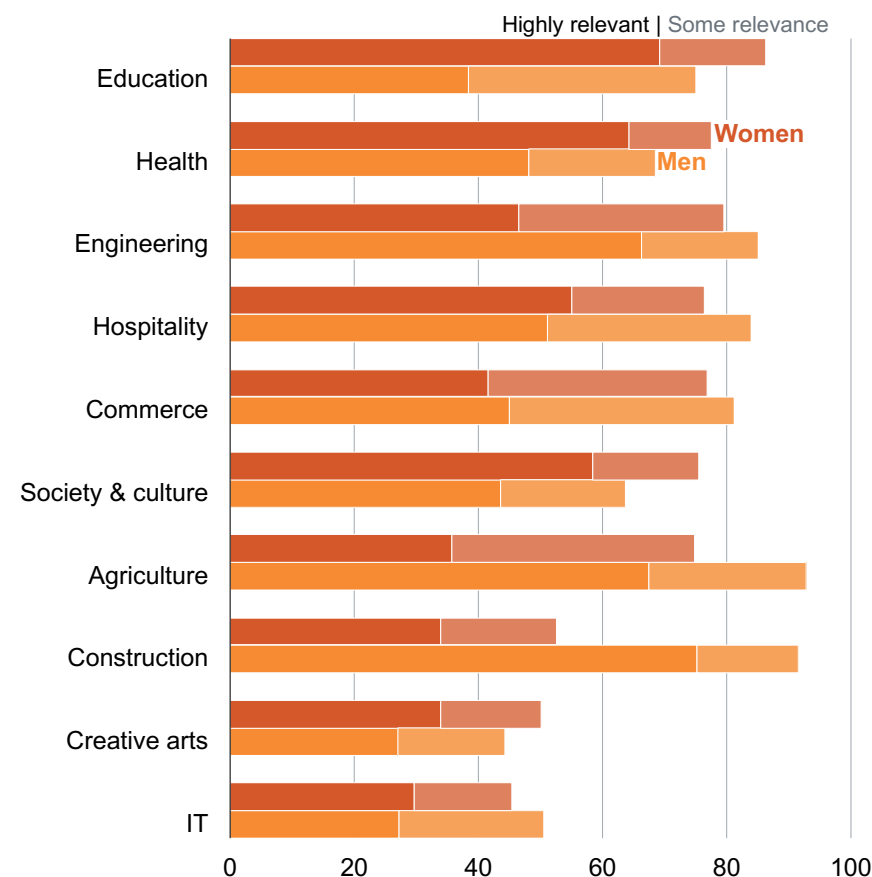
More than four in five employed male vocational engineering qualification holders were in a ‘relevant occupation’ after graduation.⁵⁴ This is about the same rate of professional employment for high-ATAR bachelor of engineering graduates (Figure 3.2).

Rates of relevant work for women with vocational qualifications are high in education and health fields, similar to their bachelor equivalents. Four in five employed people with vocational commerce qualifications find work they consider relevant to their training. This is higher than commerce bachelor graduates with ATARs above 90, three-quarters of whom find professional work after graduating.

54. This includes work that was ‘highly relevant’ or had ‘some relevance’. See NCVER (2019g, p. 133).

Figure 3.7: Vocational education usually leads to relevant work

Whether vocational training was relevant to current occupation, per cent



Notes: Highest prior education is Year 12 only. Excluding people who pursued further study after graduation.

Sources: NCVER (VOCSTATS, 2019e).

Vocational qualification holders from society and culture courses found relevant work at higher rates than bachelor graduates.⁵⁵ However, there is a different mix of courses within society and culture in vocational compared to higher education. Vocational education society and culture courses lead directly to occupations, such as a child carer and welfare support worker. Higher education society and culture courses such as humanities lack these close links to jobs.

3.3.3 ATAR and income of vocational graduates

Although higher ATARs are associated with lower unemployment for people with vocational qualifications, for those who have full-time early-career jobs (that is, at ages 21-25), ATAR has a less consistent link with income, as Figure 3.8 shows.

Our analysis found no discernible difference between incomes of low- and high-ATAR male vocational qualification holders in education, humanities, commerce, or IT.⁵⁶

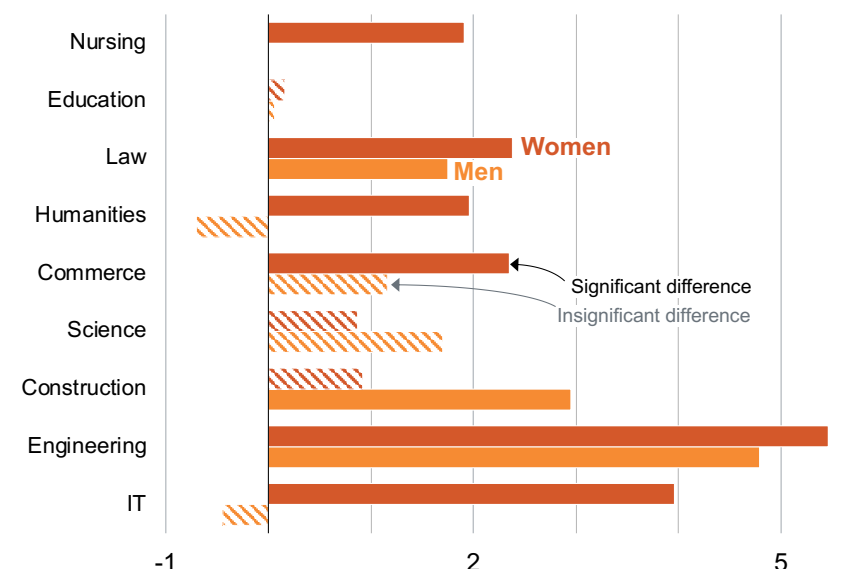
The ATAR-income relationship holds more for vocationally-educated women than for men. In nursing, law, humanities, and commerce, a 10-point increase in ATAR is associated with about a 2 per cent increase in income for women. This is slightly weaker than for similar bachelor graduates (Figure 3.3).

For men and women, engineering and construction vocational qualification holders with higher ATARs tend to earn more than those with lower ATARs. People with an ATAR 10 points higher tend to earn about 5 per cent more, around the same effect that ATAR has for higher education engineering graduates.

Although the relationship between academic ability and income is, as expected, less clear for vocational than higher education, other

Figure 3.8: ATAR and income are less clearly linked for vocational qualifications

Percentage increase in income associated with a 10-point higher ATAR



Notes: 21-25 year-old domestic vocational qualification holders 1 to 4 years after completing their qualification, who were working full-time. Only major fields are shown. Excludes people pursuing further study. Vocational qualifications include Certificate III to advanced diploma. ATAR was imputed for respondents who did not report their ATAR. See also Figure 3.3 and Appendix A.

Sources: Grattan analysis of NCVER (LSAY, various years).

55. See Table A.5 on page 63 for a detailed breakdown of fields of education.

56. This does not necessarily mean there was no relationship. See Appendix A.

data sources suggest that it exists. ABS data shows that people with a Certificate III/IV or diploma who have dropped out of university typically earn more than Certificate III/IV or diploma holders who never tried university.⁵⁷ Their admission to university suggests that they have above-average academic ability for people with vocational qualifications.

3.4 Lifetime incomes of low-ATAR graduates

The persistent pattern of lower-ATAR university students doing less well from their degree early in their careers, along with evidence that a higher ATAR is associated with slightly better outcomes for people with vocational qualifications, supports the theory from Section 3.1 that people with lower ATARs, by university standards, will be over-represented in the lower part of the bachelor-degree income range. Although the ATAR relationship is often weaker in vocational education, if people with lower ATARs choose a vocational course, it is still likely that they will be over-represented in the group with relatively high earnings.

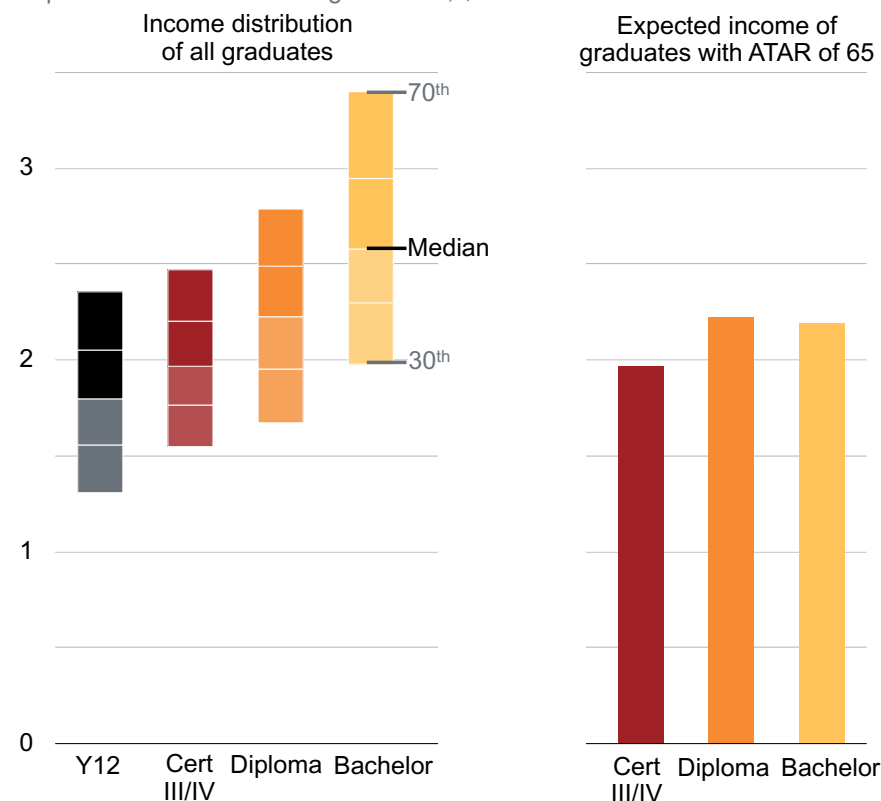
Unfortunately, no data source tracks outcomes by ATAR over the very long term. This section uses LSAY and Census data to estimate lifetime income (see Appendix B for our methodology). As with ATAR and shorter-term employment outcomes, there is a range of longer-term outcomes. Some high-ATAR bachelor-degree graduates do not have financially rewarding careers, and some low-ATAR graduates have high incomes. We are looking here at broad patterns that show risks and opportunities.

Expected lifetime earnings for men

For a male bachelor-degree graduate with an ATAR of 65 (the median ATAR in LSAY for people who complete an upper-level

vocational qualification), his expected lifetime earnings are \$2.2 million (Figure 3.9), after deducting courses costs and income tax. This is nearly \$400,000 less than the median for all bachelor-degree

Figure 3.9: Lower-ATAR men could potentially earn more with a diploma
Expected net lifetime earnings for men, \$2016 million



Notes: Post-tax lifetime income net of course costs. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

57. ABS (2016a). See the chart at Norton et al. (2018b, p. 20).

graduates. For graduates with ATARs below 65, the gap between their likely earnings and the median would be larger. As well as being below the expected earnings for the typical bachelor-degree graduates, a graduate with an ATAR of 65 is expected to earn \$30,000 less over their lifetime than a diploma holder with the same ATAR, but materially more than someone who finished their education at Year 12 or completed a Certificate III/IV.

In 2016, about one in five male school-leavers who commenced a bachelor degree had an ATAR of 65 or less. Compared to higher-ATAR graduates, they are at greater risk of not getting the potential financial rewards of higher education. Compared to vocational diploma holders with lower ATARs, they have a greater chance of above-median income from vocational education. But not every diploma leads to higher income. As in higher education, for diplomas some fields of education do better than others. Chapter 4 examines choices for men in more detail.

Expected lifetime earnings for women

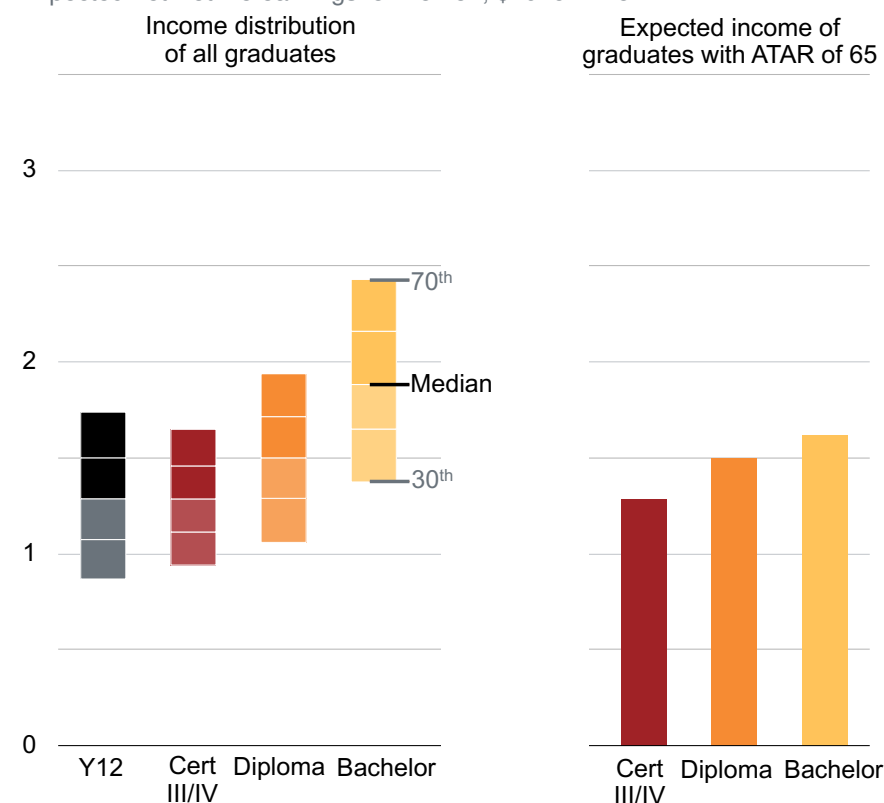
Like men, women with an upper-level vocational qualification generally have lower ATARs than bachelor-degree graduates. In LSAY, the median ATAR for women with a diploma or Certificate III/IV is 65, while the median ATAR for female bachelor-degree graduates is 85.⁵⁸ And as for male graduates, a female graduate with a lower ATAR is expected to earn less than the median for all female graduates (Figure 3.10). Over her career, the lower-ATAR women is expected to earn nearly \$400,000 less.

Unlike men, however, low-ATAR female bachelor-degree graduates are still expected to earn more than low-ATAR upper-level vocational education holders. Female graduates with an ATAR of 65 are expected

to have lifetime earnings of \$1.5 million – \$120,000 more than the expected earnings of diploma holders and \$200,000 more than for Certificate III/IV holders with the same ATAR. The career options for lower-ATAR women are explored in more detail in Chapter 5.

Figure 3.10: Lower-ATAR women are typically better off at university

Expected net lifetime earnings for women, \$2016 million



Notes: Post-tax lifetime income net of course costs. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

58. Grattan analysis of NCVER (LSAY, various years). Including imputed ATAR. For methodology, see Appendix B.

4 Men's choices

Lower-ATAR men focused on their career and future income face complex post-school choices. The generally true assumption that a university qualification leads to a higher income does not necessarily apply. It depends on their course choice.

At any ATAR, men who study humanities are at high risk of earning less than graduates in most other university disciplines and significant numbers of vocational diploma holders. The risks for lower-ATAR humanities graduates are even higher. Many vocational education courses have better earnings prospects, although not all of them will appeal to humanities students. Commerce is the most likely alternative discipline for a humanities student.

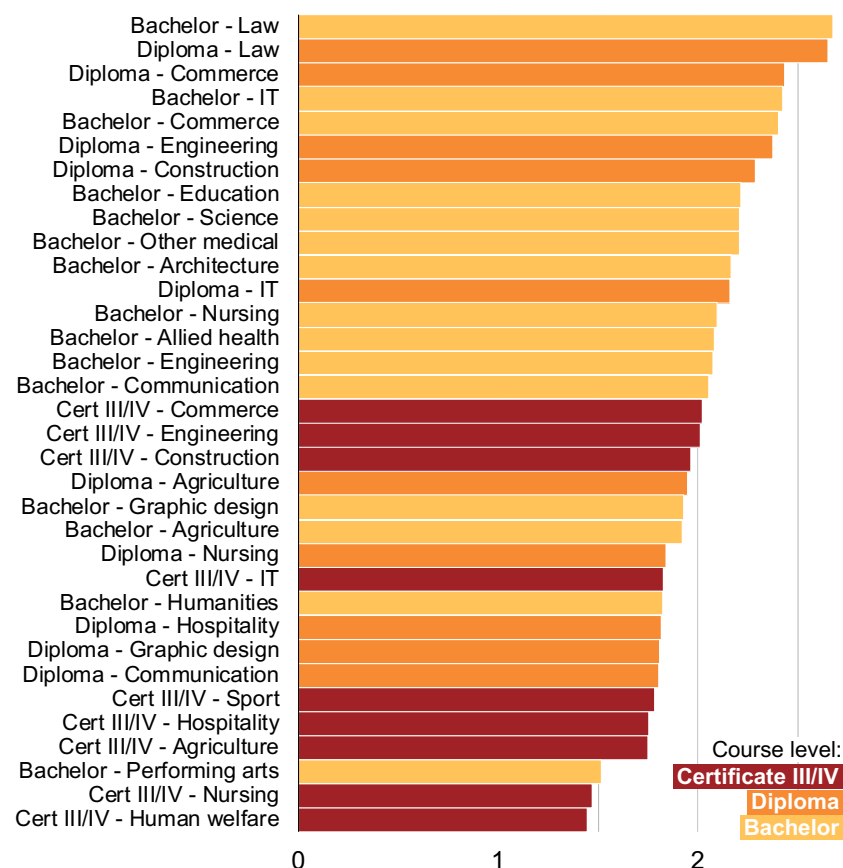
Lower-ATAR science bachelor-degree graduates do better than humanities graduates, but also face significant financial risks. An engineering diploma is the vocational alternative most likely to provide better earnings prospects.

4.1 Potential vocational choices for lower-ATAR men

Earnings vary significantly across disciplines, so whether a male lower-ATAR student could earn more in vocational than higher education depends on his study plans. Figure 4.1 shows estimated expected lifetime earnings for a male with an ATAR of 65 (see Appendix B for the methodology). This creates a more realistic list of choices than comparing vocational and higher education qualifications overall. In each sector, there are courses with high and low earnings estimates. Most, but not all, of the top 10 courses for estimated earnings are bachelor degrees. And most, but not all, of the bottom 10 are vocational courses.

Figure 4.1: Lower-ATAR men have some strong earnings options at the diploma level

Expected net lifetime income of men with ATARs of 65, \$2016 million



Notes: Post-tax lifetime income net of course costs. Excluding medicine. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

4.2 Realistic choices

While some courses clearly have a lower-risk of poor outcomes than others, this does not translate easily into useful educational advice. Students do not choose degrees just for a job or to maximise their income. According to ABS data, while most bachelor-degree students give a job-related reason as their main reason for study, 10 per cent say enjoyment or interest is their main reason.⁵⁹ And when not forced to rank their reasons, 95 per cent of first-year university students agree with the proposition that ‘studying in a field that really interests me’ is an important reason for enrolling.⁶⁰

Prospective students often have multiple interests, but these do not stretch across the full range of post-school courses. Interests are a personality trait. They evolve during childhood and are usually quite stable in adults.⁶¹ Encouraging someone to take a course, and after that a career, that does not fit within their interests is unlikely to lead them to a happy or fulfilling future. Telling a prospective performing arts student that on average accountants earn more is accurate, but probably unhelpful.

The sections that follow use university applications and course change data to determine which courses might interest a prospective student.⁶² These data sources reveal clusters of student interests that are often found together. If advised of employment risks or opportunities, students might be willing to change course choices within their group of interests.

Course choices are also constrained by entry requirements. Few lower-ATAR students are offered places in medicine or other in-demand health fields at university. Although engineering courses are accessible

in vocational education, at university they are difficult to get into for lower-ATAR applicants.⁶³ Law courses, similarly, typically have high ATARs except in some newer law schools with lesser reputations.

This chapter focuses on potential choices for men considering enrolling in humanities or science courses. These have been chosen because they are large fields with unfavourable employment and earnings prospects.

4.3 Vocational alternatives

Humanities

Although most higher education humanities students are women, it is the second-most popular course for low-ATAR men (Figure 2.3 on page 19). Of male humanities commencing students with an ATAR, one in four have an ATAR of 65 or below.

As Figure 4.1 shows, the earnings prospects of lower-ATAR male humanities graduates are worse than for diploma and Certificate III/IV holders in many fields.

But Figure 4.2 shows that the vocational fields that tend to pay more than a humanities bachelor degree are seldom realistic alternatives. Few men with an interest in humanities express a preference for or switch to engineering, architecture, or IT. Although the ABS classifies policing diplomas as ‘law’ courses, most university students would see policing as a very different course choice to law. Very few police officers have humanities degrees.⁶⁴

Figure 4.3 narrows down the choices of lower-ATAR male humanities students to their likely realistic vocational education alternatives. Male

59. ABS (2018b).

60. Baik et al. (2015, p. 24).

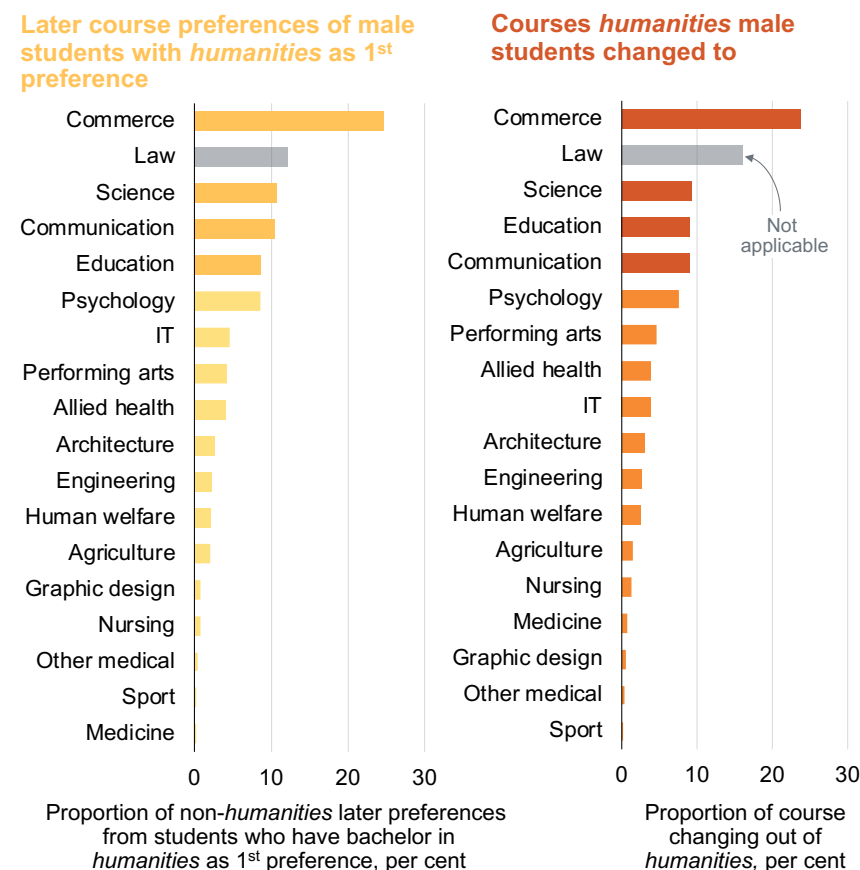
61. Nye et al. (2012); and Rounds and Su (2014).

62. See Appendix C for more detail.

63. Department of Education and Training (2018d, p. 44).

64. According to the 2016 Census, 420 male police officers have a humanities degree as their highest qualification: ABS (Census, 2016b).

Figure 4.2: Commerce is the most compatible course for male humanities students

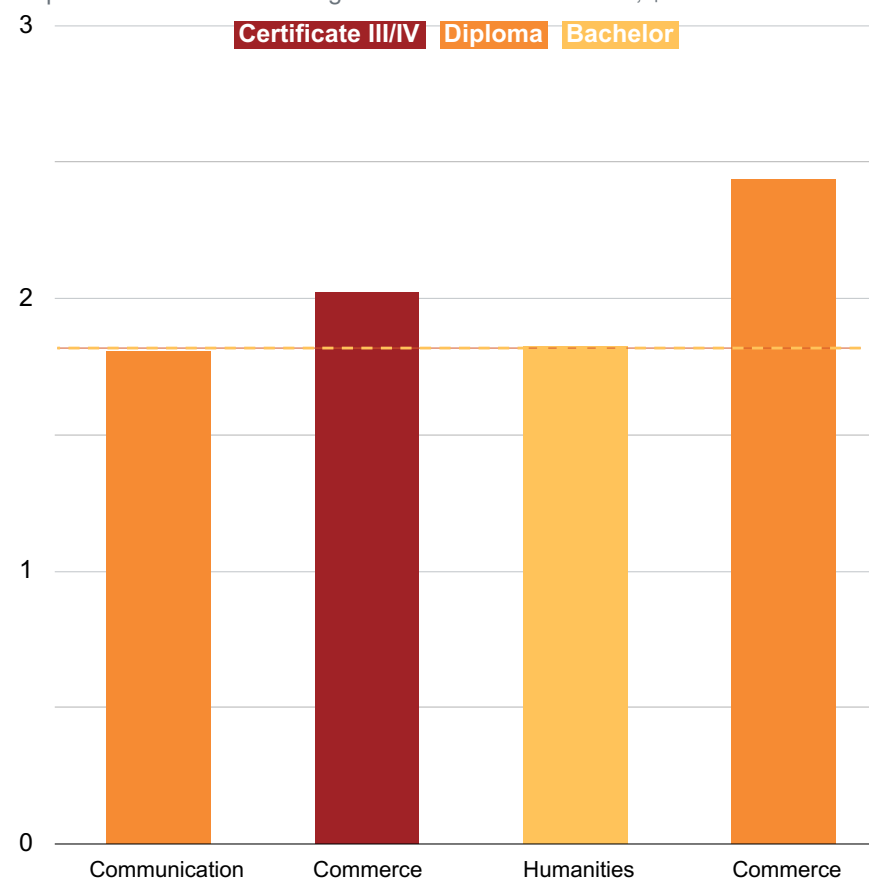


Note: For methodology, see Appendix B.

Sources: Grattan analysis of Department of Education and Training (Student data collection, various years).

Figure 4.3: Male prospective humanities students have stronger earnings options in vocational education

Expected net lifetime earnings of men with ATARs of 65, \$2016 million



Notes: Post-tax lifetime income net of course costs. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

humanities graduates with an ATAR of 65 have expected lifetime earnings of about \$1.8 million, below the \$2.1 million estimate for male humanities graduates overall (median ATAR of 85). As Chapter 3 shows, lower-ATAR humanities graduates are more likely to be unemployed or under-employed than high-ATAR graduates and less likely to have a professional job. Lower-ATAR humanities graduates who have a job often earn less than those with a high ATAR.

Men with an ATAR of 65 and a diploma in commerce can expect to earn about \$2.5 million over their lifetime, and about \$2 million for a Certificate III/IV in commerce. In other words, for men with similar ATARs, commerce diploma holders can expect to earn about 30 per cent more, and the holders of Certificate III/IV in commerce can expect to earn 10 per cent more, than humanities graduates. Men with a diploma in communication have similar estimated lifetime earnings as men with a humanities bachelor degree.

For school leavers, however, there are some important caveats to these earnings projections. Occupational requirements change over time. Some occupations are no longer options for people with diplomas of commerce. For example, from 2019 financial advisers must have a bachelor degree.⁶⁵ For some business occupations, even if a bachelor degree is not legally required, graduates may be more competitive in the labour market.⁶⁶ Major occupations for people with vocational commerce qualifications, such as processing financial transactions, have been widely automated, and this trend is likely to continue.

Men with a diploma of commerce are likely to earn more if they have other qualifications and experience. Even for relatively young diploma of commerce students (that is, aged 20-24), nearly 30 per cent already

have another diploma or a Certificate III/IV. For older students (aged 30-39), nearly 40 per cent already have an upper-level vocational qualification.⁶⁷ Many of them are likely to already being doing well in their careers, and their commerce diploma is for additional skills, not to enter a new industry or field.

Science

Science is a popular course for lower-ATAR men (Figure 2.3 on page 19). 1,300 men with an ATAR below 70 enrolled in a science bachelor course in 2016, up from 700 in 2007.

Science graduates have higher estimated lifetime earnings than humanities graduates (Figure 4.1). But in recent years science graduate employment outcomes have deteriorated, making these estimates based on census data seem optimistic.⁶⁸ Between 2006 and 2016, science graduates became less likely to work full-time or work in a professional job.⁶⁹ With science enrolments growing by nearly 10 per cent between 2015 and 2017, compared to a less than 1 per cent increase in enrolments overall, in coming years there will be more science students graduating and looking for a job. They will find it difficult to compete for the more general professional jobs open to graduates from a range of fields. Lower-ATAR science graduates will find it even tougher (Chapter 3).

For lower-ATAR male bachelor-degree students interested in science but hoping to avoid these employment risks, Figure 4.4 shows other compatible vocational education options. Male science graduates with an ATAR of 65 are expected to earn \$2.2 million over their lifetime, which is similar to men with an IT diploma but below men with commerce or engineering diplomas.

65. Australian Securities and Investments Commission (2017).

66. This shift is less likely to affect Certificate III/IV holders since they are unlikely to become professionals. About 8 per cent of men aged 25-34 with a Certificate III/IV in commerce worked in a professional job in 2016: ABS (Census, 2016b).

67. NCVER (VOCSTATS, 2019b).

68. Norton and Cakitaki (2016, Chapter 10) provides a detailed analysis.

69. Norton et al. (2018a, Chapter 10).

Of the alternatives, engineering is the most popular compatible discipline; one in five students who chose science as their first course preference had engineering as a back-up option. Male science graduates have worse employment outcomes than diploma holders in engineering because they are less likely to work full-time. During their early career (aged 25-34), 83 per cent of all men with a diploma in engineering work full-time, compared to 78 per cent of male science graduates. The gap remains as they get older. Male science graduates are twice as likely to work in sales and services as men with a diploma in engineering.⁷⁰

Nearly half of men with a diploma in engineering who have a job work as technicians or trades workers during their early career. Many move up to managerial roles as they get older. Across all age groups, one in five male diploma holders works in a professional job – mostly as an engineer.⁷¹

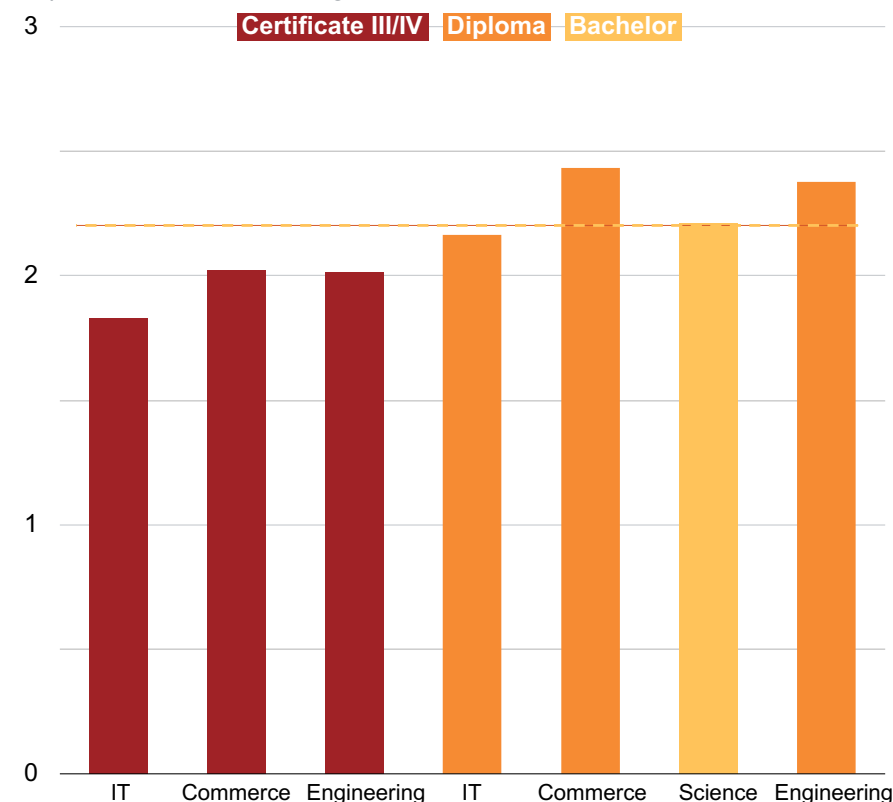
As with men with commerce diplomas, men with engineering diplomas are likely to earn more if they have other qualifications and experience. About 30 per cent of 20-24 year-old engineering diploma students, and more than half of those aged 25-39, already have a Certificate III/IV or diploma qualification. Their engineering diplomas may be further education to advance their careers.⁷² Although men with a Certificate III/IV only have lower median earnings than men with a diploma, a Certificate III/IV can be a pathway to a diploma and increased income.

Even without the second qualification, employment prospects seem good for men with vocational engineering qualifications. For the most common Certificate III qualifications, nearly 80 per cent of the men aged 20-24 who completed in 2018 have full-time work, and nearly 90

per cent have received job-related benefits: they got a job, promotion or pay rise.⁷³

Figure 4.4: Male prospective science students with lower ATARs could earn more with engineering or commerce diplomas

Expected net lifetime earnings of men with ATARs of 65, \$2016 million



Notes: Post-tax lifetime income net of course costs. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

70. ABS (Census, 2016b).

71. Ibid.

72. NCVER (VOCSTATS, 2019b).

73. NCVER (VOCSTATS, 2019e).

5 Women's choices

Vocational education alternatives to higher education are less financially attractive for women than for men. Female graduates with lower ATARs earn less than other female graduates, but are usually still better-off financially in higher education than women who hold a diploma.

For lower-ATAR women, education and nursing are popular and have proved to be good choices. Female graduates in these fields have high rates of professional employment and high expected lifetime earnings, compared to low-ATAR women in other fields.

Women have fewer appealing vocational education options than men. Not many women choose traditionally high-paying vocational fields such as engineering, and when they do their outcomes are often poor. Hiring practices that favour men, and rigid working conditions, prevent many women from realising the potential financial gains of these qualifications.

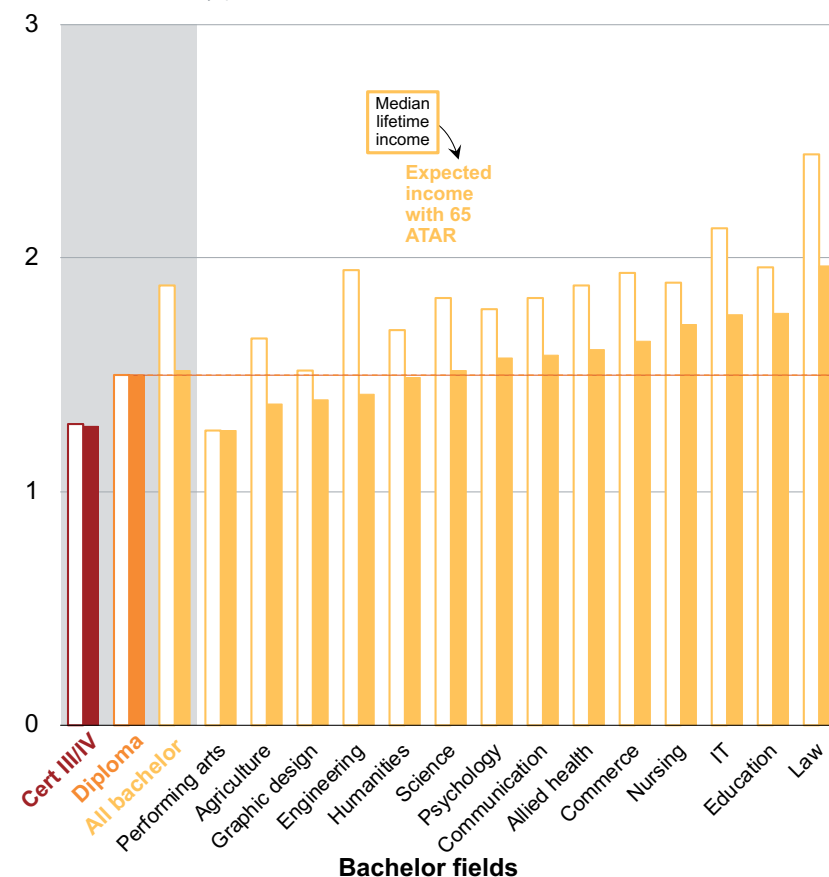
5.1 Strong earnings outcomes for lower-ATAR female graduates

As for men, women with lower ATARs earn less than their higher-ATAR peers. But compared to men, lower-ATAR women are more likely to be better off in higher rather than vocational education. Figure 5.1 compares expected earnings of female graduates with an ATAR of 65 with diploma earnings. Performing arts, agriculture, graphic design, and engineering bachelor degree graduates are below the expected earnings from a diploma. But few lower-ATAR female students enrol in these disciplines (Figure 2.3 on page 19).

By contrast, in popular bachelor-degree choices for lower-ATAR female school leavers, such as education and nursing, graduates are likely to earn more than bachelor or vocational qualification holders in most fields (Figure 5.2 on the next page).

Figure 5.1: Lower-ATAR female graduates from most courses can expect to earn more than female diploma holders

Expected lifetime income for women, and expected lifetime income for women with ATARs of 65, \$2016 million



Notes: Post-tax lifetime income net of course costs. Excludes medicine. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

A strong employment market underpins this outcome. Women with education and nursing degrees usually find jobs that match their skills. In 2016, 85 per cent of employed female education graduates were teachers, and 92 per cent of employed female nursing graduates were nurses.⁷⁴ Women with lower ATARs have similar rates of employment to their higher-ATAR peers (Section 2.2). The number of school-age and elderly Australians is increasing, which suggests that education and health employment opportunities will continue to grow.⁷⁵

Although teachers and nurses rarely earn high incomes, their strong unions help maintain wages and working conditions. Since 2015, wages in education and health industries have grown by 8 per cent, compared to about 5 per cent in professional, scientific, and technical services industries, the largest employers of graduates after the education and health industries.⁷⁶

The main risk for school-leavers with lower ATARs is more stringent entry requirements to teaching courses. Victoria and NSW have introduced changes that make it difficult for school leavers without strong academic results to enter teacher education courses after leaving school.⁷⁷ At the 2019 federal election, Labor proposed a similar restriction.⁷⁸ With Labor's defeat, national restrictions on lower-ATAR students are unlikely during the current federal parliamentary term. But future policy change could restrict entry to education degrees.⁷⁹

74. Grattan analysis of ABS (Census, 2016b).

75. ABS (2018e).

76. ABS (2019d); and ABS (Census, 2016b).

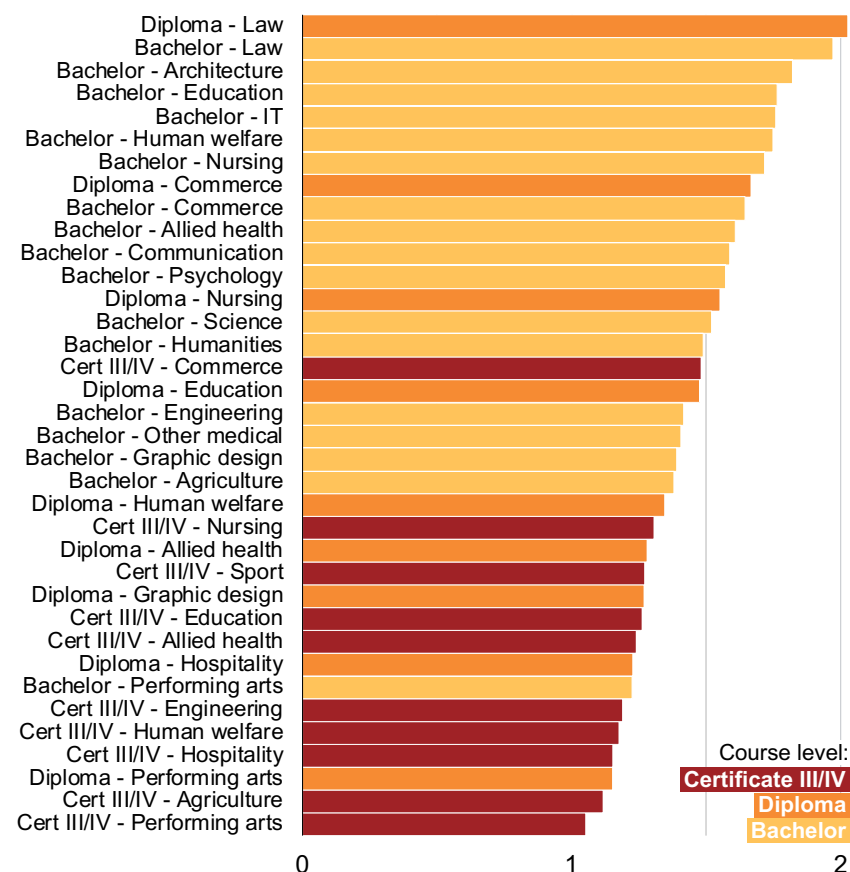
77. Norton et al. (2018a, p. 29). However, other forms of post-school admission would still be open to lower-ATAR students who could prove their abilities by other means, such as success in another course.

78. Conifer (2019).

79. A forthcoming Grattan Institute report, *Attracting high achievers to teaching*, documents international research showing that, on average, teachers with strong prior academic achievement are rated highly by their principals and help their students to achieve more.

Figure 5.2: Lower-ATAR women are usually better off with a bachelor degree than a vocational qualification

Expected lifetime income of women with ATARs of 65, \$2016 million



Notes: Post-tax lifetime income net of course costs. Excludes Medicine. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

5.2 Weak earnings outcomes for lower-ATAR women with vocational qualifications

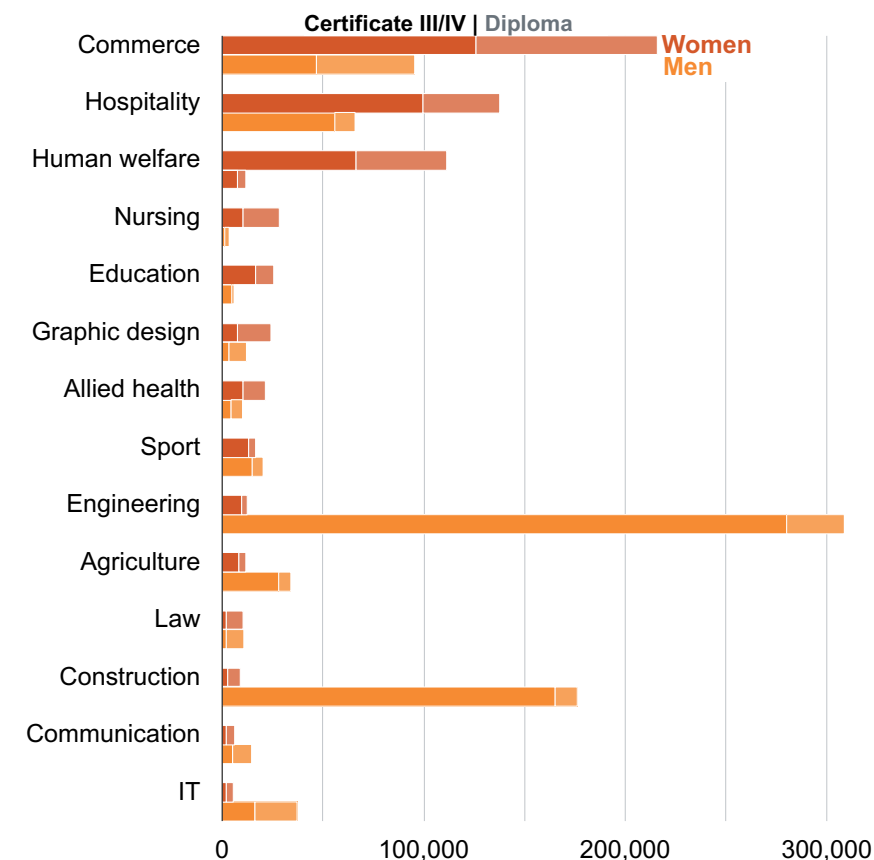
For men, vocational education engineering can be financially attractive. But few women study engineering in either higher or vocational education, and lower-ATAR women share this aversion (Figure 2.3 on page 19).⁸⁰ Figure 5.3 shows that men are more likely to hold vocational engineering qualifications. Engineering is the most popular vocational qualification for men, but only the 10th most popular for women. In 2016, in the early- to mid-career ages of 18-39, 12,000 women held an upper-level vocational qualification in engineering, compared to 300,000 men.⁸¹

There is little reason to think that this sharp gender divide will change.⁸² A NSW school student survey found that gender occupational stereotypes form at a young age. Boys list motor mechanic, carpenter, and electrician among their most popular occupations; girls list hairdresser, beauty therapist, and child carer. These preferences persist through school.⁸³

The few women who enrol in vocational engineering-related courses have poor earnings prospects, in marked contrast to men. Female Certificate III/IV holders in engineering with an ATAR of 65 have expected lifetime earnings of \$1.2 million, \$800,000 less than for men. As Figure 5.2 shows, this is less than the expected earnings of female Certificate III/IV holders from many disciplines, including education, nursing, and commerce. Women with a Certificate III/IV in commerce can expect to earn \$290,000 more over their lifetime than women with

Figure 5.3: Engineering is the most common vocational qualification for men, but attracts few women

Number of 18-39 year-old vocational qualification holders, 2016



Notes: Australians aged 18-39, based on their highest qualification in 2016. Excludes science, performing arts, psychology, humanities, and other medical due to low sample size.

Source: Grattan analysis of ABS (Census, 2016b).

80. See Figure 1.7 on page 16 for more detail on overall enrolments.

81. ABS (Census, 2016b).

82. Mackey (2019).

83. Gore et al. (2017, Table B2). Common occupations in both lists were sportsperson, police officer and animal trainer. These early preferences are consistent with women's preferences for 'people' compared to men's preferences for 'things': Cheryan et al. (2017, p. 10).

an engineering qualification. Lower-ATAR women with a Certificate III/IV in engineering can expect to earn less than diploma holders from all but one discipline (performing arts).

A major reason for these lower earnings is that even when qualified for well-paid technical jobs in engineering or construction, women tend to work in other, predominantly lower-paying, occupations.⁸⁴ As Figure 5.4 shows, more than half of men in their mid-career (that is, aged 35-44) with a Certificate III/IV in engineering work as technicians or tradespeople, compared to less than 20 per cent of women. Nearly 30 per cent of women with engineering qualifications work in sales and services, compared to less than 10 per cent of men.

A 2018 report found that recruitment and progression in the construction industry are often informally arranged through male-to-male networks, which routinely deny women employment opportunities. Many potential employers consider women not to be ‘cultural fits’ for these occupations.⁸⁵ Women face similar problems in other male-dominated industries.⁸⁶ On worksites, sexism and a lack of mentoring and career support often leave women feeling isolated and excluded.⁸⁷

When women do get jobs in these male-dominated industries, rigid work practices mean they are more likely to leave. Four in five mid-career women are mothers, and they still have primary child

84. Grattan analysis of ABS (Census, 2016b).

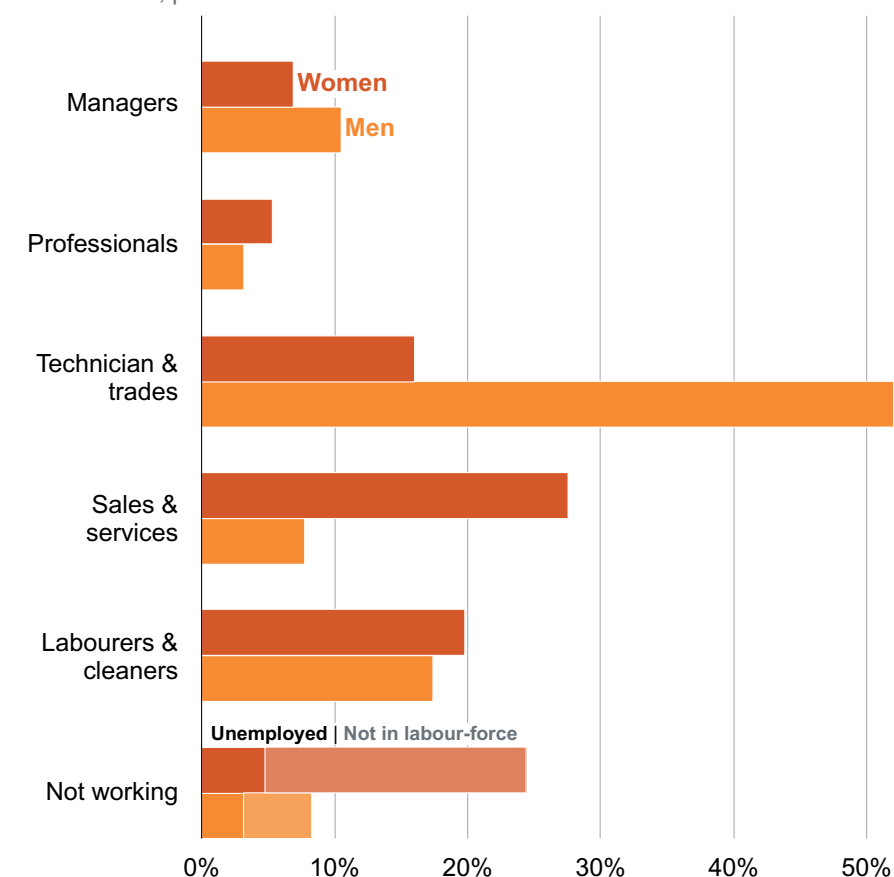
85. Galea et al. (2018, p. 10). Most recruitment and career progression in these industries is done through informal channels. The report recommends the industry strengthen its formal channels of recruitment and progression.

86. Riach and Rich (2006) uses job applications to show that women are less likely to receive ‘call-backs’ when applying for a job in a male-dominated occupation. The same is true for men applying for a job in a female-dominated occupations, further enforcing the gender divide: Booth and Leigh (2010). See also Oxenbridge et al. (2019).

87. Galea et al. (2018, pp. 12–13).

Figure 5.4: Female Certificate III/IV holders in engineering are more likely to work in sales and services than as technicians

Occupation and labour force status of 35-44 year-old engineering Certificate III/IV holders, per cent



Note: Australian citizens only.

Source: Grattan analysis of ABS (Census, 2016b).

caring responsibilities.⁸⁸ In 2016-17, more than 95 per cent of primary parental leave was taken by women.⁸⁹ Maternity leave still carries stigma in male-dominated industries – roles are often not backfilled, so the workload is spread among peers, who resent the woman taking leave.⁹⁰

Flexible working hours, part-time work, and the ability to work from home are important for primary child-carers to stay in the labour force. But those flexible conditions are also often lacking in male-dominated industries.⁹¹

For many women with vocational qualifications in engineering, poor conditions and rigid working arrangements in trades industries mean that working in sales and services is a more attractive choice, even though these jobs pay less. Given these difficulties, it is unsurprising that few women study engineering in the first place.

Other factors affecting women's earnings from vocational qualifications

Although male dominated-fields present problems for women whatever their qualification level, overall women are more likely to work if they have greater levels of education. As a result, women with bachelor

degrees tend to have higher lifetime earnings than women with vocational qualifications.

Women who are married or otherwise in a relationship are often the second income-earners in their household. By working, or increasing their hours of work, they often incur high effective marginal tax rates, because they pay more tax and receive fewer government benefits, especially at lower incomes.⁹² If there is little financial reward from working, women with vocational qualifications may decide to stay out of the labour force. Long periods out of the workforce can lead to diminished skills and fewer employment opportunities.⁹³ The longer women spend out of the workforce, the lower their lifetime earnings.

5.3 Other potential vocational choices

Female humanities and science graduates with an ATAR of 65 have similar expected lifetime earnings as female diploma holders (median ATAR of 86). This section examines whether they have realistic vocational education alternatives that could lead to increased lifetime earnings.

Humanities

Humanities is the most popular course for lower-ATAR women (Figure 2.3 on page 19). As for men, commerce is the most compatible discipline for female humanities students; one in six female humanities bachelor-degree students who changed courses switched to commerce.⁹⁴ Figure 5.5 shows that female humanities graduates with an ATAR of 65 have expected lifetime earnings of about \$1.5 million. Of their compatible vocational options, a diploma in commerce has modestly higher expected earnings, at \$1.65 million.

88. In the 2016 Census, 81 per cent of women aged 35-44 indicated that had at least one child: ABS (Census, 2016b).

89. Primary parental leave is overwhelmingly taken by women: ABS (2018f, Table 10.3).

90. Galea et al. (2018, p. 12).

91. Heath (2018, Graph 6). About 60 per cent of employed women with a child under the age of 6 were working part-time, compared to 8 per cent of men: ABS (2018f, Table 1.9) Of those working part-time, women were 10 times more likely to be working part-time because of childcare responsibilities: Heath (2018, graph 5). Employees in these industries are expected to be able to adapt to a change in the location of their workplace, or to relocate: Galea et al. (2018, p. 10). A 2018 study found that less than 20 per cent of women in the automotive industry can work part-time: Oxenbridge et al. (2019, p. 1).

92. Daley et al. (2019, pp. 36–37).

93. Treasury (2009).

94. See Appendix C.

Our analysis is aimed at minimising risk and maximising opportunities for school leavers. As with men, the estimated lifetime earnings for women with a diploma in commerce, based on recent data, may not be a reliable guide for women in future. Due to labour market changes, younger diploma of commerce holders may have fewer occupational choices and lower earnings than people who began their careers in earlier decades (Section 3.3).

Based on university preferences and course switching data, education-related courses may also appeal to female prospective students considering a humanities degree. For low-ATAR women, the two courses offer similar expected earnings. Women with a diploma in education are typically employed as child carers.⁹⁵ They tend to earn less than women with a diploma in commerce, although the salaries of child care workers are a significant public issue, and so this may change in the future. In the lead-up to the 2019 federal election, Labor promised child care workers wage increases of 20 per cent over eight years.⁹⁶ With Labor's defeat, wage increases may not be imminent, but demand for child carers is strong. The Department of Employment, Skills, Small and Family Business expects an 18-per-cent growth in child care jobs over the next five years, or about 30,000 new jobs.⁹⁷ This is nearly twice the growth rate expected for professional jobs – and it should minimise the risk of unemployment for people with diplomas in education.

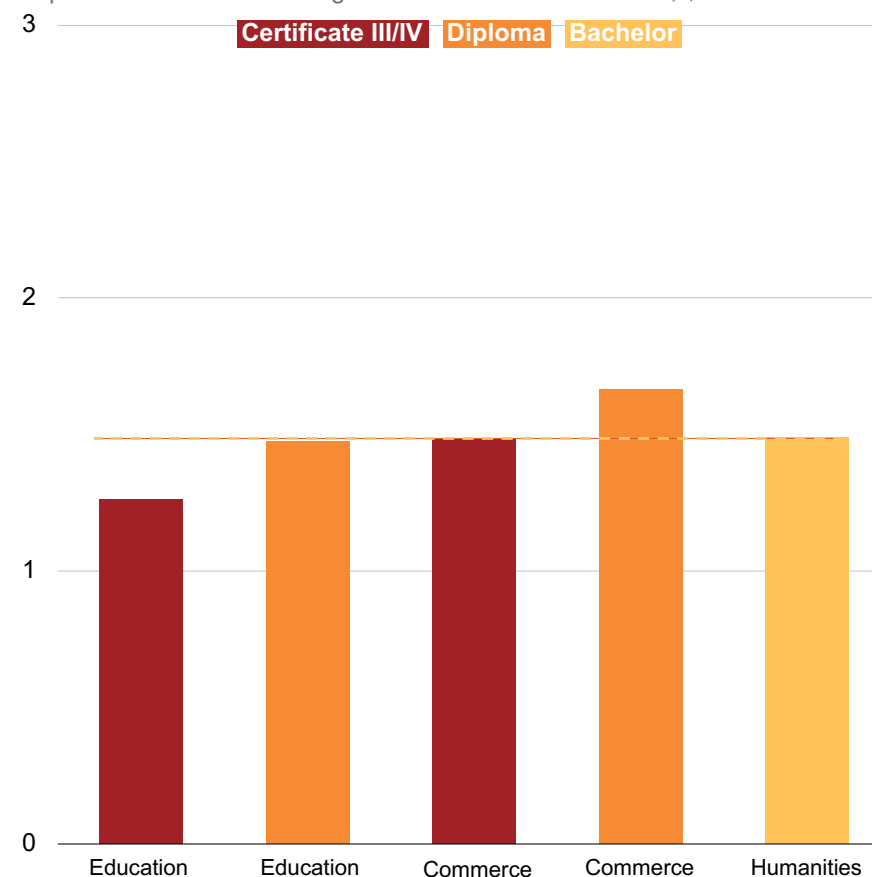
95. ABS (Census, 2016b). Most education diplomas are in child care: NCVER (VOCSTATS, 2019b).

96. Shorten (2019).

97. DESSFB (2018). This is unlikely to include the additional growth expected from additional funding from the Victorian Government for subsidised kindergarten programs for three-year-olds; Department of Treasury and Finance (Victoria) (2019, Chapter 1).

Figure 5.5: Lower-ATAR female prospective humanities students have only one vocational education option with higher earnings

Expected net lifetime earnings of women with ATARs of 65, \$2016 million



Notes: Post-tax lifetime income net of course costs. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

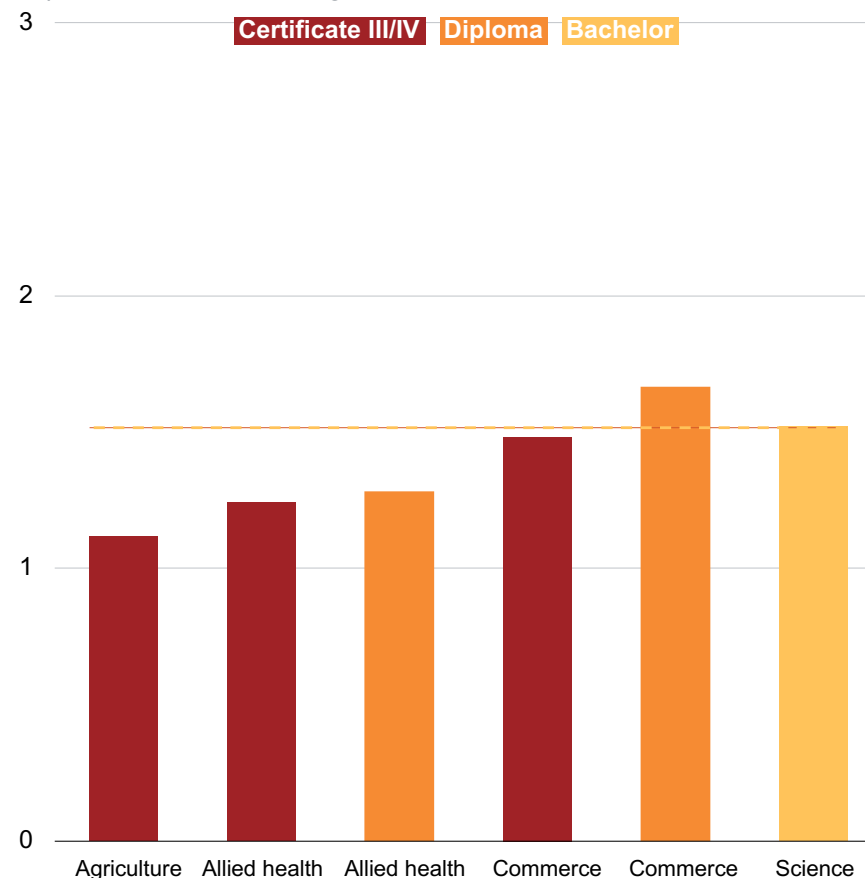
Science

Science is a popular university course for women, with enrolments increasing significantly over recent years. But for lower-ATAR women it is less popular than humanities, commerce, education, or health-related courses (Figure 2.3 on page 19). Science graduates with an ATAR of 65 are expected to earn less than women in a range of bachelor degrees (Figure 5.1). In vocational education, however, their alternatives are limited. Unlike men, they rarely want to take engineering-related courses. The analysis in Section 4.2 gives them little reason to reconsider. The main compatible vocational fields for a science student are commerce and allied health, but Figure 5.6 shows that only commerce has higher expected earnings.

Women with ATARs of 65 are likely to earn about 10 per cent more if they hold a diploma in commerce than a science bachelor degree. But with concerns about the longer-term prospects of commerce diplomas as well as science bachelor degrees, it is difficult to recommend one over the other.

Figure 5.6: Lower-ATAR female science graduates could earn more with a diploma in commerce

Expected net lifetime earnings for women with ATARs of 65, \$2016 million



Notes: Post-tax lifetime income net of course costs. For the earnings adjustment calculation, see Appendix B. See also Figure 1.6.

Source: Grattan Institute analysis of ABS (Census, 2016b).

6 Improving post-secondary education choice

Young people have always had to make choices after finishing school. Before the 1980s they chose industries or occupations by applying directly for jobs, but now they often have to acquire a qualification first. Although post-school education has expanded to facilitate course choices, not all young people are well-positioned to make informed decisions.

Course and career advice provided by schools is patchy, but promised policies may improve this. Vocational education policy is unstable, with significant doubts about whether it can satisfactorily meet student needs.

6.1 Course and careers advice

Young people know that further education after high school is expected and usually in their long-term interests.⁹⁸ Surveys of late-secondary students show that only a small minority plan no post-school education, and a modest majority aspire to a university education.⁹⁹ But converting these broad objectives into specific decisions can be difficult.

Numerous surveys find evidence of student uncertainty about university.¹⁰⁰ For a substantial group of young people, their university application is not a firm decision. It is part of an on-going process

98. Of first-year students in 2004, 41 per cent cited parental expectations, and 65 per cent cited school pressure, as a factor in their decision to go to university: Baik et al. (2015, p. 22).

99. ANOP/DEET (1994); Roy Morgan Research (2009); and ACER (2018).

100. South Australian research found that one in five Year 12 students were uncertain about their university preferences, but were going to apply anyway, and only 60 per cent were certain or very certain about their first preference: Parks et al. (2017, p. 8). A 2015 survey of first-year students at two universities found that less than two-thirds believed they had a good or very good understanding of which course would be best for them: Harvey et al. (2016, p. 58).

of deciding what to do next.¹⁰¹ Going to university is a sociable and parent-pleasing way of getting more time to make a serious choice.¹⁰² Enrolling can be an experiment, with the course or with university in general. Many students change direction after enrolling. About one in seven first-year students leave higher education, although some return in later years.¹⁰³ About one in 10 university bachelor-degree students change course from one field of study to another from year to year.¹⁰⁴

When young people have a career goal they do not always know how to achieve it. A survey commissioned for the 2018-19 Joyce review of vocational education asked 17-22 year-olds about their 10-year occupational aspirations and compared them to the highest level of education they had already completed, were currently doing, or planned to take in the next three years (Figure 6.1 on the following page). There seems to be confusion as to whether they need to take a vocational or higher education course.¹⁰⁵ Taken together with the university student surveys, it suggests that more course and career guidance could be helpful.

101. Norton et al. (2018b, Chapter 1).

102. A 2014 survey of first-year university students found 4 per cent were unclear about why they were at university, and 20 per cent agreed with the proposition that they were 'marking time': Baik et al. (2015, p. 31).

103. Department of Education and Training (2018e, section 15).

104. Grattan analysis of Department of Education and Training (Student data collection, various years).

105. Not all of this apparent mismatch need be confusion. Recent education may not relate to 10-year aspirations; it could be for a past job, a current job, a realistic job, or purely for interest. But an earlier study found more than a third of Year 12 students in an NSW government school survey who aspired to a job that required vocational education did not plan to enrol in vocational education: Gore et al. (2017, p. 31).

Schools usually offer career education, but of varying quantity and quality. A 2017 review of Victorian government schools found that the median school spent 2 hours per student per year on careers education. While some schools invest significant time in advising their students, others spend hardly any time.¹⁰⁶ Nationally, about 20 per cent of students do not discuss career plans with either a careers advisor or a teacher.¹⁰⁷ Among students who had a discussion, most found it very useful.¹⁰⁸

Widespread but anecdotal evidence suggests that vocational education suffers more than higher education from poor careers advice. University-educated teachers and career advisors are less aware of vocational education and may consider it to be of lesser status. The Joyce review survey found that only 40 per cent of respondents received information about vocational education from teachers, and just 27 per cent from school counsellors ('careers expos' were the most common source of information).¹⁰⁹

A lack of quality career education increases the risk that students make decisions that are not in their best interests. This leads to additional costs for them and for government, due to changing or dropping out of courses.

From this perspective, recent moves to make career education a higher priority are welcome. Following the Joyce review, the Commonwealth Government announced that it would establish a National Careers

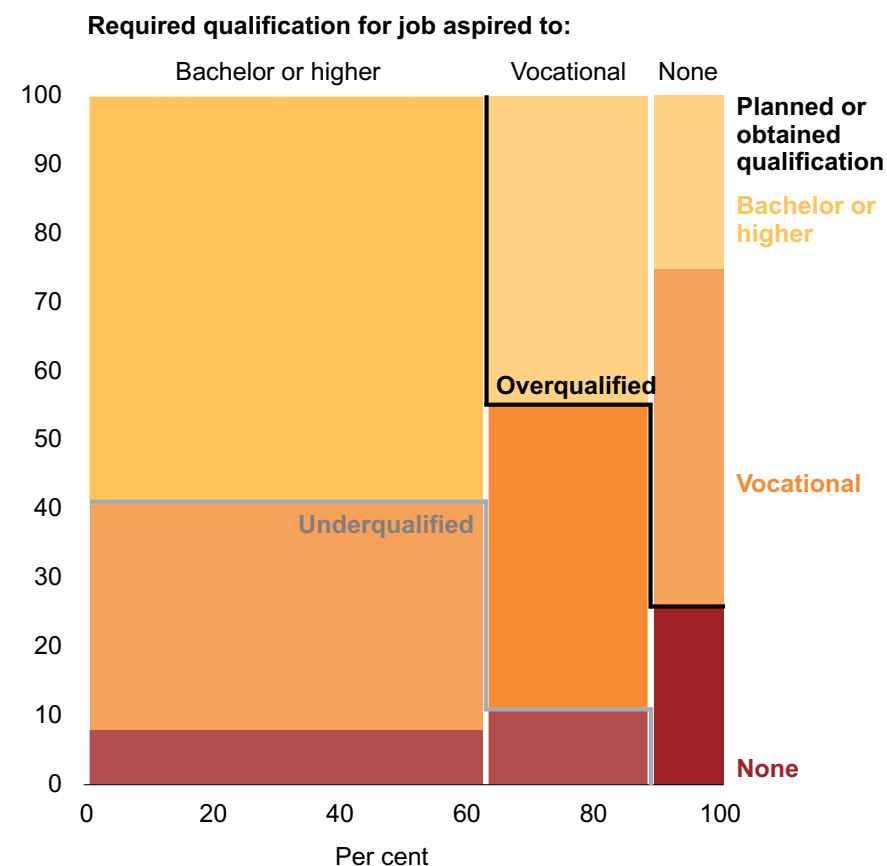
106. 10 per cent spent 12 hours or more per student per year on career education, while another 10 per cent spent 45 minutes or less per student per year: Dandolo partners/Department of Education and Training (Victoria) (2017, p. 4).

107. Similar results at age 17 and age 18, NCVER (LSAY 2009 cohort, various years).

108. A 2017 meta-analysis of international literature on career choice interventions also found that individual counselling is highly effective in helping students making career choices: Whiston et al. (2017).

109. Qualtrics and PM&C (2019, p. 30).

Figure 6.1: Student plans for study often don't match job aspirations
Per cent



Source: Joyce (2019).

Institute and appoint a National Careers Ambassador to improve career advice to both young and older Australians.¹¹⁰

The Careers Institute and Ambassador will be helpful, but this report highlights the complexity of providing advice to individuals, as opposed to general information about the employment and earnings prospects of different courses and occupations. Although on average most university courses lead to higher lifetime earnings than most vocational education courses, this is not always true for individual prospective students. Many low-to-mid-ATAR graduates, especially men, will earn less than their peers who went into vocational education. Individual advice can help students choose courses that are right for them.

Recommendation 1:

The National Careers Institute should review current career advice practices at public and independent schools. Students should receive personalised advice.

6.2 Reducing barriers to education choices

Improving individual outcomes doesn't just require better course and career advice. The vocational and higher education systems need to turn better course choices into enrolments.

The Commonwealth-funded higher education system had this capacity with demand-driven funding, which let universities respond to student course preferences.¹¹¹ Health-related courses, many of which were linked to occupations with strong labour market demand, had the largest enrolment increases. Enrolments also went up in other courses linked to skills shortages.¹¹² Demand-driven funding ended in 2017,

110. Department of Education and Training (2019b).

111. See Norton et al. (2018a, Chapter 7) for a brief description of demand-driven funding.

112. Norton (2019c, pp. 222–223).

and the higher education system's capacity to match students and courses will deteriorate over time.¹¹³ But due to capacity built up during the demand-driven era, few major short-term problems are likely.

For students, the higher education system is generally accessible. Most domestic undergraduate students are in government-subsidised places with price-capped student contributions. Students can borrow under the HECS-HELP scheme to pay these student contributions, and repay on an income-contingent basis.¹¹⁴ In 2017, 824,000 students borrowed under HECS-HELP.¹¹⁵ Students on low incomes are entitled to income support, although the payments are too little to live on.

The vocational education system is less well-placed to meet future needs. Total public spending on vocational education has declined.¹¹⁶ The Commonwealth and states have a 'picking winners' approach, restricting funding eligibility to specified students, courses, and providers.¹¹⁷ This can target funding to identified needs, but leaves gaps and inequities in the training system.

Younger vocational education students are more likely to receive government tuition support than older vocational students, but nearly 30 per cent of their subjects receive no public funding.¹¹⁸ Fees are often charged for students in public as well as private vocational education institutions.

These fees vary widely between providers. For example, the 'myskills' website reports course fees for a Certificate III in Civil Construction

113. Daley et al. (2019, Chapter 9).

114. See Norton et al. (2018a, Chapters 6 and 7) for more information on higher education student support.

115. Department of Education and Training (2018e, Table 5.7).

116. For funding trends see: Pilcher and Torii (2017) and NCVER (2018c).

117. For lists of eligible courses see: Training Services NSW (2019) and Department of Education and Training (Victoria) (2019); and the *VET Student Loans (Courses and Loan Caps) Determination 2016*.

118. Of students aged 15–19, subject enrolments: NCVER (2019f).

of between \$2,064 and \$23,298. For a Diploma of Nursing, course fees range between \$8,435 and \$31,190. Concessions, subsidies, discounts, and employer payments often reduce the fees actually paid, but there is little public information on how this affects student finances.

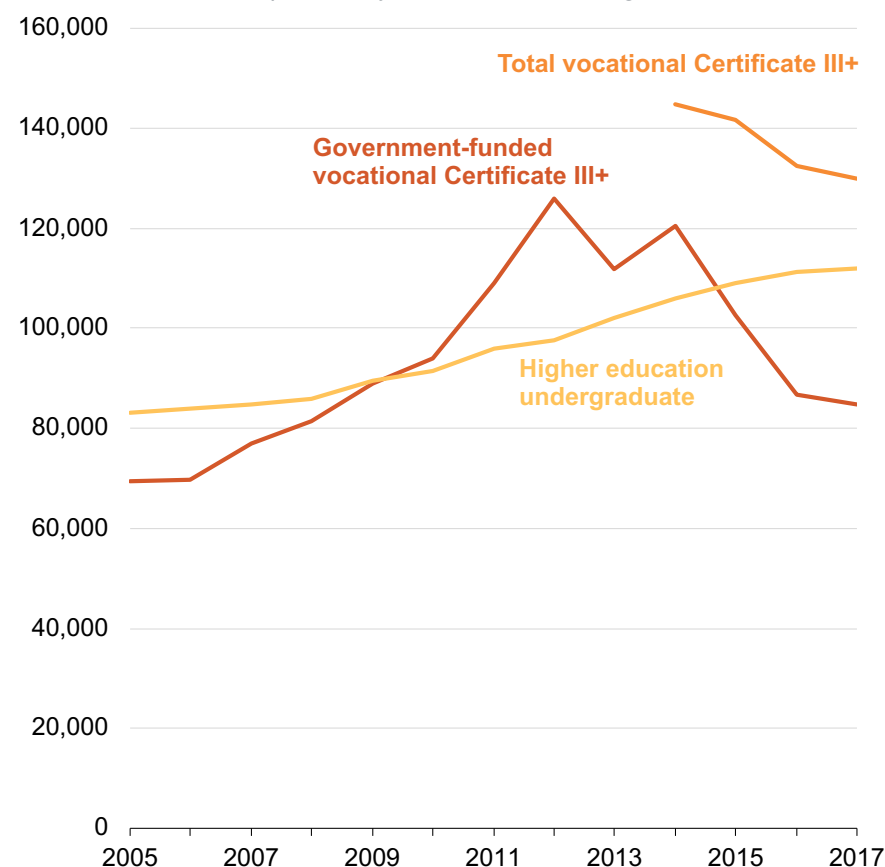
Income-contingent loans are available in the vocational education sector, but with limited eligibility and sometimes only partial coverage of costs. A Trade Support Loans program provides up to \$21,000 for living and learning expenses for people completing an apprenticeship. As for other vocational education funding programs, only students enrolled in specified qualifications are eligible. In 2017-18, 52,000 apprentices received a loan.¹¹⁹

The VET Student Loans (VSL) scheme is available for only some diploma-level courses. It replaced the scandal-ridden VET FEE-HELP scheme that had much wider eligibility. A dramatic fall in the number of students taking out loans, from 219,000 under VET FEE-HELP in 2016 to 42,000 in the second half of 2018 for VSL, suggests there has been an over-correction, with the scheme leaving many students paying upfront.¹²⁰ Even when students can borrow, they can be left with a gap fee they must pay upfront.¹²¹

Student income support is more limited in vocational than higher education. Diploma students are not eligible unless their course is approved for VSL.¹²² Students in other vocational courses can in theory

Figure 6.2: Vocational education completions are trending down

Annual number of completions by domestic students aged 15-25



Notes: Vocational education includes Certificate III, Certificate IV, vocational diploma, and vocational advanced diploma with no previous completion of a Certificate III-or-above course. Higher education undergraduate includes higher education diploma, advanced diploma, associate degree, and bachelor degree, and excludes people with a prior bachelor or higher qualification.

Sources: NCVER (VOCSTATS, 2019c); special data request to the Department of Education (2019).

119. Department of Education and Training (2018f). This implies that between one in three and one in four apprentices use the scheme.

120. Department of Education and Training (2019c). In 2017, diploma enrolments dropped 25 per cent on 2016, to 319,000: NCVER (VOCSTATS, 2019b). The original budget estimates for VSL were much higher than current projected costs, suggesting that loan take-up was much lower than the Government originally expected.

121. On average in early 2018, the gap fee between the fee and the loan cap was 8 per cent of the course cost: The Auditor-General (2018, p. 61).

122. *Student Assistance (Education Institutions and Courses) Determination 2019*.

receive student income support, but rarely meet other eligibility criteria because they often combine work and study.¹²³ Working students cannot meet the full-time study requirement and/or earn too much to receive a payment. Vocational education students who don't receive benefits cannot access the Student Start-Up Loan, which lets higher education students borrow \$2,150 a year for their living expenses.¹²⁴

Given vocational education's many funding issues it is unsurprising that enrolments are declining. Young people are less affected by this trend, but in 2018 the number of people aged 24 or younger in a Certificate III/IV or diploma course was 19 per cent below its 2012 peak.¹²⁵ Completions are also trending down, especially for government-funded students (Figure 6.2).

There is no research on how post-school choices are affected by the funding differences between vocational and higher education. Some vocational courses are more expensive than courses in the same field in higher education, have no or limited loan availability, and lead to no or less-generous income support. This must affect student decisions to some extent, whether in steering students towards higher education or alternative vocational courses, or deterring them from post-school study. Even when funding does not distort choices, the differences between higher and vocational education are inequitable.

The recommendations below focus on affordability issues for students and prospective students.

123. The vast majority of Youth Allowance and Austudy recipients are higher education students: Department of Social Services (2017a) and Department of Social Services (2017b).

124. Department of Human Services (2019). The loan is paid back on the same basis as HELP loans.

125. NCVER (VOCSTATS, 2019b). This analysis included only people who had completed Year 12.

Recommendation 2:

The Federal Government should investigate the causes of low take-up of VET Student Loans.

Recommendation 3:

The Federal Government should examine how upfront charges affect post-school choices.

Detailed remedies for the vocational education funding system are beyond the scope of this report. There have been several recent proposals.¹²⁶ But the differences between vocational and higher education mean that policies that work in one sector are not necessarily successful in the other.

In higher education, demand-driven funding generally led to a better match between supply and demand than previous funding systems.¹²⁷ But in vocational education, entitlement funding systems – including uncapping the number of student places (especially in Victoria), and letting diploma students borrow the full cost of their courses (through the Commonwealth's VET-FEE HELP scheme) – caused significant problems. Enrolments surged, suggesting untapped demand for vocational education, but unscrupulous recruitment practices, poor-quality education, and other provider malpractice meant that public and private costs were high.¹²⁸ The very large number – around 4,000 – of often small-scale vocational education providers creates significant regulatory challenges.¹²⁹

In principle, income-contingent student loans should be available in all fee-paying post-school education markets. These reduce obstacles to

126. Joyce (2019); Parker et al. (2018); and Business Council of Australia (2018).

127. Norton (2019c).

128. Burke (2018).

129. Count from training.gov.au, current registrations.

education by removing upfront costs, spreading payments over time, and managing the risk that education will not pay off.¹³⁰ The difficulty with extending the current income-contingent loan schemes is that, as shown in this report, vocational education qualification holders often earn less than higher education graduates, making them less likely to repay. Although lowering the initial HELP/VSL repayment threshold to \$46,000 a year from 2019-20 (down from \$56,000 in 2017-18) will make the system more suitable for vocational education, doubtful debt – debt that is not expected to be repaid – will still be high.¹³¹

To make vocational education more accessible without loans, some state and territory governments recently introduced free vocational courses at public institutions. In 2019, the Victorian Government introduced free TAFE for 50 courses at Certificate II or above. Demand for these courses rose significantly – commencements by the end of March increased by more than 100 per cent compared to the same period in 2018.¹³² The NSW Government is increasing the number of free apprenticeship and traineeship courses for young people.¹³³ The ACT Government also offers a limited number of free apprenticeship courses.

These changes may increase vocational education enrolments again. But they can also be seen as another instalment in the policy instability that has long plagued the vocational sector. Schemes and programs come and go, and funding goes up and down.¹³⁴ It is not a good basis for creating reliable and stable options for people who are choosing between vocational and higher education, or the much larger number of students who just want a good vocational education.

130. Norton and Cherastidham (2016, Chapters 4 and 5).

131. Ibid. (pp. 33–34).

132. Pallas (2019, p. 10).

133. NSW Government (2019).

134. Burke (2018).

7 Conclusion

This report has established that lower-ATAR students face increased employment risks, as well as academic risks. But it has mixed findings on whether those risks would be better managed in vocational education. For some lower-ATAR men, a few courses would probably increase their employability and income. But for lower-ATAR women, higher education is almost always their best option, even if they're expected to earn less than their high-ATAR peers.

7.1 The individual mix of risks and opportunities

Assessing opportunities and risks for prospective students requires considering their realistic options. This report focuses on the broad choice between vocational and higher education. Other important alternatives exist within each of vocational and higher education – and there is data relevant to these choices in some of the report charts. Not initially acquiring any higher-level post-school qualification limits a person's future opportunities, but it also enables them to avoid spending resources on education that sometimes does not improve their life and career prospects.

The report focuses on the alternatives for lower- to mid-ATAR school leavers for whom the choice between higher and vocational education is a practical issue. Students with very low ATARs rarely apply to university or receive offers if they do, while high-ATAR school leavers show little interest in anything but higher education.¹³⁵ The main student overlap between vocational and higher education is in the 50-70 ATAR range, affecting more than 40,000 young people a year. While students with these ATARs will only receive offers for some courses at some universities, they are more likely to get into higher education now than in the past.

135. Norton et al. (2018b, p. 8).

To better understand these choices, the report looks at the risks and rewards of a person's realistic alternatives. There are two broad types of risk: academic and employment. Because academic risks must be overcome to secure employment benefits, both affect a prospective student's chances of achieving their career objectives.

A direct and precise comparison of completion rates between the two sectors is not possible, but significant minorities of both low-ATAR bachelor degree and upper-vocational education students do not complete their course. But the financial implications of not completing can differ. Some vocational education courses are free or have low fees, while higher education is free-to-try only in the first few weeks of the teaching term. However, where there are high fees and no student loans in vocational education, students take on more risk than they would in higher education.

In higher education, graduates with lower ATARs fail more subjects before completing their degrees. Subject fail rates for low-ATAR (30-59) higher education graduates do not differ significantly from overall vocational education fail rates. This risk does not strongly differentiate the sectors.

In vocational education, academic transcripts grade students only as competent or not; no specific marks are recorded. In higher education, low-ATAR university graduates report lower average marks than their higher-ATAR peers. These marks are included on their academic transcripts, giving employers negative information that is absent from vocational transcripts.

In employment as in their studies, low-to-mid-ATAR students face higher risks and lower rewards than high-ATAR students. They are less likely to be employed in jobs that use their qualification, and partly as

a result, on average they earn less. But for low-to-mid-ATAR students, high-ATAR students are not the relevant comparison point. It is too late for school-leavers to get a high ATAR. If these risks concern them, they need to look at their realistic alternatives.

The report shows that these alternatives differ for men and women. For some low-to-mid-ATAR men, there are vocational education courses and careers that may interest them and have a good prospect of paying more than their current higher education choices. For example, some men currently taking humanities courses may be interested in a diploma of commerce, while some men currently taking science courses may be interested in a diploma of engineering. Each could leave them financially better off over their careers.

Whether these potential employment and earnings advantages would sway prospective students will depend on the strength of their preferences. Someone with a strong interest in the humanities might not be influenced by a moderate amount of money. But young people without a clear post-school direction, who currently enrol in university despite not being committed to their course, may be open to vocational options.

For low-to-mid-ATAR women, there is less evidence that vocational education could lead to better employment and earnings than higher education. In part, this is because the higher education courses commonly chosen by women in these ATAR ranges, such as nursing and teaching, have good employment outcomes. More negatively, women rarely choose high-paying vocational fields, such as engineering or construction, and often miss out on the employment benefits when they do.

7.2 The balance between higher and vocational education

This report, like the Grattan Institute *Dropping out* report of 2018, was motivated by a concern that higher education was overshooting: that

it was taking in too many students who were unlikely to benefit from the experience and who would be better off doing something else. Observing that there are people with vocational qualifications who are doing as well as or better than graduates in their careers, our project investigated vocational education courses as alternatives to higher education.

As with the *Dropping out* report, we are left with complex conclusions. Some individuals make poorly-informed post-school choices, and policy changes could help steer them into better decisions. But there has been no large-scale and misguided transfer of enrolments from vocational to higher education.

In aggregate terms, the higher education expansion reported in Chapter 1 mostly did not come from vocational education. The higher education enrolment boom of 2009 to 2014, triggered by demand-driven funding, probably drew students from some vocational courses, but for the first few years the two systems both grew in the same late-teenage market, each facilitated by policies that entitled students accepted into a course to be publicly funded. The subsequent fall in government-funded vocational enrolments since 2012 was much larger than any growth in higher education. In the rise and fall of enrolments, each of vocational and higher education affects the proportion of young people not participating in post-school education more than the other sector.

In both vocational and higher education, expanded enrolments had mixed consequences. In the vocational diploma market, the VET FEE-HELP scheme was widely rorted by unscrupulous education providers, burdening students with unnecessary debt.¹³⁶ Overly-rapid expansion in Victoria also led to malpractice. In higher education, there was no equivalent large-scale unethical behaviour, but more people left university with a HELP debt but no degree.

136. Saccaro and Wright (2018).

For those students who did finish, employment outcomes deteriorated in the middle years of this decade. As documented in this report, higher education graduates became more likely to be unemployed or under-employed, and less likely to be in professional jobs. There was a parallel trend for people with vocational education qualifications, who became more likely to be unemployed and, if working, less likely to be employed at a higher skill level.¹³⁷

The declining outcomes in each sector had a common central cause: increased completions colliding with the end of the mining boom. Employment of young people fell for a while, affecting people with higher and vocational education qualifications, as well as those who had finished their education at school.¹³⁸ A different balance between higher, vocational, and no post-school education would not have improved employment outcomes for young people over the past decade. Only a broader labour market recovery could do that, and it eventually came. Employment outcomes for all groups have since improved, although not to their best previous levels.

These fluctuating employment levels highlight the difficulty in predicting labour market needs for vocational or higher education. When each of their enrolment booms began in the later years of the last decade, skills shortages in occupations served by each sector were at their highest level since records began in 1986.¹³⁹ There appeared to be many opportunities for new qualification holders.

The first economic disruption to affect employment prospects, the global financial crisis, soon emerged, and the more serious end of the mining boom a few years later. When the bad employment news became apparent, enrolments stopped growing in higher education and, accelerated by policy changes, dropped in vocational education.

But fluctuations in enrolments and even more so in completions inevitably lag economic booms and busts.

The decisions of people hoping to improve their employment prospects through education should be influenced by the likely future labour market, as seen in already-observed trends, and informed by judgements on future changes. But these decisions involve unavoidable uncertainty, both at the micro-level of prospects for particular occupations, and the macro-level of overall economic conditions.

This uncertainty means that periods of poor outcomes do not retrospectively make individual decisions bad. A perfect match between the supply of graduates and qualification-holders, and demand for their services, will never exist. That a graduate did not, in the end, achieve their desired employment outcome does not mean they made an unwise decision. They could only choose between their realistic options, given their school results, interests, and the information available at the time.

Most qualifications still open up opportunities that would not otherwise be available. But a good tertiary education system steers prospective students towards courses that increase their opportunities and minimise their risks. Australia's post-school system does not always achieve this goal.

137. NCVER (2018d, Table 1).

138. ABS (2019e, Table 3).

139. DESSFB (2019).

Appendix A: ATAR-income methodology

This report uses the Longitudinal Survey of Australian Youth to examine the relationship between early-career income and ATAR. The analysis used a number of common statistical techniques which are detailed in this section.

A.1 Data

The ATAR-income relationship is examined using five cohorts of the Longitudinal Survey of Australian Youth (LSAY). LSAY is a longitudinal survey financed by the Department of Education and Training that follows high-school students for about 10 years ('waves'), through high-school completion, post-secondary education and transition into the workforce.¹⁴⁰ The current collection of the survey has six cohorts, commencing in: 1995, 1998, 2003, 2006, 2009 and 2015. Our analysis uses cohorts 1995-2009. The most recent available wave from the 2009 cohort is wave 9 in 2017.

About 14,000 students in Years 9 and 10 are surveyed in the first wave of each cohort. Survey attrition substantially reduces the number of respondents in each subsequent wave. Inverse probability weights are used to minimise the effect of attrition bias in our analysis.

A.2 Weights and attrition bias

LSAY provides two sets of weights for each respondent in each wave. The first is a 'population weight' (or sample weight) designed to adjust the prominence of respondents to match the population of, in this case, 15-year-olds in Australia. Population weights are larger for groups

under-represented in the survey compared to the population, and lower for over-represented groups.¹⁴¹

The second is an 'attrition weight'. Survey attrition is when respondents stop participating in the survey, and is our largest concern in using LSAY. At the best of times, survey attrition is a difficulty for longitudinal surveys. Spanning 10 or 11 years, LSAY is a particularly long survey that attempts to maintain contact with young Australians during various times of transition: high-school study, leaving school, starting vocational education or university, moving to a new house, travelling, and starting work. This means attrition is substantial.¹⁴²

For our analysis, important personal characteristics correlate with survey attrition. People who go onto university are more likely to stay in the survey, while people who go to VET or straight to work are less likely to continue participation. Respondents who do not report their ATAR are more likely to leave the survey (see Appendix A.4.1).

To aid with – but not completely solve – this issue, we construct a unique set of weights for the analysis wave based in the inverse probability that a respondent would report their income in a given wave. The inverse probability weights are based on the process outlined by NCVER and Patrick Lim in *Weighting the LSAY Programme of International Student Assessment cohorts*.¹⁴³

An individual, i , who reports their income, y , in a given wave, w , is considered a valid response. This variable includes both survey attrition

140. NCVER (2012, p. 10).

141. This population weighting is constructed by the OECD: OECD (2012) and OECD (2005).

142. Productivity Commission (2019, p. 89).

143. Lim (2011). The same approach was taken by the Productivity Commission in their research paper *The Demand Driven University System: A Mixed Report Card*: Productivity Commission (2019).

and item non-response:¹⁴⁴

$$r_{i,w} = \begin{cases} 1, & \text{if individual } i \text{ reported a valid income in wave } w \\ 0, & \text{otherwise} \end{cases}$$

A logistic model is run over each cohort separately to generate the probability of a respondent reporting a valid income in a given wave:

$$\text{logit}(r_{i,w}) = \alpha + \beta \mathbf{X}_{i,w} + \varepsilon$$

where β is the vector of coefficients and $\mathbf{X}_{i,w}$ is the design matrix for the relevant demographic covariates described in Table A.2. The probability of an individual reporting their income $\hat{p}_{i,w}$ is generated and stored:

$$\hat{p}_{i,w} = \frac{e^{\hat{\alpha} + \hat{\beta} \mathbf{X}_{i,w}}}{1 + e^{\hat{\alpha} + \hat{\beta} \mathbf{X}_{i,w}}}$$

The inverse probability is calculated, $\hat{i}p_{i,w} = 1/\hat{p}_{i,w}$. The final inverse probability weights are scaled by their original population weights to include initial demographic adjustments:

$$\widehat{iwt}_{i,w} = \text{popwt}_{i,w} \times \hat{i}p_{i,w}$$

The $\widehat{iwt}_{i,w}$ weights are applied to the chained multiple-imputation for ATAR, described in Appendix A.4.1, and the subsequent regressions to more precisely determine the relationship between ATAR and income.¹⁴⁵

144. See Productivity Commission (2019, p. 89).

145. Note that unweighted analyses produce results roughly similar to those presented in Table A.6 to Table A.8.

A.3 The analysis wave

A.3.1 Building the analysis wave

Our study combines five LSAY cohorts and examines the incomes of people in the waves following the completion of their highest eventual qualification. People who eventually obtain a postgraduate qualification are excluded from the analysis entirely. Those who do not obtain a qualification in at least seven waves of survey participation are examined from the age of 22 onwards.

Any wave in which a person did not report their income, or is studying, is excluded.

This new wave – the ‘analysis wave’ – therefore contains three groups of people:

1. **Bachelor:** respondents whose highest eventual qualification is a bachelor degree in the years after they have completed their study, and who are not pursuing additional study.
2. **VET:** respondents whose highest eventual qualification is a Certificate III/IV, diploma or advanced diploma, in the years after they have completed their study and who are not pursuing further study.
3. **No qualification:** People who do not complete a post-secondary qualification (Certificate III or above) who are not currently studying and who are 22 years old and over.

These three groups are exclusive. A respondent cannot qualify for more than one group. For example, a respondent who starts a bachelor degree in wave 5, drops out and starts a vocational qualification in wave 6, and completes the qualification in wave 7 will be classified as ‘VET’. All waves after they have reported completing their vocational qualification will be included in the analysis wave.

The groups aren't exhaustive. Respondents who stopped participating in the survey before the age of 22 and who did not complete a post-secondary qualification are excluded entirely. Those who eventually complete a postgraduate qualification while participating in the survey are excluded. Respondents who were studying for each wave of the survey they participated in are also excluded.

By excluding waves in which people are studying, this structure avoids associating the income from student jobs with those without a qualification. By looking into the future to determine a respondent's eventual highest qualification, the analysis wave is able to more accurately classify respondents as career or pre-career workers. As the goal of this specific analysis is to determine the association between ATAR and income, this feature avoids associating gap-year or pre-university income with no-qualification income. However, if a respondent commences a qualification and drops out, their income in non-study waves will be counted from the age of 22 onwards.

A.4 Variables used in analysis

Variables used in this analysis are reported in Table A.2 on the next page. Key and complex variables are discussed in the following subsections.

A.4.1 ATAR

The Australian Tertiary Admission Rank (ATAR) is an overall rank between 0.00 and 99.95 that indicates a student's position relative to all students in their age group.¹⁴⁶

Queensland is the only state to use a different scale. Year 12 graduates from Queensland receive an Overall Position (OP) ranging from 1 (highest) to 25 (lowest). Our analysis converts OP ranks using Table A.1, provided by the Queensland Tertiary Admissions Centre.

Table A.1: Overall Position (OP) to ATAR conversion

OP	ATAR	OP	ATAR
1	99	14	70
2	97	15	68
3	96	16	66
4	94	17	65
5	92	18	64
6	89	19	63
7	87	20	62
8	84	21	61
9	82	22	60
10	79	23	59
11	77	24	58
12	75	25	57
13	72		

146. UAC (2019). For a summary of the university admission systems in Australia, see Cardak et al. (2015, pp. 75–79). For a discussion of pre-2000s tertiary admission ranks in Australia, see Marks et al. (2001, pp. 64–77).

Table A.2: Regression variables

Variable	Description	Source	Weight	Model
Reported income	Respondent reported their income. Binary variable.	Derived from originally reported average weekly pay.	$y_{i,w}$	
(Log) income	The log of annualised income.	Derived from originally reported average weekly pay.		$y_{i,w}$
ATAR	A respondent's reported or imputed ATAR.	Originally reported and imputed; see Appendix A.4.1.		$atar_i$
ATAR10	A respondent's reported ATAR in groups of 10. One of: No ATAR reported, 30-40, 40-50, 50-60, etc.	Originally reported.	$X_{i,w}$	
SES	A respondent's socio-economic status.	Derived; see Appendix A.4.2.	$X_{i,w}$	$X_{i,w}$
Years out	Number of years since completion of a post-secondary course.	Derived; see Appendix A.4.3.	$X_{i,w}$	$X_{i,w}$
Highest qualification	Highest qualification completed by wave i .	Derived; see Appendix A.4.4.		<i>Filter</i>
Highest FOE	Field of education of highest qualification completed by wave i .	Derived; see Appendix A.4.5.		FOE_i
Age	A respondents age in a given wave.	Originally reported.	$X_{i,w}$	$X_{i,w}$
Cohort	A respondent's cohort. One: 1995, 1998, 2003, 2006 or 2009.	Originally reported.	$X_{i,w}$	$X_{i,w}$
State	The home state of a respondent in the first wave.	Originally reported.	$X_{i,w}$	$X_{i,w}$
Sector	The school sector of a respondent in the first wave. One of: Government, Catholic, independent.	Originally reported.	$X_{i,w}$	$X_{i,w}$
Language	Language spoken at home. Grouped to be one of: English, Asian, European, other.	Derived from idiosyncratic 'language spoken at home' variables in each cohort.	$X_{i,w}$	$X_{i,w}$
Region	Geographic location of school in first wave. One of: Metro, provincial, remote.	Originally reported.	$X_{i,w}$	$X_{i,w}$
Gender	Gender of the respondent in the first wave. One of: female, male.	Originally reported.	$X_{i,w}$	<i>Filter</i>
Immigrant	Immigration status of the respondent. One of: Native, parent born overseas, born overseas.	Derived from originally reported immigrant status (2003-2009) or respondent/parent countries of birth (1995-1998).	$X_{i,w}$	$X_{i,w}$
Maths	Year 9 maths score (out of 20 for 1995-1998; PISA plausible values for 2003-2009).	Originally reported.	$X_{i,w}$	
Reading	Year 9 reading score (out of 20 for 1995-1998; PISA plausible values for 2003-2009).	Originally reported.	$X_{i,w}$	
University aspiration	Aspiration to attend university after school.	Originally reported.	$X_{i,w}$	
VET aspiration	Aspiration to attend VET after school.	Originally reported.	$X_{i,w}$	

Imputation of ATAR

A substantial minority of otherwise-valid respondents in the analysis wave have a missing ATAR. The missing-ATAR group are made up of those who did not receive an ATAR and those who did not report their received ATAR.¹⁴⁷

The probability that a respondent reports their ATAR is strongly correlated with past school performance, post-school aspirations in Years 9 and 10, socio-economic status, and other variables contained in the LSAY dataset. Listwise deletion of observations with missing ATARs – excluding them from our analysis – could lead to biased results. In this case, missing observations are explained by other variables in the data.¹⁴⁸ Multiple imputation can be used to handle missing data in a way that results in valid statistical inference.¹⁴⁹

Multiple imputation is a ‘simulation-based statistical technique for handling missing data’.¹⁵⁰ Missing data is modelled and predicted M times, allowing for the uncertainty surrounding the imputed data (the between-imputation variability) to be incorporated into tests of significance.¹⁵¹ Our analysis repeats the imputation $M = 40$ times.¹⁵²

There are smaller instances of missing data in other variables used in our model, of which ATAR is missing most often. We used

147. See Marks et al. (2001, p. 76). Students also reported not being able to remember their ATAR. The average ATAR is expected to be lower for the missing-ATAR group than for the reported-ATAR group.

148. In this context the missing-data mechanism is said to be ‘ignorable’: StataCorp (2017, p. 6).

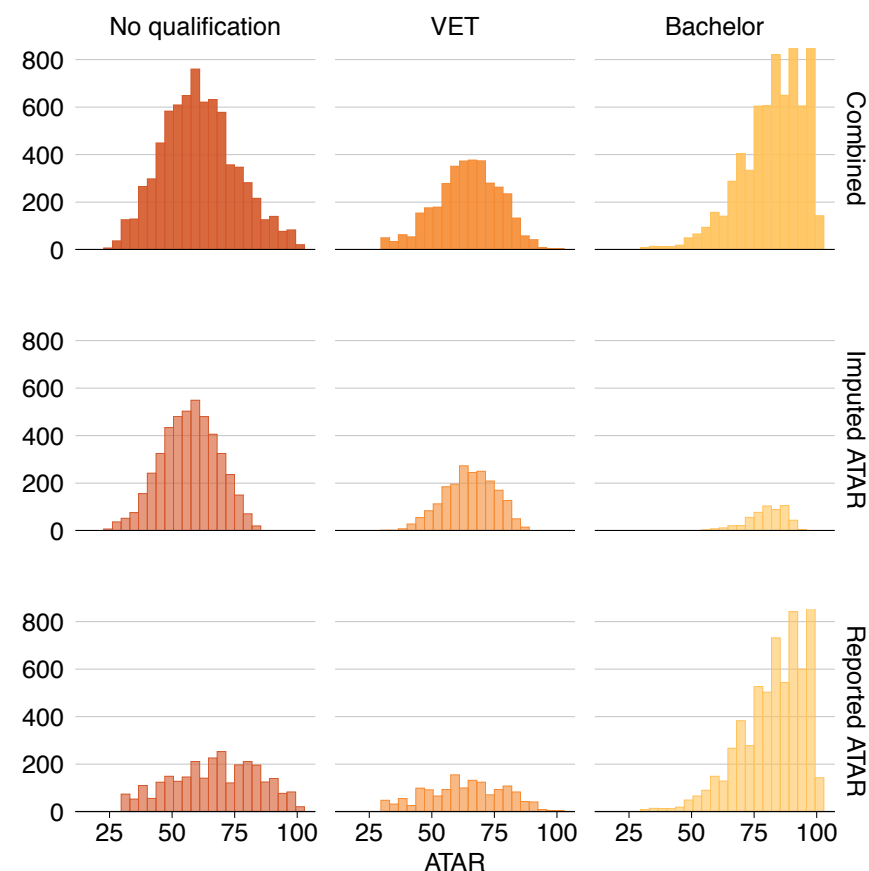
149. Rubin (1996).

150. StataCorp (2017, p. 3).

151. Single-imputation generates one imputed value for each missing data point, which is seen as ‘certain’ at the time of analysis. Confidence intervals and significance tests do not incorporate the uncertainty of the imputed value. Multiple-imputation reduces the sampling error due to imputations: StataCorp (ibid., pp. 3–8).

152. The rule-of-thumb recommendation is at least $M = 20$: StataCorp (ibid., p. 5).

Figure A.1: Number of respondents by 3-point ATAR band



Source: Grattan analysis of NCVER (LSAY, various years).

chained imputation to fill in these arbitrary missing values iteratively before arriving at ATAR. Inverse probability weights, described in Appendix A.2, are applied during the chained imputation process. Truncated regression is used to restrict imputed ATAR to values between 0 and 100.¹⁵³

Multiple-imputation results are stored and used during the model estimation process, described in Appendix A.5. Figure A.1 shows the number of respondents by three-point ATAR band by eventual qualification (top panel), and by imputation status (bottom panels). Most respondents in the analysis wave who completed a bachelor degree reported their ATAR, while less than half of the VET group did. Those who did not get a qualification were the least likely to report their ATAR.

The 'spikes' seen in the reported ATAR plots are due to OP-to-ATAR conversion (shown in Table A.2) and by reporting clustering, in which respondents tend to report vague ATARs rounded to the nearest multiple of five or ten.¹⁵⁴

A.4.2 Socio-economic status

Table A.3 shows that socio-economic variables are not consistent across LSAY cohorts. Later cohorts, from 2003 onwards, have richer measures, including an index of economic, social and cultural status.

153. While the ATAR imputed with this truncated regression function is 'allowed' to have values less than 30, Figure A.1 shows that few do. No respondent reported an ATAR of less than 30, which is the lowest automatically-reported rank to school-leavers: VTAC (2017). This means the relationship between ATAR and other variables is limited at the lower-bound, skewing the imputation process.

154. This is a particular concern for lower-ATAR respondents. For example, more people reported receiving an ATAR of 40 or 45 than 39, 41, 42, and so on. As this figure is self-reported, rounding 'upward' may be an issue.

Table A.3: Socio-economic variables in LSAY cohorts

Variable	Description	95	98	03	06	09
ANU3 score – mother	Index of socioeconomic status based on mother's occupational prestige, on a scale of 0-100.	✓	✓			
ANU3 score – father	Index of socioeconomic status based on father's occupational prestige. As above.	✓	✓			
EDU – mother	Mother's level of education. One of: No Y12, Y12, technical qualification, higher education.	✓	✓			
EDU – father	Father's level of education. As above.	✓	✓			
ESCS	Index of economic, social and cultural status.			✓	✓	✓
ISCED – mother	Education level of mother. One of: None, primary school, some secondary, Y10/11, Y12/Cert, Diploma, Bachelor and above.			✓	✓	✓
ISCED – father	Education level of father. As above.			✓	✓	✓
White/blue collar work – mother	Occupation category of mother. One of: High-skilled white collar; low-skilled white collar; high-skilled blue collar; low-skilled blue collar; not working.			✓	✓	✓
White/blue collar work – father	Occupation category of father. As above.			✓	✓	✓

These variables are all from cohorts' first wave, meaning their non-response rates are low. Those who have missing, unknown or invalid responses are given the mean response.¹⁵⁵

Our analysis creates a standardised socio-economic variable for each cohort, following the process used by the ABS in the construction of their Socio-Economic Indexes for Areas (SEIFA).¹⁵⁶

Figure A.2 shows our generated socio-economic score for people in the analysis wave. Higher 'SES' scores are populated by eventual bachelor graduates, reflecting the expected relationship between the education and occupation of parents and their children's educational attainment.

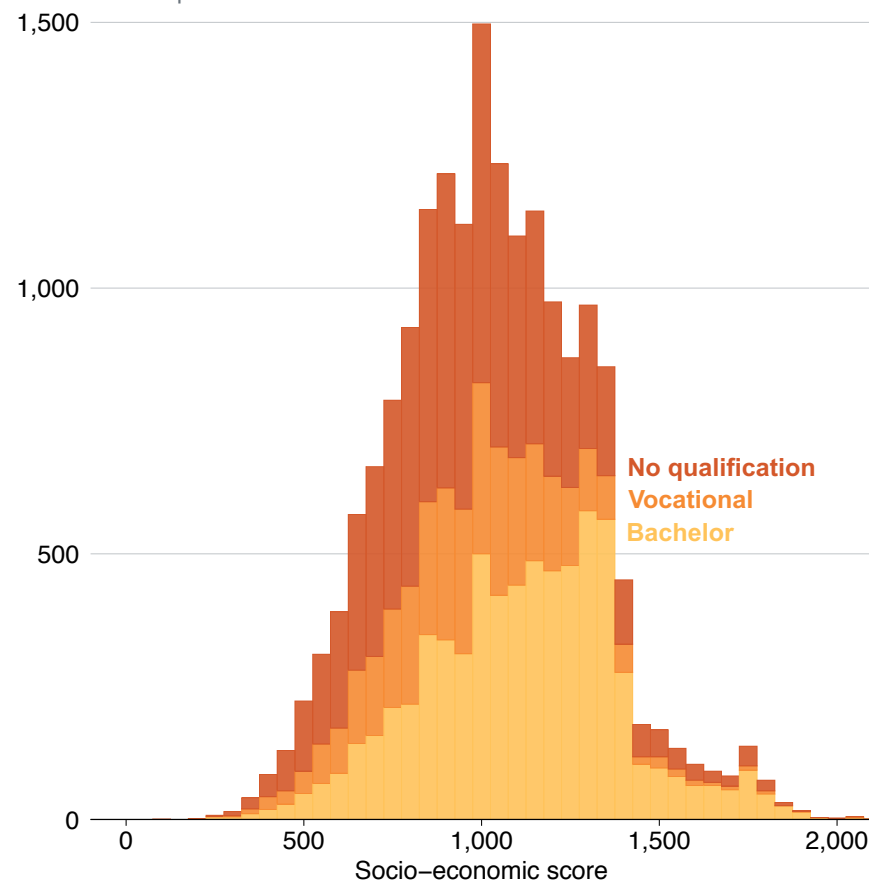
A.4.3 Years since completion

The 'years since completion' variable, *ysc*, is the number of waves since the respondent reported completing their highest eventual qualification. For example, a person who reports that they have completed their bachelor qualification in wave 6 of the survey will have *ysc* = 1 in wave 7, *ysc* = 2 in wave 8, etc.

For people with an eventual post-secondary qualification, only observations one or more years since completion, $ysc \geq 1$, are examined. Depending on when in the year a student finishes their study and when they answer the next survey, the $ysc \geq 1$ restriction gives graduates between 12-23 months between finishing and having their income analysed.

Figure A.2: Number of people by socio-economic score

Number of respondents



Source: Grattan analysis of NCVER (LSAY, various years).

155. This imperfect assumption avoids listwise deletion of observations with otherwise-sufficient data.

156. ABS (2013, pp. 15–19).

A.4.4 Highest qualification

In post-secondary waves in all cohorts, respondents are asked if they have started, continued, withdrawn, deferred, changed, or completed a post-school qualification. Each of these variables are used to determine a respondent's study status, level, field, level, and completion or non-completion of study in each wave.¹⁵⁷

For each individual, their current level and field of study is recorded. Qualification levels are classified according to Table A.4.

A.4.5 Field of education

Fields of education are provided in LSAY and are coded according to the Australian Standard Classification of Education (ASCED).¹⁵⁸ Our analysis constructs 20 useful fields that are derived from ASCED. These are an exhaustive combination of ASCED fields.¹⁵⁹

Fields for a gender and qualification level were included in our analysis if there were more than 6,000 respondents aged 18-39 with the qualification in the 2016 Census.¹⁶⁰

Table A.5 on the following page shows the field classification, the corresponding ASCED 2- or 4-digit codes and names, and whether the field was used in our analysis (✓).

Table A.4: Qualification classifications

Detailed qualification level	Simple qualification level
Certificate I	No qualification
Certificate II	No qualification
Certificate III	VET
Certificate IV	VET
Certificate – level unknown	No qualification
Diploma/Advanced diploma	VET
Bachelor degree	Bachelor
Graduate diploma/certificate	Postgrad (except law and psychology, which remain bachelor)
Masters	Postgrad
PhD	Postgrad

157. The LSAY dataset provides derived variables that go part-way to answering our questions. However, our 'VET' definition focusses on higher-level vocational courses (Certificate III and above), meaning we needed to derive our own study status variables.

158. Six-digit codes. See ABS (2001).

159. Some waves of LSAY cohorts 1995 and 1998 provided fields of education in the earlier Higher Education Discipline Groups, which have been corresponded to ASCED.

160. Grattan analysis of ABS (Census, 2016b).

Table A.5: Fields of education classifications and use in analysis

		Used in analysis ✓:					
		Male			Female		
Field	ASCED code and name	Cert III/IV	Diploma	Bachelor	Cert III/IV	Diploma	Bachelor
Science	01 Natural and physical sciences			✓			✓
IT	02 Information technology	✓	✓	✓			✓
Engineering	03 Engineering and related technologies	✓	✓	✓	✓		✓
Architecture or Construction	04 Architecture and building	✓	✓	✓			✓
Agriculture	05 Agriculture, environmental and related studies	✓	✓	✓	✓		✓
Medicine	0601 Medical studies			✓			✓
Nursing	0603 Nursing	✓	✓	✓	✓	✓	✓
Other medical	0605 Pharmacy; 0607 Dentistry; 0609 Optical science; 0611 Veterinary; 0615 Radiography			✓			✓
Other health	0613 Public health; 0617 Rehabilitation therapies; 0619 Complementary therapies; 0699 Other Health			✓	✓	✓	✓
Education	07 Education			✓	✓	✓	✓
Commerce	08 Management and commerce; 0919 Economics and econometrics	✓	✓	✓	✓	✓	✓
Humanities	0901 Political science and studies; 0903 Studies in human society; 0913 Librarianship, information management and curatorial studies; 0915 Language and literature; 0917 Philosophy and religious studies; 0999 Other Society and Culture			✓			✓
Psychology	0907 Behavioural science						✓
Human welfare	0905 Human welfare studies and services	✓			✓	✓	✓
Law	0911 Law, justice and law enforcement		✓	✓		✓	✓
Sport	0921 Sport and recreation	✓			✓		
Performing arts	1001 Performing arts, 1003 Visual arts and crafts, 1099 Other creative arts			✓	✓	✓	✓
Graphic studies	1005 Graphic and design studies		✓	✓		✓	✓
Communication	1007 Communication and media studies		✓	✓			✓
Hospitality	11 Food, hospitality and personal services	✓	✓		✓	✓	

A.5 Modelling ATAR and income

Ordinary least squares (OLS) regression is used to estimate the relationship between ATAR and income for six subgroups of the analysis wave:

1. Women with no eventual qualification
2. Women with highest qualification as VET
3. Women with highest qualification as bachelor
4. Men with no eventual qualification
5. Men with highest qualification as VET
6. Men with highest qualification as bachelor

The OLS model is the same for each subgroup and is described in matrix notation:

$$\ln(y_{i,w}) = \alpha + \beta_1(atar_i \times FOE_i) + \beta_2\mathbf{X}_{i,w} + \varepsilon_{i,w}$$

y_i is the natural log of respondent i 's income in wave w .¹⁶¹ The interaction term, $atar_i \times FOE_i$, is of the respondent's reported or imputed ATAR (analysed as a continuous variable) and the field of education of their highest eventual qualification (a categorical variable).¹⁶² $\mathbf{X}_{i,w}$ is the design matrix for the relevant demographic covariates described in Table A.2. $\varepsilon_{i,w}$ is the error term.

A multiple-imputation OLS estimation procedure is implemented using Stata's `mi estimate` command. This process adjusts coefficients and

standard errors to account for the uncertainty introduced by imputed variables (see Appendix A.4.1).¹⁶³

Three log-income variables are investigated:

1. All valid observations.
2. Valid observations excluding zero-income.
3. Valid observations working an average of 35 hours or more per year.

The coefficients for the interaction terms for these variations are presented in Table A.6, Table A.7 and Table A.8 on the following pages.

The ATAR-to-income relationship is larger when zero-income observations are included (Table A.6) because people with lower ATARs are more likely to be unemployed or otherwise not working (see Chapter 3). When we just look at people who are employed (i.e. have positive income, Table A.7), the relationship is smaller but remains significant for most fields. Restricting the sample to just people who are working full-time – 35 hours or more per week – provides the estimates in Table A.8.

The GOS (Graduate Outcomes Survey) columns in these tables show the estimates for similar bachelor-graduate groups to the LSAY cohort (i.e. graduates aged 25-or-younger). The sample size of GOS is substantially larger than LSAY.¹⁶⁴ But GOS surveys graduates just four months after finishing their course, compared to 1-4 years in our analysis of LSAY respondents. High unemployment rates of these recent graduates in GOS are strongly correlated with ATAR (Chapter 3). When the sample is restricted to people working full-time, as in Table A.8, the results between GOS and LSAY are more comparable.

161. For estimates that include zero-incomes, log-income is set to zero when recorded income is zero.

162. FOE_i is set to "No FOE" for people with no eventual qualification.

163. StataCorp (2017, p. 41). See also Rubin (1987).

164. More than 200,000 people respond to the Graduate Outcomes Survey per year.

Table A.6: Regression results: Field and ATAR coefficients, including zero-income observations

Data source:	Female				Male			
	LSAY	LSAY	LSAY	GOS	LSAY	LSAY	LSAY	GOS
	Qualification: No qualification	VET	Bachelor	Bachelor	No qualification	VET	Bachelor	Bachelor
atar×No FOE	0.0178***				0.0088***			
atar×Agriculture		0.0134***	0.0094***	0.0221***		0.0134***	0.0116***	0.0299***
atar×Architecture		0.0185***	0.0008	0.0302***		0.0162***	0.0112***	0.0346***
atar×Commerce		0.0126***	0.0072***	0.0331***		0.0101***	0.0064**	0.0311***
atar×Communication		0.0123**	0.0067***	0.0261***		−0.0031	0.0004	0.0235***
atar×Education		0.0012	0.0093***	0.0444***		0.0172***	0.0101***	0.0483***
atar×Engineering		0.0179***	0.0097***	0.0333***		0.0162***	0.0110***	0.0320***
atar×Graphic studies		0.0122***	0.0055**	0.0204***		−0.0038	0.0065**	0.0229***
atar×Hospitality		0.0065*	0.0100***			0.0093***	0.0051	
atar×Human welfare		0.0055	0.0055	0.0381***		−0.0028	0.0110***	0.0368***
atar×Humanities		0.0028	0.0057**	0.0210***		0.0089**	0.0058**	0.0209***
atar×IT		0.0097	0.0103***	0.0304***		0.0082***	0.0069**	0.0264***
atar×Law		0.0151***	0.0072**	0.0291***		0.0159***	0.0065**	0.0294***
atar×Medicine			0.0099***	0.0466***			0.0130***	0.0499***
atar×Nursing		0.0139***	0.0105***	0.0460***		0.0014	0.0150***	0.0536***
atar×Other health		0.0182***	0.0074***	0.0359***		0.0130***	0.0105***	0.0350***
atar×Other medical		0.0201***	0.0118***	0.0417***		0.0148***	0.0089**	0.0471***
atar×Performing arts		0.0042	0.0015	0.0208***		−0.0065	0.0031	0.0203***
atar×Psychology		0.0106	0.0067***	0.0280***		−0.0031	−0.0028	0.0177***
atar×Science		0.0145***	0.0073***	0.0190***		0.0115**	0.0039	0.0170***
atar×Sport		0.0053	0.0107***	0.0248*		0.0117***	0.0006	0.0450***
Observations	6,141	3,784	7,492		7,843	4,103	5,044	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Coefficients shown in this table represent the increase in income based on a one-point increase in ATAR. e.g. from an ATAR of 75 to an ATAR of 76.

Table A.7: Regression results: Field and ATAR coefficients, excluding zero-income observations

Female					Male			
Data source:	LSAY	LSAY	LSAY	GOS	LSAY	LSAY	LSAY	GOS
Qualification: No qualification		VET	Bachelor	Bachelor	No qualification	VET	Bachelor	Bachelor
atar×No FOE	0.0025***				0.0017***			
atar×Agriculture		0.0031***	0.0046***	0.0017***		0.0007	0.0070***	0.0034***
atar×Architecture		0.0008	0.0035***	0.0031***		0.0046***	0.0086***	0.0053***
atar×Commerce		0.0035***	0.0047***	0.0043***		0.0017*	0.0058***	0.0045***
atar×Communication		0.0010	0.0028***	0.0028***		−0.0011	0.0035***	0.0005
atar×Education		0.0001	0.0049***	0.0075***		0.0021*	0.0063***	0.0068***
atar×Engineering		0.0074***	0.0064***	0.0066***		0.0061***	0.0078***	0.0059***
atar×Graphic studies		0.0016	0.0006	0.0018***		−0.0058***	0.0036**	0.0018**
atar×Hospitality		0.0022***	0.0036***			0.0017*	0.0053***	
atar×Human welfare		0.0018**	0.0055***	0.0055***		−0.0004*	0.0048*	0.0036***
atar×Humanities		0.0014	0.0033***	0.0022***		−0.0002	0.0049***	0.0019***
atar×IT		0.0019	0.0060***	0.0058***		−0.0005	0.0065***	0.0053***
atar×Law		0.0035***	0.0039***	0.0051***		0.0004	0.0055***	0.0043***
atar×Medicine			0.0068***	0.0086***			0.0080***	0.0082***
atar×Nursing		0.0035***	0.0062***	0.0064***		−0.0027**	0.0101***	0.0060***
atar×Other health		0.0014	0.0044***	0.0042***		−0.0016	0.0066***	0.0042***
atar×Other medical		0.0037***	0.0063***	0.0065***		−0.0001	0.0071***	0.0069***
atar×Performing arts		−0.0038***	0.0006	0.0005		−0.0054***	0.0036***	−0.0004
atar×Psychology		0.0043***	0.0036***	0.0019***		0.0054***	0.0029*	0.0006
atar×Science		0.0015	0.0045***	0.0022***		0.0005	0.0064***	0.0020***
atar×Sport		−0.0025	0.0037***	0.0030		0.0001	−0.0001	−0.0011
Observations	4,847	3,329	7,090		7,014	3,832	4,733	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Coefficients shown in this table represent the increase in income based on a one-point increase in ATAR. e.g. from an ATAR of 75 to an ATAR of 76.

Table A.8: Regression results: Field and ATAR coefficients, observations working 35 hours or more

Female					Male			
Data source:	LSAY	LSAY	LSAY	GOS	LSAY	LSAY	LSAY	GOS
Qualification: No qualification		VET	Bachelor	Bachelor	No qualification	VET	Bachelor	Bachelor
atar×No FOE	0.0016***				0.0021***			
atar×Agriculture		0.0016***	0.0028***	0.0011***		−0.001	0.0035***	0.0018***
atar×Architecture		0.0009	0.0018**	0.0010***		0.0030***	0.0057***	0.0023***
atar×Commerce		0.0024***	0.0026***	0.0016***		0.0012	0.0037***	0.0024***
atar×Communication		0.0010*	0.0016***	0.0006***		−0.0004	0.0020**	0.0007
atar×Education		0.0002	0.0033***	0.0033***		0.0001	0.0039***	0.0039***
atar×Engineering		0.0055***	0.0041***	0.0035***		0.0048***	0.0053***	0.0035***
atar×Graphic studies		0.0020***	0.0011	0.0006*		−0.0038	0.0018*	0.0010**
atar×Hospitality		0.0013**	0.0015**			0.0003	0.0023***	
atar×Human welfare		0.0012**	0.0030***	0.0029***		−0.0022*	0.0037***	0.0023**
atar×Humanities		0.0020***	0.0022***	0.0015***		−0.0007	0.0034***	0.0021***
atar×IT		0.0040***	0.0037***	0.0028***		−0.0004	0.0043***	0.0032***
atar×Law		0.0024***	0.0035***	0.0023***		0.0018*	0.0036***	0.0028***
atar×Medicine		0.0030***	0.0053***	0.0046***			0.0061***	0.0048***
atar×Nursing		0.0019**	0.0041***	0.0032***		−0.0003**	0.0063***	0.0034***
atar×Other health		0.0024***	0.0030***	0.0025***		0.0003	0.0039***	0.0031***
atar×Other medical		0.0031***	0.0048***	0.0025***		−0.0002	0.0047***	0.0035***
atar×Performing arts		−0.0001	0.0017***	0.0003		−0.0002**	0.0023**	0.0012**
atar×Psychology		0.0035**	0.0030***	0.0017***		0.0035***	0.0017*	0.0022***
atar×Science		0.0009	0.0033***	0.0019***		0.0017	0.0043***	0.0027***
atar×Sport		0.0016*	0.0027***	0.0020		−0.0000	0.0008	0.0010
Observations	3,337	2,449	5,721		5,899	3,339	4,053	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: Coefficients shown in this table represent the increase in income based on a one-point increase in ATAR. e.g. from an ATAR of 75 to an ATAR of 76.

Appendix B: Adjusted lifetime income methodology

Adjusted lifetime income is a two-step process. First, the distribution of lifetime income based on gender, qualification and field is estimated using Census data. Second, an expected lifetime income is generated by adjusting a person's place on the income distribution based on their ATAR.

B.1 Lifetime income distribution

Lifetime income distribution is generated using the model described in a 2012 Grattan Institute report, *Graduate Winners*. The technical paper attached to that report outlines the methodology in detail.¹⁶⁵

Pre-tax income data is retrieved from the 2016 Census for Australian citizens by gender, age, field of education (including none, see Table A.5) and qualification level (including none, see Table A.4) of their highest qualification.¹⁶⁶ We define a 'cohort' as a group of people with the same qualification in the same field at the same age. The level of income at each decile is recorded for each group.

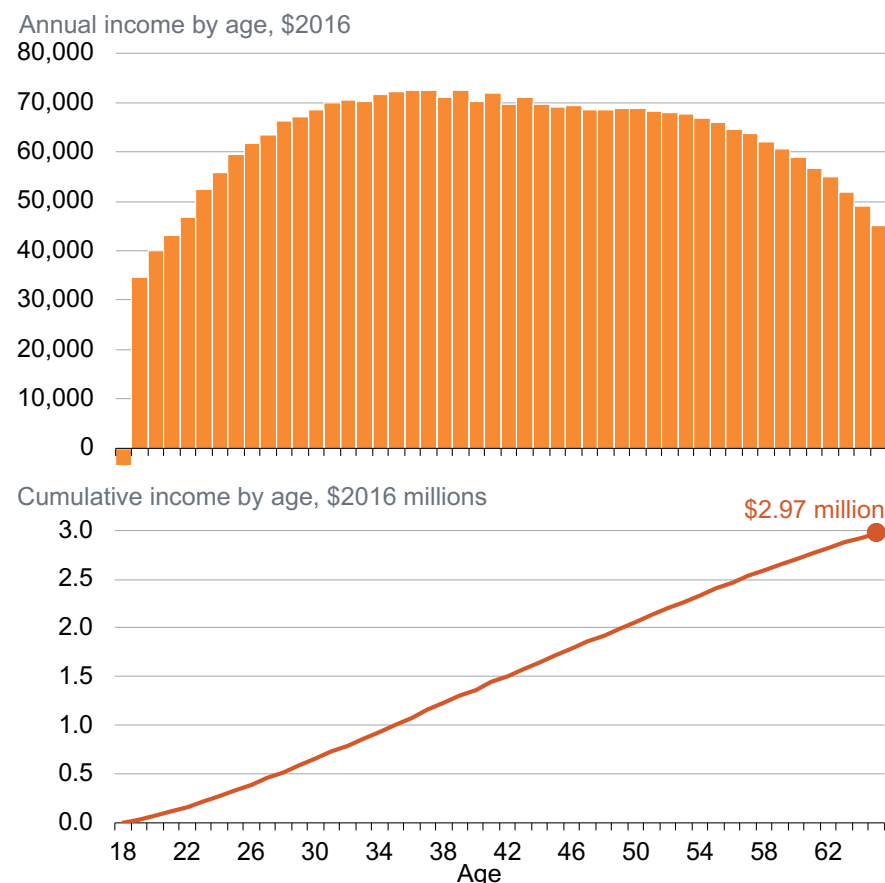
Tax, course costs and HELP repayments (where applicable) are then deducted from pre-tax income at each decile for each cohort, giving net income.¹⁶⁷ We have assumed 2016 costs, tax rates and HELP repayment settings for all Census years. Changes in tax rates, such as

165. Weidmann and Norton (2012). This methodology was also used for the analysis in Norton et al. (2018a).

166. ABS (Census, 2016b). Highest qualification order is determined by the Australian Qualifications Framework. The use of highest qualification does not recognise if a person has more than one qualification (e.g. a diploma and a bachelor degree).

167. Annual course costs are field-specific student contributions for bachelor degrees (between \$6,256 and \$10,440 for 3-5 years, depending on field). The cost of diplomas is derived from VET Student Loans and adjusted for inflation (\$7,808 for two years). The cost of Certificate III/IVs vary substantially by state, field, and an applicant's eligibility for subsidy. They are assumed to cost \$5,000 for one year.

Figure B.1: Earnings for male Certificate III/IV engineering holders at the 80th percentile



Sources: Grattan analysis of ABS (Census, 2016b).

those recently legislated by the government, will alter the net earnings estimates.

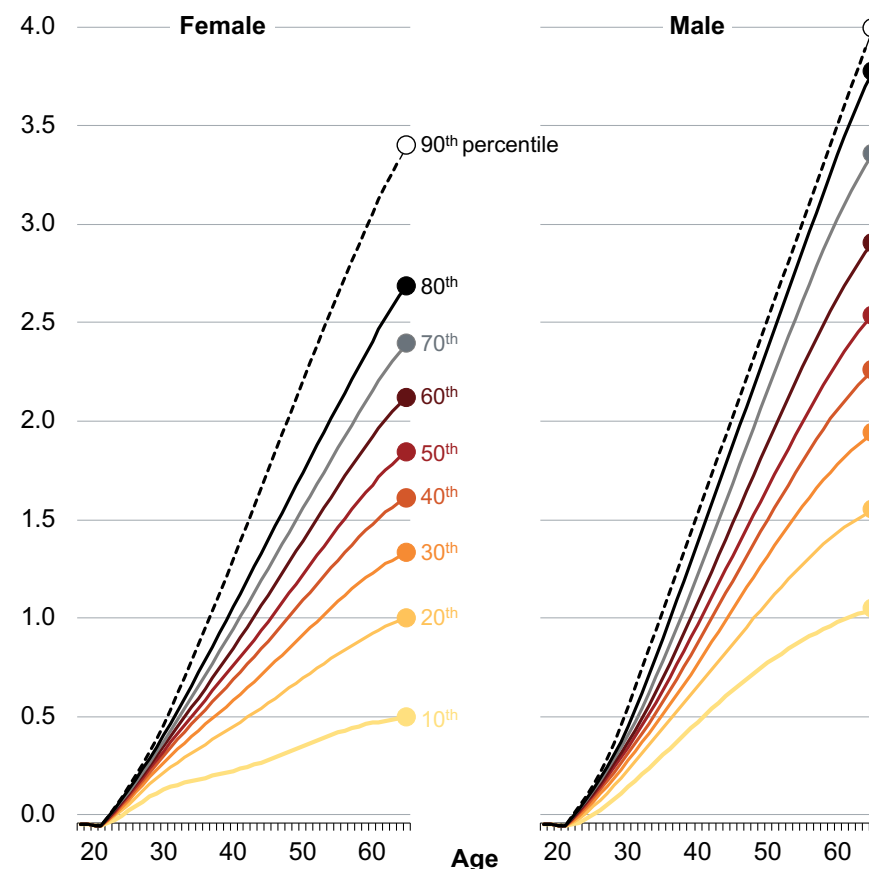
Lifetime incomes are the sum of annual net incomes at a given percentile between the ages of 18 and 65. We assume graduates remain on the same income percentile throughout their career. Income is often more volatile, especially when people move in and out of the labour force or between full- and part-time employment. Our assumption smooths out these individual differences to a greater extent than is likely in real life. While this tends to under-estimate the incomes at low percentiles and over-estimate higher incomes, median incomes remain relatively unchanged when allowing for movement between income percentiles.¹⁶⁸

A lifetime income example is shown in Figure B.1. It shows the 80th percentile income for a man with a Certificate III/IV in engineering: at age 18 he is assumed to be studying, out of the labour-force, and spending money on training materials. At age 19 he earns \$34,000, increasing to \$40,000 the next year. This continues, reaching about \$70,000 per year in his thirties before gradually declining to \$45,000 at age 65. Cumulatively, he will earn \$2.97 million net income over his working life.

B.2 Adjusting lifetime income for ATAR

Where somebody sits on the income distribution for their qualification is important, as Figure B.2 shows. Appendix A shows that there is a relationship between a person's performance at school – their ATAR – and their income in the first few years after graduation. This relationship holds within most fields and qualifications, meaning a bachelor graduate of science with a higher ATAR is going to earn more, on average, than a similar graduate with a lower ATAR. We use

Figure B.2: Lifetime earnings for male and female graduates
Expected net lifetime income, \$2016 million



Sources: Grattan analysis of ABS (Census, 2016b).

168. Daley et al. (2018, section C.4.2).

this estimated relationship to adjust the expected lifetime earnings described in Appendix B.1.

This analysis assumes that graduates with the median ATAR earn the median earnings for each field of education, qualification, and gender. LSAY is used to estimate the median ATAR of Certificate III/IV, diploma and advanced diploma holders (see Appendix A.4.1). The median ATAR for bachelor-degree graduates is calculated from the Commonwealth Government's higher education administrative data from 2005 to 2016. When estimated using LSAY, bachelor-field ATAR distributions are similar. ATAR distributions used in this analysis are presented in Figure B.3.

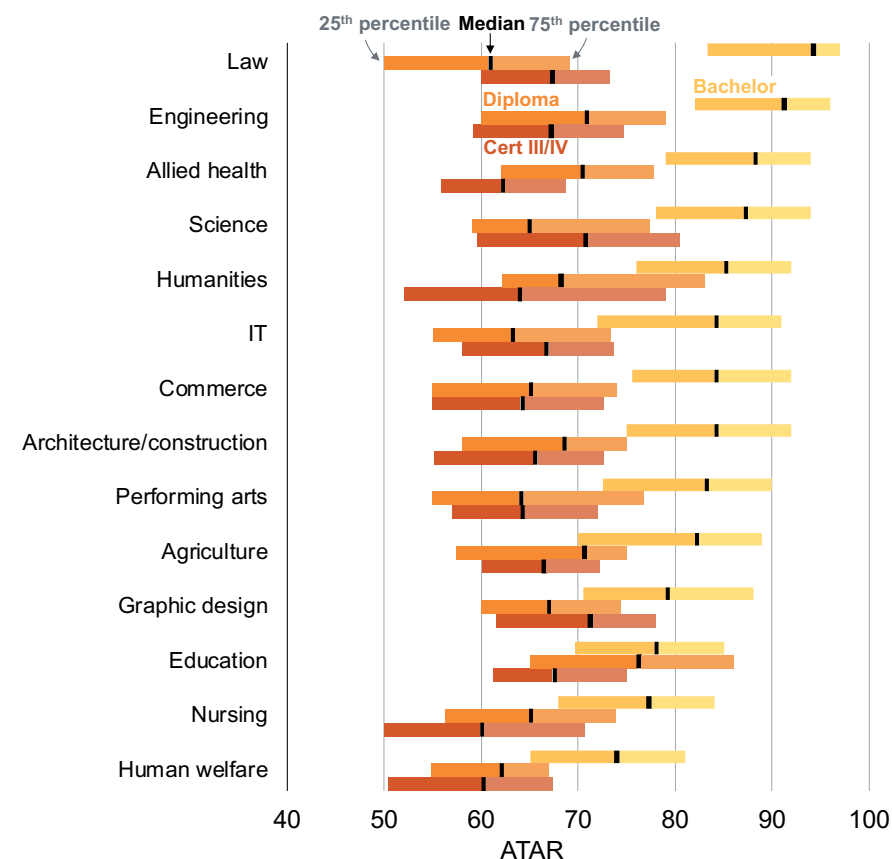
To allow for cross-qualification and field of education comparisons, the report focuses on expected outcomes of students with an ATAR of 65, which is the median ATAR of upper-level vocational education holders. This ATAR mimics post-school options for a typical upper-level vocational education student.

To estimate expected lifetime earnings for graduates with an ATAR of 65, the difference between the median ATAR of a qualification and 65 is multiplied by the estimated relationship between ATAR and earnings (shown for each qualification, field and gender). This figure is then subtracted from the median lifetime earnings.¹⁶⁹

For example, Figure B.3 shows that the median ATAR for science bachelor graduates is 88. The *median* woman with a science bachelor degree is expected to earn \$1.83 million over her lifetime. A one-point increase in the ATAR of a science graduate is associated with increased income of 0.7 per cent, meaning a science graduate with

an ATAR of 65 is expected to earn 17 per cent less than the median, or \$1.52 million over her lifetime.¹⁷⁰

Figure B.3: ATAR distribution by field and qualification



Notes: Includes imputed ATAR (see Appendix A.4.1).

Sources: Grattan analysis of NCVER (LSAY, various years).

169. The relationship is used only when it is significant at $p < 0.05$. Otherwise, we conclude that there is not evidence available of a relationship between income and ATAR for that field, and adjusted income is left as expected income.

170. i.e. $0.7\% \times (88 - 65) = 16.9\%$.

Appendix C: Course preferences

Universities offer a variety of courses reflecting students' diverse interests. While students have a first-preference course, they often also have other courses that they would be interested in studying. Of the students who applied for a university course through tertiary admission centres (TACs) in 2016, 82 per cent included multiple courses in their applications.

Students differ in their likely other course preferences. For example, course alternatives for humanities and engineering students are likely to differ. Women and men may also have different preferences. The report's analysis determines likely compatible disciplines by analysing university applications and course switching patterns.

In their TAC applications, students rank courses according to their interests and their chance of being admitted. Each course is categorised into one of 20 fields of education (Table A.5). For students whose preferences span across multiple disciplines, this report uses the relationship between their first and later course preferences to determine likely compatible disciplines. For each first-preference discipline, the five most popular other disciplines are assumed to be compatible.

Students who switch between courses also reveal their preferences. About one in ten university bachelor-degree students change course from one field of study to another from year to year.¹⁷¹ This report assumes when a student switches from one course to another, the course she switches to is within her cluster of interests. Combining course switching patterns from 2006 and 2015 across disciplines, the top five most popular courses students switch to are assumed to be potential alternatives to the student's first-preference course.

171. Grattan analysis of Department of Education and Training (Student data collection, various years).

The two data sources generally reveal similar sets of alternative courses. For example, in humanities, the top five most popular other disciplines for male students who choose humanities as their first preference are commerce, law, science, communication and education. These courses are also the top five most popular choice for male humanities students who switch courses. Figure 4.2 on page 36 compares the two data sources. In a small number of cases where the top five courses based on the two sources do not match, the top five courses from both sources are assumed to be potential alternatives.

A drawback of this analysis is that it is based on higher education data and therefore course preferences within higher education. This reflects the lack of cross-sector preferences data, although the personality traits and preferences that drive interests are likely to be similar irrespective of a person's level of education. An exception is law. Most diploma courses in law are diplomas in policing. Most people with these diplomas become police officers. Bachelor of law graduates, however, tend to work in legal professional jobs. For this reason, law is excluded from the compatible course list.

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