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# Mapping Australian higher education 2016

Andrew Norton

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Andrew Norton's higher education reports are notified via Twitter, @andrewjnorton, and through the Grattan Institute's mailing list. To join it, please go to: http://www.grattan.edu.au/

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## Overview

For people new to higher education and higher education policy, the field can seem bewildering. Basic facts are surprisingly difficult to find and interpret. Funding entitlements reflect the sector's history more than consistent policy principles. Performance measures are published in many different places.

*Mapping Australian higher education 2016*, the fourth report in a series, puts key facts and their context in one place.

Australia has 40 full universities, and around 130 other higher education providers. Their revenues in 2014 approached $30 billion, making higher education a significant industry.

Although Australian universities have increased their private income since the 1980s, they still rely on government. Nearly 60 per cent of their cash flow is government grants or loans.

While major increases in higher education public funding are unlikely, the Commonwealth Government makes a significant investment in higher education. In 2015-16, it spent $15.7 billion, including direct grants to universities, student income support, and subsidies to the student loan scheme, HELP. About one dollar in five lent through HELP is not expected to be repaid.

Since the last edition of *Mapping*, the international student market has recovered. In 2014, nearly 350,000 international students took courses with Australian universities. Domestic enrolments exceeded one million for the first time.

For domestic students, humanities and commerce remain the most popular fields of study, but health and science enrolments show the fastest growth. Most international students take commerce-related courses.

New data shows that the most common average mark reported by students is between 70 and 79 per cent, but that international students tend to get lower marks than domestic students.

Many recent graduates find it difficult to get full-time work, although employment levels vary from course to course. This edition of *Mapping* has a special section on employment in science, information technology and engineering (STEM). Australia has many more science graduates than the labour market can absorb in related jobs. IT graduates seem unable to take full advantage of job growth in the IT industry. Engineering jobs are in decline, but new engineers have good job prospects compared to other graduates.

Despite slower transitions from university to career, the unemployment rate for all graduates remains low. Over their working lives, graduates on average earn significantly more than people who finish their education at Year 12.

The higher education workforce plateaued in 2015 after a period of growth, with 53,000 people holding academic jobs. Most of them are in research-only or teaching and research positions. They are supported by a large number of casually-employed tutors and lecturers, who mostly hold teaching-only jobs.

As well as teaching more students, since the 1990s Australian academics have substantially increased their research output, particularly through journal articles. But this growth has come to an end. Evidence from 2014 and 2015 shows that research expenditure, staff and outputs are stable or slightly declining.

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# Introduction

*Mapping Australian higher education 2016* provides an overview of higher education policy and trends. Since its first edition in early 2012, the report has established itself as a widely used one-stop source of information on higher education.

Chapter 1 explains **how higher education is defined** in Australia, the different types of higher education provider, the various types of qualification, and what makes universities distinctive among higher education providers.

Chapter 2 reports on **student trends including enrolment numbers**, courses chosen, and the mix of students on campus. It also discusses how students enter the higher education system.

Chapter 3 looks at the **higher education workforce**, including why people become academics, their employment arrangements, and their pay.

Chapter 4 looks at **research in Australian universities**, including what topics are researched and research outputs.

Chapter 5 provides information on **how higher education is funded**, including overall levels of funding, the income-contingent HELP student loan scheme and research funding.

Chapter 6 outlines how **per student funding levels** are determined, and **how student places are distributed** among higher education providers.

Chapter 7 describes the expanding **scope of the Commonwealth Government** in higher education, the key government departments and the higher education interest groups.

Chapter 8 examines **higher education's social outcomes**, including whether the disciplines studied meet employment needs, the quality of university research, and public satisfaction with Australian universities.

Chapter 9 covers **outcomes for students**, including academic standards, student satisfaction with teaching, and graduate employment and earnings.

Chapter 10 looks in more detail at **science, IT and engineering** enrolment trends and employment outcomes.

# 1. Higher education providers

What is higher education? The answer is surprisingly complex. This opening chapter explores the issue by examining the activities of universities, non-university higher education providers and other organisations in the higher education industry.

## 1.1 What is higher education?

For many people, 'higher education' and 'universities' are synonyms. But universities are a particular kind of institution that delivers higher education. While universities educate most higher education students, they are a minority of higher education providers in Australia – 43 of the 170 operating in mid-2016. This includes 40 universities, one specialist university and two overseas universities.[1] The other providers are colleges, institutes, and schools that are authorised to offer higher education qualifications.

Before offering higher education qualifications, higher education institutions must be registered by the Tertiary Education Quality and Standards Agency (TEQSA – discussed in more detail in section 7.2.3). TEQSA ensures that all institutions meet conditions set by government. They are expected to support free intellectual inquiry, offer teaching and learning that engages with advanced knowledge and inquiry, employ academic staff who are active in scholarship, and issue qualifications that in Australia must comply with the Australian Qualifications Framework (AQF).[2]

The power to issue particular types of qualifications is the most important defining feature of a higher education provider. Free intellectual inquiry, engagement with advanced knowledge, and scholarship all occur outside as well as within the higher education sector. For these aspects of higher education no government permission is required: the market of ideas assesses value. It is the licence to issue AQF-recognised higher education qualifications, to certify individuals as having acquired knowledge and skills, that makes higher education providers distinctive.

Qualifications are differentiated according to the knowledge and skills required for their successful completion. Table 1 shows the AQF qualifications, ranked from 1 to 10. Generally, certificates I to IV (levels 1 to 4) are classified as vocational, while associate degrees through doctoral degrees (levels 6 to 10) are classified as higher education. Level 5 diplomas and level 6 advanced diplomas can be vocational or higher education, though in practice most are taught in the vocational education sector.

[1] TEQSA (2016b). Appendix A and appendix B have a full list of higher education providers.

[2] DIICCSRTE (2013a). A revised standards framework comes into effect in 2017: Department of Education and Training (2015f).

**Table 1: Australian Qualifications Framework**

| Level | Qualification |
|---|---|
| 1 | Certificate I |
| 2 | Certificate II |
| 3 | Certificate III |
| 4 | Certificate IV |
| 5 | Diploma |
| 6 | Advanced Diploma; Associate Degree |
| 7 | Bachelor Degree |
| 8 | Bachelor Honours Degree; Graduate Certificate; Graduate Diploma |
| 9 | Masters Degree |
| 10 | Doctoral Degree |

*Source: AQF (2013)*

Key differences between the qualifications include the level of theoretical knowledge required, and the student's capacity to analyse information, make independent judgments and devise solutions to problems. Certificate I or II holders are expected to apply technical skills to routine tasks or predictable problems, while doctoral degree graduates are expected to be able to create new knowledge. In the middle classifications there are sometimes subtle distinctions. A certificate IV holder is expected to analyse information to complete a range of activities, while a bachelor degree holder is expected to analyse and evaluate the information. A certificate IV holder is expected to provide solutions to sometimes complex problems, while a bachelor degree holder is expected to generate solutions to problems that are sometimes complex and unpredictable. The AQF encourages pathways between the qualifications, including full credit towards bachelor degrees for time spent acquiring diplomas, advanced diplomas, and associate degrees.

Since there is a continuum of knowledge and skills rather than sharp dividing lines between the AQF levels, the distinctions between vocational and higher education are partly a matter of convention. The terminology should not be taken to imply that one sector is concerned with the world of work and the other is not. Most higher education students are seeking vocational outcomes. When the Australian Bureau of Statistics asked people studying qualifications in the past year about their main reason for undertaking learning, 86 per cent of those enrolled in higher education gave a job-related reason. For people in certificate III and IV qualifications, 92 per cent gave a job-related reason.[3]

Vocational and higher education providers also overlap. The public-sector vocational education providers, the TAFEs, are adding degrees to their course programs; eleven had done so as of mid-2016. Especially in Victoria, some universities are 'dual sector', with substantial TAFE operations. Other universities offer a smaller range of vocational education courses. In the private sector, many institutions offer both higher education and

[3] Calculated from ABS (2014).

vocational education courses. All up, at least 86 organisations provide both higher and vocational education courses.[4]

## 1.2 Non-university higher education providers

Non-university higher education providers (NUHEPs) are a significant part of Australian higher education. In July 2016, 127 NUHEPs (listed in Appendix A and Appendix B) were registered with TEQSA.[5] Some are public institutions: the Australian Film, Television and Radio School, the Australian Institute of Police Management, and the various TAFEs now offering degrees, for example. Some are hard to classify on a public-private spectrum, as they are for-profit colleges owned by public universities. But most (106) are clearly in the private sector. A 1999 survey identified 78 private NUHEPs, indicating growth of a third to 2016.[6]

Just under half (45) of private NUHEPs are registered with the Australian Charities and Not-for-profits Commission (ACNC).[7] NUHEPs not registered as charities may still be not-for-profit. In November 2015, TEQSA identified 58 private NUHEPs as not-for-profit.[8]

Although a significant number of for-profit NUHEPs operate in the Australian market, some companies own several providers. An Australian stock market listed company, Navitas Limited, owns nine NUHEPs. In 2014-15 it had university program revenues of $566 million, with profits of $140 million, from operations in many countries.[9] Two large American for-profit higher education companies, Kaplan and Laureate International Universities, also operate in the Australian market. In 2013-14, the median for-profit higher education provider earned profits of 12 per cent of their revenue.[10]

We cannot say for sure how many students are taught in NUHEPs. Where public universities outsource teaching (section 1.4) the students are counted in the university rather than the teaching institution. With this caveat, in 2014 NUHEPs enrolled at least 67,550 full-time equivalent students.[11] It is a big increase on slightly less than 15,000 full-time equivalent students in 1999, but still only seven per cent of all enrolments (see section 2.1 for more detail on enrolments).

The non-university higher education sector is quite diverse, so most generalisations have exceptions. However, NUHEPs are specialised compared to universities (discussed in section 1.3). For most, teaching is their only major education function. They often use staff and facilities for revenue-generating teaching for

[4] The MySkills website was used to count vocational providers. It was based principally on name matching, so there could be additional providers with different names but common owners.
[5] This count is not straightforward; it is of distinct legal entities on TEQSA's National Register of Higher Education Providers. However, some providers have multiple trading names and in one case two legal entities share a trading name: TEQSA (2016b)
[6] Watson (2000). There is also significant turnover in NUHEPs, including closures and takeovers.
[7] ACNC (2016). To be registered, higher education providers must have a charitable purpose in the public benefit. 'Advancing education' is a legislated charitable purpose: *Charities Act 2013*, division 2.
[8] TEQSA (2016a), p 7
[9] Navitas (2015), p 22. These are pathway programs to universities (see discussion in this section).
[10] TEQSA (2016a), p 24. This is double the university rate.
[11] TEQSA (2016d), p 9

longer periods of the year than universities do. Students can also finish their courses more quickly, studying for three trimesters a year rather than the two semesters offered by most universities.

Within their teaching function, NUHEPs often specialise in particular course levels. Very few offer the full range of AQF qualifications through to PhD. Fourteen institutions known as pathway colleges specialise in diploma-level courses. Their purpose is to prepare students for entry into the second year of a university course. Typically, they have a relationship with a particular university, and the diploma curriculum will match that taught in the target university's first year. For example, students who successfully complete a Diploma of Business at the South Australian Institute of Business and Technology can enter the second year of a University of South Australia Bachelor of Business. By contrast, the College of Law offers entirely postgraduate courses as it prepares law graduates for practice or gives lawyers additional specialist skills.

NUHEPs also tend to specialise in what they teach. Many include a specific field of study, industry or occupation in their title, for example: Kaplan Business School, International College of Hotel Management, and the Australian College of Nursing. Subject specialisation can build brand reputations in particular niche areas.

An analysis of course offerings shows that business-related courses are most common in the non-university higher education sector. These include some delivered by professional associations such as Chartered Accountants Australia and New Zealand. There are also a significant number (21) of institutions with a religious affiliation. Some are theological colleges, but others offer a wider range of courses.

Health, and particularly alternative health, is also a common field in the non-university higher education sector. Nineteen providers have a health-related speciality. Another 15 colleges specialise in various kinds of creative arts.

Some NUHEPs are primarily focused on the international student market. Twenty-eight NUHEPs with published enrolment data report that two-thirds or more of their students are from overseas.

In most cases, accreditation for NUHEP courses must be sought from TEQSA.[12] The accreditation process includes examining course content, student admission criteria, assessment methods, and staff qualifications. Course content needs to be comparable to courses at the same level in similar fields at other Australian higher education providers. There is provision for NUHEPs with appropriate quality assurance systems and a track record of re-accreditation to become self-accrediting – to have a legal right to approve their own courses. However, most NUHEPs are not self-accrediting.[13]

On top of these licence-to-operate requirements, some NUHEPs seek other third-party approval or endorsement of their courses. For example, NUHEPs offering accounting courses have them recognised by CPA Australia, so their graduates can become members of that accounting professional association. Some courses at the Australian College of Applied Psychology are approved by the Psychotherapy and Counselling Federation of Australia, a professional body.

[12] TEQSA (2016c)
[13] The eight self-accrediting NUHEPs are noted in Appendix A.

## 1.3 What is distinctive about universities?

'University' is a regulated term in Australia. No educational organisation can operate as an Australian university without meeting criteria set out in law. Commonwealth Government Provider Category Standards enforced by TEQSA determine which institutions can operate as universities.[14] Overseas universities can offer their home country qualifications in Australia if they are approved by a higher education accrediting authority acceptable to TEQSA.[15]

### 1.3.1 Research

The most important distinctive aspect of universities as higher education institutions is their combination of research and teaching. Research is defined as original work conducted to produce new knowledge. To be a full Australian university, a higher education provider must be active in research across at least three broad fields of study: disciplines such as health, engineering, education, or science.[16] Higher education institutions with research activity in only one or two fields can apply to be a specialist university. Under this provision, the Melbourne College of Divinity became the University of Divinity.

While the idea that universities must be active in research is widely accepted in Australia today, the original Australian universities established in the mid-19th century were to be places of scholarship – expertise in existing knowledge rather than original research. Though universities were conducting some research by the latter part of the 19th century, PhD degrees were not offered until the 1940s.[17] In the late 1980s and early 1990s, predominantly teaching-focused colleges of advanced education and other government-funded higher education institutions were turned into or merged with universities, substantially diluting the university sector's research orientation. The universities that were created as a result are still sometimes referred to as "Dawkins universities" (after the minister behind the policy, John Dawkins).[18] The description was partly intended to distinguish them from pre-1988 universities. Yet only 10 years later, research became a defining legal feature of a university.[19]

The research requirement has made it difficult for new universities to start. University research typically is not self-financing. Public research funding is primarily awarded according to past research performance, which makes it hard for new universities to build research output. So after a period in the 1980s and 1990s, when many new universities were created, no new full Australian universities were established in the decade after the three fields of study rule came into effect in 2000.

In October 2011, the first new university to be established under the three fields of study rule was announced. Torrens University Australia is owned by the American for-profit university

[14] TEQSA (2016c); DIICCSRTE (2013a); Department of Education and Training (2015f). A list of universities is in Appendix A. Most universities also have their own founding legislation, usually from a state government.
[15] Carnegie Mellon University and University College London are the current overseas universities. University College London is closing its Australian operations from 2017, see Brewer (2015).
[16] A detailed categorisation of disciplines can be found in ABS (2001).
[17] Starting with the University of Melbourne in 1945: Forsyth (2014), p 27.
[18] The universities created during the Dawkins years are noted in the list of universities in Appendix A. For a more detailed history see Croucher*, et al.* (2013).
[19] Through agreements between education ministers: MCEETYA (2000), later replaced by MCEETYA (2007).

conglomerate, Laureate International Universities. It took its first students in 2014.

Universities aspire to a teaching-research nexus: in other words, that teaching and research are not just two separate functions of the same institution, but mutually beneficial. Using empirical measures of teaching performance, it has been difficult to prove that a reliably positive nexus exists.[20] A Grattan Institute report analysed student surveys on teaching to see whether research activity levels made a difference. While it identified some differences between high and low research departments, overall no consistent positive or negative effect of research on teaching was found.[21] This does not show that research never benefits teaching, but that an overall assessment includes negative effects of research on teaching. Teaching and research compete for limited academic time, attention and resources. Australian academics generally have a low preference for teaching compared to research. [22]

Both research output and student satisfaction with teaching have improved in the last 15 years (sections 4.3 and 9.1.2), which might suggest a synergy. But it is more likely that changed policies and practices aimed directly at each activity explain the improvement (sections 5.2.4 and 9.1.2).

### 1.3.2 Comprehensiveness

While many NUHEPs are specialised in what they teach (section 1.2), full Australian universities must offer courses in at least three broad fields of study, as classified by the Australian Bureau of Statistics.[23] Most offer more. They are often described as being "comprehensive" in the range of courses they offer. More than half of universities have students in all ten major broad fields of study, and all but four have at least eight major fields of study.[24]

While many students specialise in their university studies, the comprehensive nature of Australian universities creates opportunities for studying more than one field. Australian universities offer many combined qualifications, such as arts/law or commerce/science, so that students graduate with two degrees.[25] Ten per cent of completing students have combined or double degrees.[26] Many students also take units from faculties other than the one they are principally enrolled in. For example, an arts student may do a mathematics unit taught by a science faculty.

Comprehensiveness also extends to the range of qualifications offered. All full universities offer courses from bachelor through to PhD (section 1.1). Some also offer diploma, associate degree and vocational education qualifications.

### 1.3.3 Self-accreditation

Unlike other higher education institutions, Australian universities automatically have the right to accredit their own courses.

[20] See the summary and references at Norton and Cherastidtham (2015a), p 31-33.
[21] Cherastidtham, *et al.* (2013)
[22] Coates, *et al.* (2009) esp. p 21-22; Strachan, *et al.* (2012), p. 37
[23] ABS (2001)
[24] Calculated from Department of Education and Training (2015m), table 2.8.
[25] In 2015, more than 40 per cent of bachelor pass degree courses offered by Australian universities were combined courses: Department of Education and Training (2015g)
[26] GCA (2015e), table 19

University academic boards approve their university's courses, within a framework established by government regulation.[27] Self-accreditation is an aspect of academic freedom (section 1.3.4). In developing courses, academics in self-accrediting universities are free to include material without seeking a government agency's approval. They are instead regulated by their fellow academics.

Though universities self-accredit, they also seek external accreditation or recognition. Often this is necessary for their graduates to be admitted to professional practice. They sometimes also secure international recognition. For example, many universities have had their business schools accredited by the international Association to Advance Collegiate Schools of Business (AACSB).

### 1.3.4 Academic freedom

The institutional freedom of self-accreditation has its individual equivalent in the idea of academic freedom. As one American study put it, "academic freedom establishes the liberty necessary to advance knowledge, which is the liberty to practise the scholarly profession."[28]

Generally, academics see themselves as having considerable autonomy in the three main areas of university activity: research, teaching and community engagement (section 1.3.6 for more on engagement). Surveys of academics show that freedom to pursue their own research interests is a major part of what attracts them to universities.[29] This freedom has legal recognition in the licence to operate rules enforced by TEQSA and the funding laws implemented by the Department of Education and Training.[30] University policies and enterprise agreements set out more detail on how academic freedom works in practice.[31]

For research and teaching, academics largely self-regulate their individual freedoms: academic research is subject to peer review (review by other academic experts) and course content is approved by academic boards. This formal academic self-regulation is absent for community engagement. University administrations sometimes try to perform this role, and dismiss or discipline academics who make controversial or embarrassing public statements.[32] Such actions almost always attract strong criticism, as academics do not see this as a legitimate role for managers (see more in section 1.3.5 below).

In practice, a strong culture of academic freedom is more a feature of universities than of higher education providers generally. Free intellectual inquiry is necessary for advancing knowledge, but not for providing higher education qualifications. Some higher education providers have narrower purposes, focusing on teaching knowledge and skills developed elsewhere.

[27] For a description of how academic boards operate see Group of Eight (2014a).
[28] Finkin and Post (2009), p 39
[29] Bexley, *et al.* (2011), p 66
[30] *Higher Education Support Act 2003*, section 19-115; DIICCSRTE (2013a); Department of Education and Training (2015f)
[31] Stobbs (2015)
[32] For examples and some background, see Jackson (2005) and O'Brien (2015) p. 223-229. From 2012, allowing academics to make public comment on issues within their area of expertise is a condition of being registered as a higher education provider: DIICCSRTE (2013a) and Department of Education and Training (2015f)

### 1.3.5 Self-governing communities

Universities see themselves as self-governing communities. Both public and private universities are legally distinct from government.[33] Government appointments to university governing bodies, commonly called councils or senates, are never a majority. Four universities have no such appointments.[34] Education ministers have no direct operational control. Partly for historical constitutional reasons, much government regulation is via conditions on grants (section 7.1), which universities can decline.

Within universities, academics see themselves as members of the university community and not just as employees.[35] The legal force of this distinction was explicitly acknowledged in a Federal Court judgment.[36] Academics expect inclusion in collective decisions, a decision-making process known as collegiality. Traditionally academics elect members to university senates and councils. Academic critiques of university administrators often complain about what they call managerialism – managers directing academics or steering their behaviour through targets and incentives. Managerialism is seen as an ideological rival to collegiality.

Student groups also seek representation in university decision making, often through student associations officially recognised by the university. Traditionally this was granted; it is now required by regulation.[37] The role and funding of official student organisations is the subject of a long-running political dispute between the Liberal Party on one side, and official student organisations, universities, and the Labor Party on the other.[38]

Despite complaints from academics that university managers are too powerful, university organisational structures are highly decentralised compared to for-profit corporations, with large amounts of consultation and decision-by-committee. Combined with change-resistant academics and staff unions, these decision-making processes can make reforming universities difficult.

### 1.3.6 Broad social responsibilities

As well as being a community in themselves, universities are expected to contribute to the broader community. Community engagement is sometimes referred to as the third stream of university activity, after teaching and research. It can include universities working with or for local communities, government, industry, not-for-profits, and the media. The standards for registration as a university elevate some of these activities from desirable to necessary, requiring demonstrated engagement with local and regional communities, and a commitment to “social

[33] For a discussion of universities as special purpose corporations see Corcoran (2000).
[34] They are Australian Catholic University, University of Notre Dame, Bond University and Torrens University Australia.
[35] See the discussion in Forsyth (2014), especially chapters 7 & 8.
[36] In *University of Western Australia v Gray* the court held that academic staff were, by virtue of the definition of ‘university’ in the UWA Act, members of a university, “linked historically by that definition to the idea of the university as a community of teachers and scholars”, see Stobbs (2015).

[37] DIICCSRTE (2013b); DIICCSRTE (2013a); Department of Education and Training (2015f)
[38] Norton (2005)

responsibility" in their activities.[39] It is also common for university founding statutes to include community engagement objectives.

Community engagement is so diverse that it is hard to measure. One input indicator comes from academic time-use surveys, although the published surveys include other activities. The latest, from 2015, found that academics spent on average 5.3 hours a week on community and university service, out of an average 50.7 hours of work.[40] An earlier survey of academics found that more than half believed that community service should be rewarded in promotions, though only 15 per cent said that it was rewarded.[41] Community service is an important part of university culture and practice, but unlike teaching and research it does not dominate.

### 1.3.7 Multiple missions

Though the term 'university' has a formal legal definition, no single feature makes universities distinct as higher education providers. Some NUHEPs conduct research, self-accredit, give their academic staff freedom, operate as a community of scholars, and engage with broader social responsibilities. But few do all of these things, and most have limited functions beyond teaching. Contemporary Australian universities are characterised by their combination of activities more than by any one feature.

The multi-faceted nature of universities has advantages. The different characteristics of contemporary universities – research, teaching and community engagement – can all inform each other. Yet the model may also have disadvantages. Where in most industries gains in quality and productivity come through specialisation, in universities potential gains from specialisation are limited by the model of a generalist practitioner. Academics are expected to be good at research, teaching, and community engagement; many are expected to be good administrators as well. The skills needed for the generalist academic's four tasks are not the same.

## 1.4 Higher education service providers

Although only higher education providers have a licence to issue higher education qualifications, other organisations support higher education providers or deliver related higher education services.

While universities do their own marketing, intermediary organisations help co-ordinate the matching of students with courses and institutions. The most important intermediaries are the state-based tertiary admissions centres, which handle most school-leaver applications for university (section 2.7).

Commercial organisations are also involved in student recruitment. SEEK Learning is an education broker advising prospective students on their course options. Owned by the same company as the SEEK job advertisement site, SEEK Learning services the overlapping markets of people looking for better jobs and an upgrade of their qualifications. In the international student market, IDP Education helps match

[39] DIICCSRTE (2013a); Department of Education and Training (2015f)
[40] NTEU (2015c). A 2007 survey, which excluded internal university service but included services to clients or patients as well as community service, reported 4.4 hours out of 50.6 hours a week: Coates*, et al.* (2009)
[41] Bexley*, et al.* (2011)

international students with universities in Australia and elsewhere.

Open Universities Australia (OUA) does not deliver education or award degrees. It sells online units and courses offered by its seven shareholder universities and other higher education providers. It is unusual in promoting not-for-degree units; selling just knowledge without a credential (though students may apply to individual universities for credit towards a degree for OUA units).

Organisations such as Blackboard and Moodle help universities co-ordinate teaching-related activities through software known as learning management systems. These store course content and are used to submit work, run student forums, record assessment results, and do other administrative tasks. An Australian university became the first in the world to use IBM's Watson machine learning platform to answer student questions.

Companies offering one-to-one online tutorial services for university students operate in the Australian market. An Australian tutorial service provider, YourTutor, works with a dozen universities. It reports peak demand for its services after 7.30pm at night and on Sundays. Another firm in this market in Smarthinking, which is owned by the world's largest international educational services company, Pearson Education.

New firms are emerging selling educational software innovations such as 'adaptive learning', where online course materials adjust to the student. These include Knewton in the United States, and Smart Sparrow in Australia.

Universities also outsource campus-based course delivery, usually to NUHEPs. For example, Navitas operates La Trobe University's 'La Trobe University Sydney' campus. Students study a La Trobe University curriculum and are awarded a La Trobe University degree. Queensland TAFE offers University of Canberra degrees. There are other similar arrangements around Australia.

These relationships may become more common in higher education. As higher education becomes more competitive (section 6.2) partnerships can give universities access to new markets and technologies. Higher education service providers can build economies of scale by supporting many universities, lowering the cost of education.

# 2. Higher education students

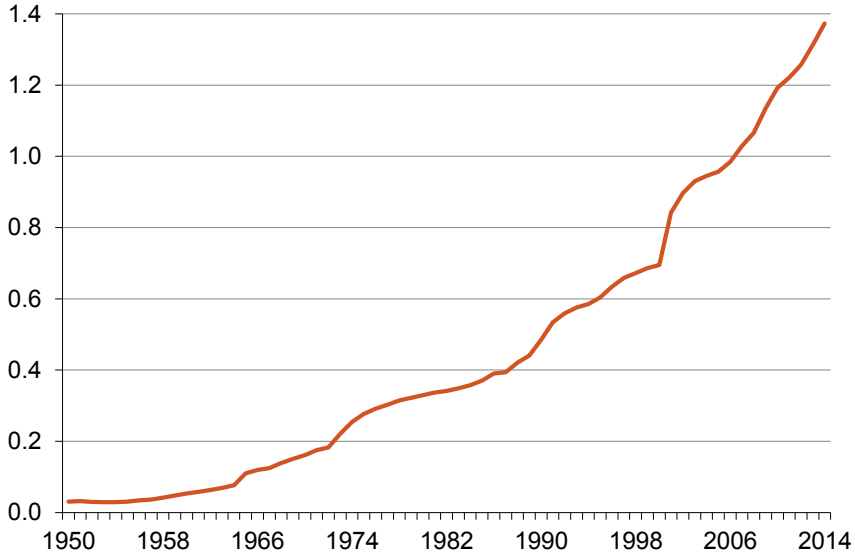
This chapter examines how many people are studying a higher education course, how they are chosen, what they are studying, and some of their social characteristics.

## 2.1 What is the overall trend in enrolments?

Australian higher education student numbers have grown rapidly since the 1960s, as Figure 1 shows. In 2014, total domestic and international student enrolments were just below 1.4 million.

Although undergraduate numbers increased by the largest absolute number over the last 30 years, postgraduate coursework has doubled its share of total enrolments from 11 to 22 per cent. While the number of research students is increasing (section 4.1), their share of all students has been stable at around 5 per cent for many years. Figure 2 shows the trends.

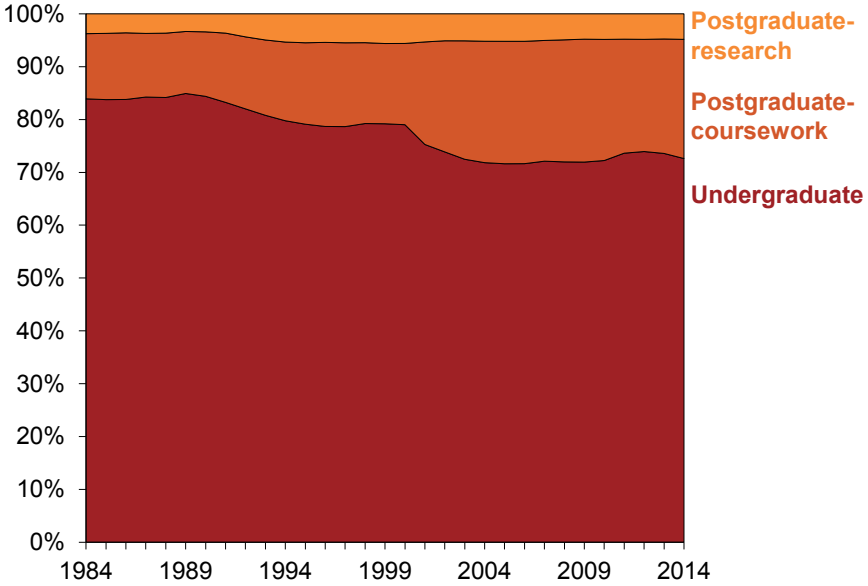
**Figure 1: Higher education enrolments, 1950–2014**
Millions of students




*Notes: Figures from 2001 onwards are based on full year enrolments, prior years are based on enrolments as at 31st March. Due to students commencing mid-year and at other times, pre-2001 enrolments are under-stated.*

*Sources: DEEWR (2000); Department of Education and Training (2015m)*

**Figure 2: Enrolment share by level of study, 1984–2014**
Proportion of enrolments

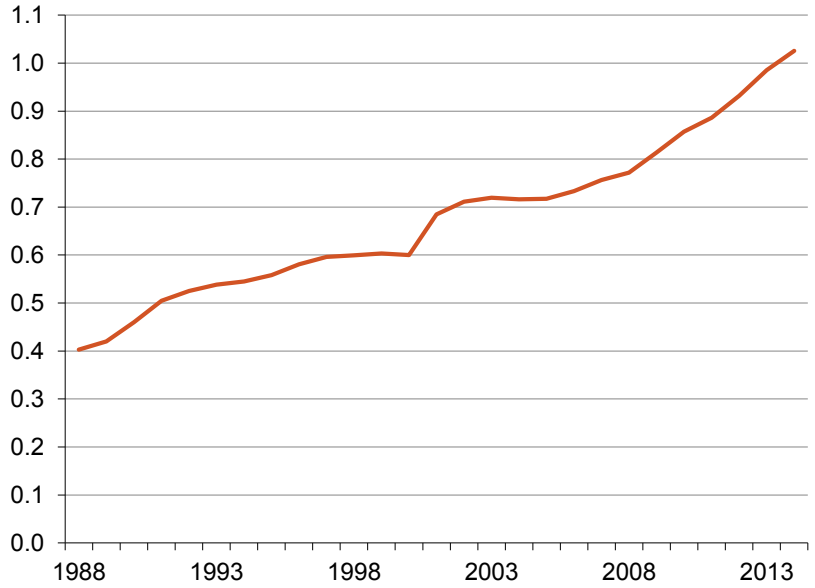



*Notes: Doctorate by coursework is classified as postgraduate coursework. Extended masters is classified as postgraduate research.*
*Sources: DEEWR (2000); Department of Education and Training (2016f)*

## 2.2 Domestic students

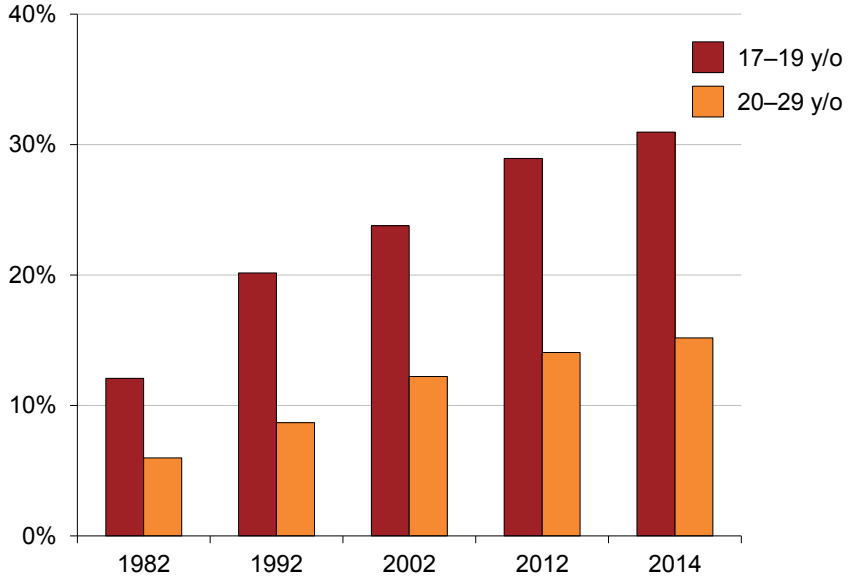
About three-quarters of students enrolled in Australian higher education institutions are Australian citizens or permanent residents. Occasional years of slow growth or small declines in student numbers only interrupt the long-term trend towards more students (Figure 3). Controls on undergraduate student numbers in public universities were eased and then largely removed in the years leading up to 2012 (section 6.2). This policy change triggered rapid enrolment increases. In 2014, domestic enrolments exceeded one million students for the first time.

**Figure 3: Domestic higher education students, 1988–2014**
Millions of students




*Note: Figures from 2001 onwards are based on full year enrolments, prior years are based on enrolments as at 31st March.*
*Sources: DEEWR (2000); Department of Education and Training (2015m)*

**Figure 4: Domestic higher education participation rates, 17–19 and 20–29 year olds, 1982–2014**
Proportion of population enrolled




*Notes: Onshore higher education international students have been removed from the population figures for 2002, 2012 and 2014. Includes undergraduate and postgraduate students.*
*Sources: DEET (1993); DEST (2002) ABS (2008); ABS (2015a); Department of Education and Training (2015m); g)*

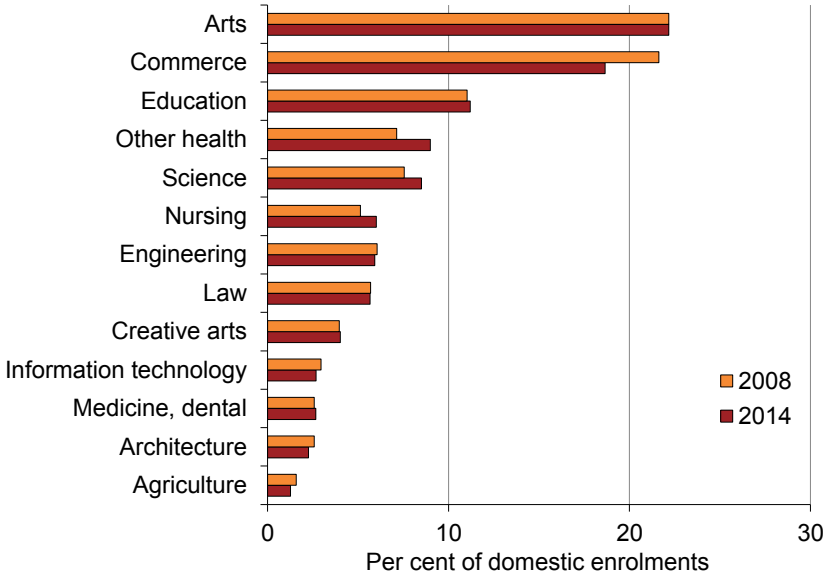
Australia's population has also grown in this period. Participation rates adjust for this by showing the proportion of people enrolled in higher education. Figure 4 reports higher education participation rates for school leavers aged between 17 and 19 years and for people in their twenties. Thirty-one per cent of the late teenage group were enrolled in higher education in 2014. In both age groups, participation rates more than doubled between 1982 and 2014.

### 2.2.1 What courses do students take?

Australian universities have mixed general and professional education from their earliest days. Although more professions require degrees for admission than in the past, with consequent increases in university enrolments in related fields, more general interest courses that are not necessarily aimed at particular occupations make up a substantial share of all domestic coursework enrolments (Figure 5). Twenty-two per cent of all enrolments are in arts courses, the largest of any field of education, and 8.5 per cent of enrolments are in science courses. Combined qualifications (section 1.3.2) let students mix vocational and general interests in their studies.

Since 2008, commerce, IT, architecture, engineering and agriculture have all lost enrolment share, while health fields, education and science have gained enrolment share (Figure 5). Trends in science, IT and engineering are considered in more detail in chapter 10. Because overall enrolments increased significantly in this period (Figure 3), no discipline had fewer students in 2014 than it had in 2008.

**Figure 5: Domestic enrolment share by field of education, 2008 and 2014**




*Notes: Shows enrolments in undergraduate and postgraduate non-research courses. 'Agriculture' includes environmental courses. The categories have been re-organised from the standard ABS fields of education to align more closely with the way universities are typically organised. Economics is included in commerce. Humanities, social sciences and communication and media studies are included in arts. 'Medicine, dental' includes veterinary science. Large groups in 'other health' include rehabilitation and public health. Students in combined or double degrees have had both fields of education counted.*
*Source: Department of Education and Training (2015g)*

## 2.3 International students

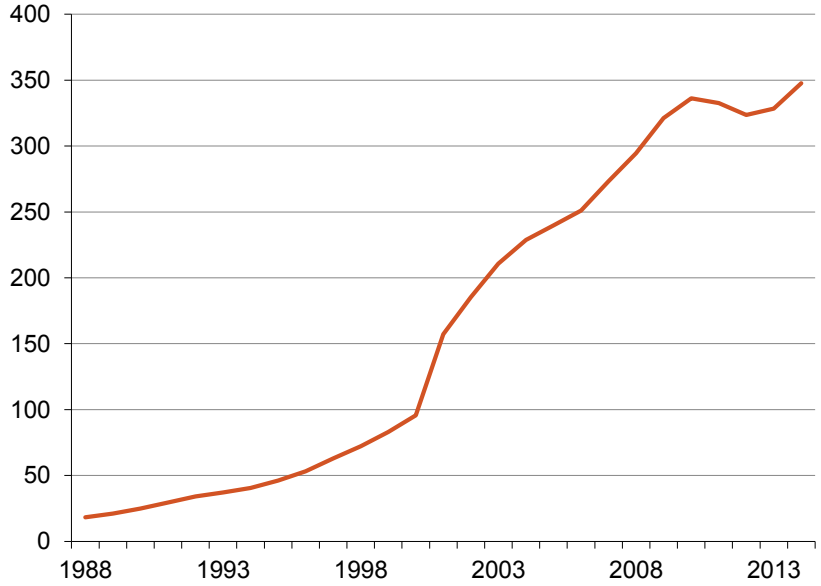
International students have long studied at Australian universities, but in small numbers until the 1990s. Before then, international enrolments were often part of Australia's overseas aid, wholly or partly subsidised by the Commonwealth.[42] From 1986, universities were allowed to take international students at fees they set and kept. Double-digit growth rates quickly became the norm, promoted at times by migration policies favouring former international students.[43] Australian universities have also established branch campuses overseas, or partnered with education providers in other countries to deliver Australian courses.[44]

In 2014, 347,560 international students were enrolled with Australian higher education providers (Figure 6). Of these, 85,873 are enrolled offshore, with about three-quarters in Singapore, Malaysia or China. Counting only onshore students, about one in five students in Australian universities is an international student. Half of all international students are enrolled in commerce-related courses. Other major fields include engineering (9 per cent) and 8 per cent for each of humanities, health and information technology.[45]

[42] Meadows (2011). A limited number of international students from developing countries still receive scholarships to study in Australia.
[43] Spinks and Koleth (2016) has an overview of migration policy changes.
[44] See Ziguras and McBurnie (2015), especially chapters 6 and 7.
[45] See the notes to Figure 5.

**Figure 6: International students enrolled in Australian higher education, 1988–2014**

Thousands




*Note: Figures from 2001 onwards are based on full year enrolments, prior years are based on enrolments as at 31st March.*
*Sources: DEEWR (2000); Department of Education and Training (2015m)*

Australian universities enrol students from most countries, but the largest numbers come from Asian nations (Table 2). Since 2001, enrolments from China have grown more than twelve-fold. They now make up over a quarter of all international students in Australian higher education.

After a slowdown between 2010 and 2013, international student numbers recovered to reach a new peak in 2014. Initial figures for 2016 suggest that it will set another record.[46]

**Table 2: Top ten international student source countries, 2001/2014**

| | 2001 | | 2014 |
|---|---|---|---|
| Singapore | 18,277 | China | 99,341 |
| Malaysia | 16,344 | Singapore | 34,325 |
| Hong Kong | 15,719 | Malaysia | 29,051 |
| Indonesia | 9,619 | India | 25,386 |
| China | 8,018 | Vietnam | 18,989 |
| India | 5,485 | Hong Kong | 13,568 |
| United States | 3,548 | Indonesia | 11,381 |
| Thailand | 3,259 | Nepal | 8,912 |
| Taiwan | 2,687 | United States | 6,666 |
| Norway | 2,527 | Pakistan | 6,284 |

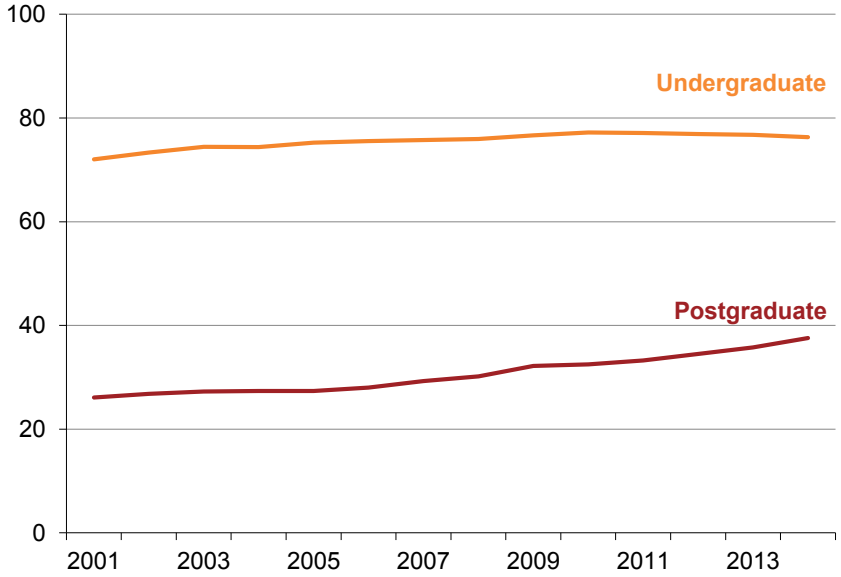
*Sources: Department of Education and Training (2015m) and predecessor publication.*

## 2.4 Full and part-time enrolment

Most undergraduate students are enrolled full-time. Since 2001 the proportion of undergraduates studying full-time has increased, but since 2010 has tapered off slightly, to 76 per cent in recent years (Figure 7). Postgraduate students are much less likely to study full-time, but an upward trend is apparent for them, reaching 38 per cent in 2014. Eighty-four per cent of international students study full-time, partly reflecting visa requirements for onshore students.

[46] Department of Education and Training (2016b), data to May 2016. However, this increase is not reflected in visa data to 31 March 2016: Department of Immigration and Border Protection (2016d)

**Figure 7: Proportion of domestic students enrolled full-time, 2001–2014**
Per cent




*Note: Full-time enrolment is defined as 75 per cent or more of a normal one year study load.*
*Source: Department of Education and Training (2015m)*

## 2.5 The rise of off-campus study

Studying off-campus is not new in Australia. Originally carried out by correspondence, distance education has never fallen below 5 per cent of total enrolments. As Figure 8 shows, the proportion of students studying off-campus has increased since the early 1990s to 17 per cent in 2014 (the drop from 2000 was due largely to declining international student off-campus enrolments). The small decrease in 2014 is due to a significant fall in student numbers at Open Universities Australia; in the rest of the higher education sector the off-campus share is growing.

Since 2001, students whose enrolment mixes on and off-campus study have been included in a separate 'multi-modal' classification. By 2014, nearly ten per cent of students were enrolled on a multi-modal basis. Combined with external enrolments, more than a quarter of students study off-campus.

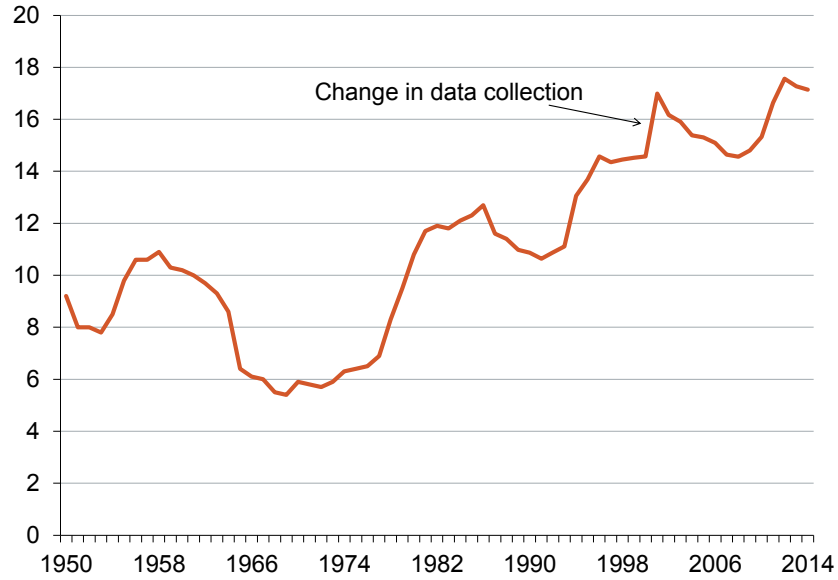
Although more students are studying off-campus, the distinctions between on- and off-campus study are blurred. In 2014, more than a third of students enrolled on campus reported doing half or more of their study online.[47] Some universities provide physical study centres for their online students, which offer computers, study rooms, and other services to assist their education.

Several factors are likely to explain these changes. Improved educational technology via the internet has made off-campus study easier. This technological change coincided with increased demand for postgraduate study, often from people with significant work and family responsibilities. Not having to travel to campus makes study easier for this group. In comparison, school leavers generally prefer face-to-face tuition.[48] Funding policy

[47] 2014 Student Experience Survey: Department of Education and Training (2015g)
[48] In 2014, 91 per cent of domestic bachelor-degree students who completed school in 2013 were enrolled on-campus. By contrast, 45 per cent of postgraduate coursework students aged 31-60 were enrolled on-campus: Student enrolment statistics, ibid.

changes have made it easier for public universities to offer more undergraduate online courses.[49]

**Figure 8: Proportion of students studying off campus, 1950–2014**
Per cent of students studying off campus




*Notes: Multimodal students not included; Open Universities Australia included. Dip from mid-1960s caused by the incorporation of non-university institutions into the statistical series; dip from mid-1980s influenced by moving nursing courses from hospitals to universities; 1994-2000 headcount discounted by 3.7 per cent to reduce the effect of possible double counting of OUA students.*
*Sources: DEEWR (2000); Department of Education and Training (2016f); (various years-c)*

## 2.6 Who is studying?

Universities used to be places mainly for men. In the 1950s, only about one in five university students was female. But in the late 1950s women started a 50-year run of consistent annual gains in enrolment share, which has now stabilised at about 58 per cent. Women have been a majority of university students since 1987 (Figure 9).

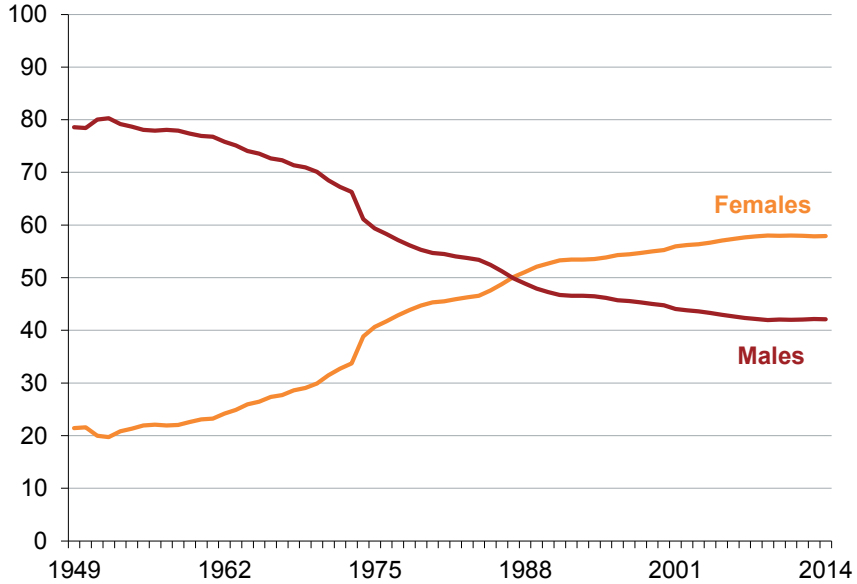
There are many reasons why this has happened: the overall social position of women has improved; entry into occupations dominated by women (teaching and nursing) now requires higher education qualifications; girls outperform boys at school; and young men have better-paying vocational education options than young women.

Despite their long-standing overall majority in higher education enrolments, women are still an official ‘equity’ group in disciplines where they are a minority of students, such as engineering and information technology. Other equity groups include students with disabilities, Indigenous students, regional and remote students, non-English speaking background students who arrived in the last decade, and low socio-economic status (SES) students.

[49] Kemp and Norton (2014), p 47

**Figure 9: Proportion of enrolments by gender (domestic students), 1949–2014**

Per cent




*Sources: DEEWR (2000); Department of Education and Training (2015m)*

Over the long term, higher education attainment has increased across all SES groups, high and low. For example, by 2001 the children of manual workers born in the 1970s had nearly five times the higher education attainment of the children of manual workers born in the 1950s. The higher education attainment level of children of 'upper service' workers increased by about two-thirds in the same period.[50]

[50] Marks and Macmillan (2007). See also Group of Eight (2014b).

Despite these increases, SES differences in university participation remain large. Table 3 reports on educational participation or attainment of people aged 20-24 in 2014, classified according to their parent's occupation. It shows that 20 per cent of the children of machinery operators, drivers and labourers were in higher education or had a degree. By contrast, 57 per cent of the children of managers and professionals were enrolled in or had completed higher education. All groups have increased their attainment since 2009.[51]

**Table 3: Level of highest education enrolment or attainment for 20–24 year olds, by parent's occupation, 2014**

| | Parent occupation | | | |
|---|---|---|---|---|
| **Highest qualification or enrolment of children (20-24)** | **Managers & professionals** | **Technicians & trade workers** | **Community, clerical & sales workers** | **Machinery operators, drivers & labourers** |
| Bachelor degree or above | 57% | 28% | 39% | 20% |
| Certificate III - Advanced diploma | 25% | 38% | 35% | 38% |
| Certificate I-II, Year 12, or below | 18% | 34% | 26% | 42% |

*Note: Where parents had different occupations, the occupation requiring the highest skill level was used.*
*Source: HILDA (2015)*

## 2.7 How are students chosen?

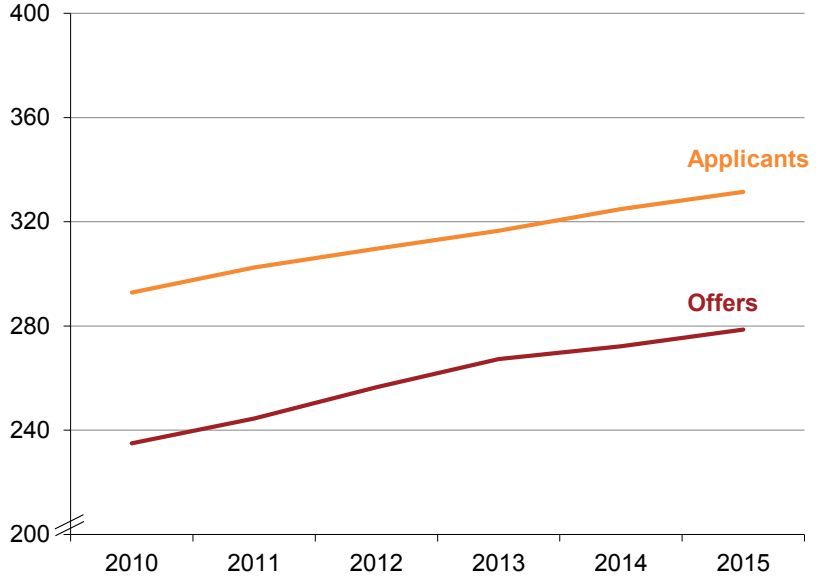
Every child has a right to a place at a government school. But universities do not accept everyone who wants to attend.

[51] See the analysis presented in Norton and Cherastidtham (2014b), p 28, using ABS (2011). Similar patterns are evident based on parental education: Hancock, *et al.* (2016), p 14.

Successful school completion is generally the minimum requirement. In the early 1950s, any school completer who applied to a university was accepted.[52] As student demand grew more quickly than university funding, university places had to be restricted. In recent years universities have been able to take unlimited numbers of bachelor degree students (section 6.2.1), narrowing the gap between applicant and offer numbers (Figure 10). But generally universities still restrict entry, reflecting capacity constraints, course academic requirements, and prestige factors.

Typically, places in over-subscribed courses are allocated based on prior academic performance. The better an applicant's past academic results, the better their chance of being awarded a place. Several ideas lie behind the practice of academic ranking: that student places should be given to those most likely to complete; that places should be given to those most likely to get high marks; that academic performance is a fair way of distinguishing between otherwise similar applicants; and that an admission system should minimise complexity and expense for both applicants and universities. These ideas do not always lead to the same conclusions about how to choose students.

**Figure 10: Unique applicants and offers, 2010–2015**
Thousands of applicants and offers




*Notes: This data counts applicants rather than applications. The same person can apply in more than one state, and both through tertiary admissions centres and direct to a higher education provider. The 2015 Year 12 cohort for Western Australia is smaller than previous years due to a change in the school starting age in 2003. Because of this, there are fewer applicants and offers in 2015 than would have been the case if this change had not occurred.*
*Source: Department of Education and Training (2015n)*

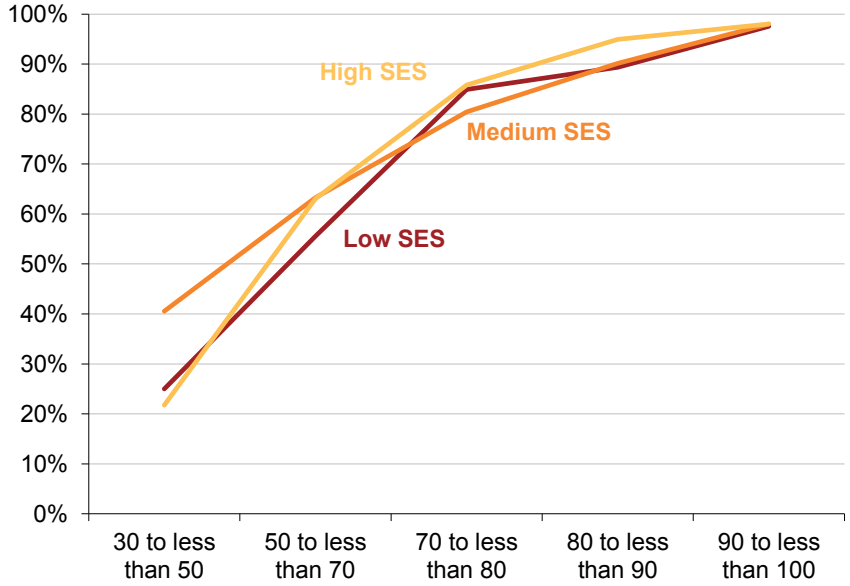
[52] Poynter and Rasmussen (1996), p 184-185

The most frequently used source of information on past academic performance is school results. Most domestic school leavers are admitted to university based on their secondary education, with their Australian Tertiary Admission Rank (ATAR) usually playing an important role.[53] The ATAR ranks school leavers in their age cohort between 0 and 99.95. For example, an ATAR of 80 means that the student did better in year 12 than 80 per cent of their age cohort, including people who did not finish school. ATARs below 30 are just reported as 'less than 30'.

More low-ATAR students are admitted to university now than in the past, but ATAR and university attendance are still closely linked. In 2015, more than 23,000 school leavers with an ATAR of 90 or more accepted an offer of a university place, compared to less than 4,000 school leavers with an ATAR of 50 or less.[54] University participation rates are similar across different socio-economic backgrounds once ATAR is taken into account (Figure 11). Differences in Year 12 completion and performance explain much of the difference in university participation by social background shown in Table 3.[55]

There is a strong relationship between ATAR and eventual completion of a course (Figure 12). After nine years, 95 per cent of students with an ATAR of 95 or more had completed a degree. By comparison, completion rates for students with an ATAR below 50 were just over half, with another 5 per cent of the commencing cohort still enrolled.

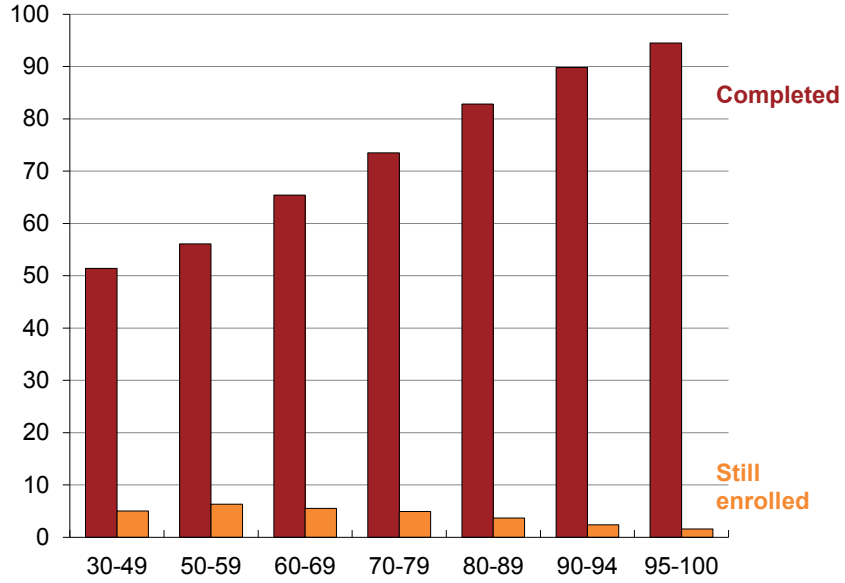
**Figure 11: ATAR, socio-economic status and university participation, 2012**




*Note: The chart shows university participation rates by 2012 for young people who were in Year 9 in 2006.*
*Source: Grattan analysis of Longitudinal Survey of Australian Youth: NCVER (2014).*

[53] Formerly called ENTER in Victoria, UAI in NSW, and TER in other jurisdictions except Queensland, which kept its OP system. The OP system will be replaced by ATAR in 2018.
[54] Department of Education and Training (2015n), appendix table A8.1
[55] Norton (2016)

**Figure 12: Completion rates by ATAR, 2005 commencing students by 2013**
Per cent




*Note: The course completed is not necessarily the course started in 2005.*
*Source: Department of Education and Training (2015c)*

ATAR is less successful at identifying which applicants will get high marks.[56] Many students get higher marks at university than their school results would suggest, while many others get lower marks. For a given ATAR, students from non-selective government schools tend to get better university grades than students from private schools or government selective schools.[57] School and university grades are influenced by factors other than underlying academic ability. It is therefore not surprising that ATAR is an imperfect guide to university prospects.

The limitations of ATAR-based admissions are well-known in the higher education sector. In practice, higher education providers use ATARs in a flexible way. Where ATAR is used for selection there is typically a published 'cut off' or 'clearly in' rank above which every applicant receives an offer. However, many applicants are admitted below this rank. Some universities award 'bonus' ATAR points for characteristics such as social background. Applicants can receive special consideration for personal circumstances such as health problems that may affect school results. An inquiry is examining the transparency of selection criteria.[58]

At some universities, an undergraduate general admission test for school leavers, UniTest, supplements rather than replaces chool result-based admission systems.[59] Mature-age applicants can sit the Specialised Tertiary Admissions Test (STAT).[60]

About a quarter of commencing bachelor-degree students apply based on previous higher education study. These include students who attended pathway colleges that award undergraduate diplomas, students switching courses or universities, or students returning for a second degree. More

[56] James, *et al.* (2009); Palmer, *et al.* (2011).
[57] James, *et al.* (2009), chapter 3; Li and Dockery (2014)
[58] Higher Education Standards Panel (2016)
[59] There are no national statistics on how widely used these tests are. In 2014, 12 per cent of the total commencing undergraduate students who completed school in 2013 were admitted based on something other than their secondary school results: Department of Education and Training (2015g).
[60] For a study of STAT's predictive value see Coates and Friedman (2010).

than 10 per cent of applicants are admitted based on their vocational education qualifications or experience.[61]

For international students, universities set admission requirements based on home country school systems or international qualifications such as the International Baccalaureate.[62] International students must also demonstrate English language proficiency.[63]

Most potential domestic students apply through centralised state tertiary admissions centres. About 55 per cent of these applications in the main summer applications period come from Year 12 students. Tertiary admission centre applicants list the courses they would like to do in order of their preferences. In effect, applicants simultaneously apply to multiple higher education providers and/or for multiple courses at the same provider. If the applicant does not receive their first preference course, they can still receive an offer for their second or a lower preference course.[64]

A large number of people, more than 100,000 in 2015, apply directly to higher education providers.[65] In recent years, direct applications to universities have grown more quickly than applications through tertiary admissions centres. Reasons include early admission opportunities that bypass the tertiary admission centres, universities using additional selection criteria such as non-academic personal attributes, and prospective students thinking it is easier or more appropriate to them.[66]

University admission processes are sometimes criticised for overly emphasising academic factors. Content knowledge is important to being a successful professional, but there are also many other relevant aptitudes and attributes. Specialised admissions tests may help identify which applicants have the desired non-academic attributes. An example is the UMAT (Undergraduate Medicine and Health Sciences Admission Test) used by students applying for medicine at some universities. In other countries, interviews and personal essays are also widely used to assess applicants in a more broad-ranging way. This is not common for Australian undergraduate courses.

For applicants with high ATARs, ATAR will continue to be a key selection tool. At these higher levels, ATAR successfully identifies applicants with a good chance of completing a course in a reasonable timeframe. Re-using school results is efficient for both universities and applicants. No alternative or additional selection tool has yet been found to more reliably predict future outcomes in a cost-effective way.

For applicants with low ATARs the issues are more complex. Their non-completion risks create dilemmas for universities. They want to create opportunities for higher education, yet taking students with poor completion prospects could be unethical if there is high risk that the student will not benefit from their enrolment.[67]

[61] Higher Education Standards Panel (2016), p 2
[62] International students also enter university from Australian schools or after other preparatory study.
[63] Arkoudis, *et al.* (2012), chapter 2
[64] Trends in applicant chances of receiving an offer are discussed in section 6.2.2.
[65] Department of Education and Training (2015n), p 48
[66] Harvey, *et al.* (2016), p 55-56, 96-97
[67] These risks and possible policy responses are discussed in Kemp and Norton (2014), p 13-19.

# 3. The higher education workforce

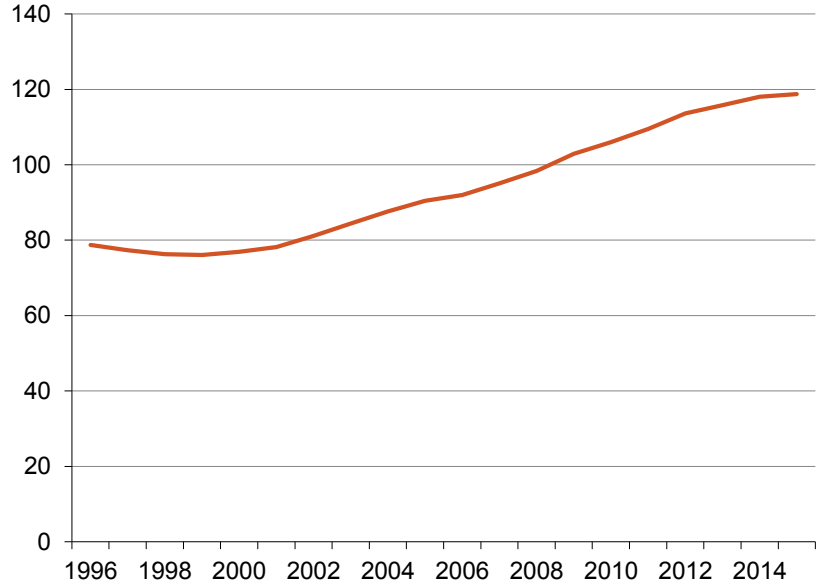
Although employment in higher education remains attractive to many people, finding long-term secure work can be difficult. Most people doing academic work are on fixed-term or casual contracts.

## 3.1 People employed in higher education

Australia's universities employed nearly 119,000 people on a permanent or fixed-term contract basis in 2015. Of these, 53,000 had academic job classifications and 65,700 non-academic job classifications. These statistics do not include casually employed staff. In 2015 an estimated 85,000 people were employed on a casual basis, predominantly in teaching-only academic roles.[68] In the non-university higher education sector staff numbers are reported on a full-time equivalent basis only. Non-university higher education providers (NUHEPs) employed 2,653 full-time equivalent academics in 2014, 44 per cent of them on a casual basis.[69]

The total number of university employees increased steadily from the late 1990s, as Figure 13 shows, before stabilising over the last two years. Student numbers have grown more quickly, leading to more students per staff member.

**Figure 13: Number of permanent and fixed-term staff in universities, 1996–2015**
Thousands of university staff



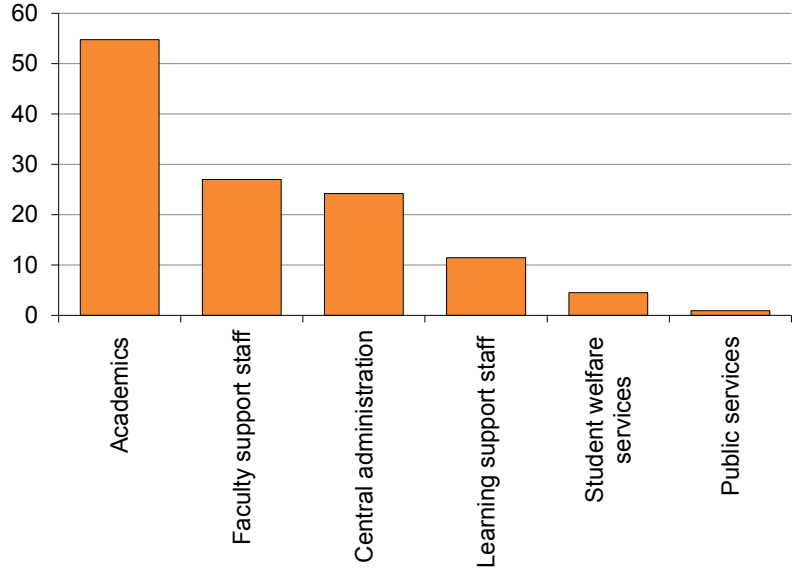

*Source: Department of Education and Training (2015l)*

[68] Kniest (2016). In 2014, 53 per cent of casual staff on a full-time equivalent bases were in teaching-only roles: Department of Education and Training (2015l), appendix 1.7
[69] TEQSA (2016d), p 17

On a full-time equivalent basis, including casual staff, 44 per cent of university employees are academics working in departments or faculties (Figure 14 has staff numbers). Another 1 per cent of university employees are people with academic titles working in other parts of the university. Twenty-two per cent of university employees are faculty support staff, 20 per cent work in central administration (which includes building and grounds maintenance), nine per cent are in learning support services (such as libraries and computing centres), and four per cent work in student welfare services (such as health and counselling).

There is a common belief that non-academic staff are growing as a share of the university workforce.[70] For on-going and fixed-term contract employees, non-academics' share of the total workforce has been stable at around 57 per cent for the last 30 years.[71] This statistic may not fully capture the effects of people with academic titles performing primarily managerial roles.

**Figure 14: Staff by area of university, 2014**
Thousands of full-time equivalent staff




*Notes: 2014 data used because it includes a count of casual staff. Most data is based on staff employed by area of the university. However data on staff functions has been used to calculate the number of non-academic staff in faculties and departments. The academics figure above refers only to those in faculties and department. An unknown number of staff with academic classifications in faculties and departments perform significant administrative roles, such as deans or heads of department. Depending on organisational structures, roles performed by 'faculty support staff' could be the same as those in other non-academic categories. The figures are approximate due to data limitations.*
*Sources: Department of Education and Training (2015l); (2016f)*

[70] Forsyth (2014), chapter 7
[71] Department of Education and Training (2015l), table 1.2; DEET (1993), p 137

## 3.2 Entry into the academic workforce

Unsurprisingly, the main motivations for seeking academic work are intellectual. In a 2010 survey of Australian academics, more than 90 per cent agreed that opportunities for intellectually stimulating work, genuine passion for a field of study, and the opportunity to contribute to developing new knowledge drew them to academia.[72] A survey of research students in the same year had similar findings. Developing knowledge and the interest and challenge of academic work were rated most highly as reasons to choose academic over other types of work.[73]

Over time, the PhD has become the most common qualification for an academic. In 1991, fewer than half of all academics had a PhD; by 2015 the proportion was nearly 70 per cent.[74] Some academic staff are enrolled in, but yet to complete, research qualifications.[75] More than 60 per cent of research students aspire to an academic job, although fewer see this as a realistic goal.[76] Annual PhD completions reached 8100 in 2014, compared to a net increase of only 1200 on-going or fixed-term contract academic jobs.[77]

The legal standards universities must meet support the practice of preferring higher qualifications. Teaching staff must have a PhD or a qualification level above the course they are teaching, or equivalent professional experience.[78] The latter exception recognises the subject matter expertise of people working outside universities, along with the insights professional practice can bring to teaching.

## 3.3 Short term academic work

Temporary academic jobs have become more common over time.[79] The proportion of academics employed casually increased substantially in the 1990s, stabilised, and then started growing again (Figure 15). On a full-time equivalent basis, casual staff are a little over 20 per cent of the university academic workforce. On a headcount basis, a 2010 study using superannuation data suggests that casually-employed academics are a majority of the academic workforce.[80] Most academic casuals are employed at the most junior academic rank.

Casual academic employment has benefits. For students, casual teaching staff can offer expertise – often from professional practice – that full-time academics lack. About a quarter of casual academic staff primarily work outside the university

[72] Bexley, *et al.* (2011), p 13
[73] Edwards, *et al.* (2011), p 39
[74] Department of Education and Training (2015l), table 4.2; DEET (1993), p 149
[75] Bexley, *et al.* (2011), p 41
[76] Edwards, *et al.* (2011), p 22
[77] Department of Education and Training (2015m); Department of Education and Training (2015k). Resignations and retirements mean that more than 1200 academic jobs became vacant in 2014. Analysis of work outcomes of people who completed PhDs in 2013 suggests that 1600 had academic jobs by early 2014. About as many again were working in the higher education sector. The true number of academic staff could be higher, but occupational categories that could be either academic or professional staff (for example, engineering professional) prevent an exact count: Postgraduate Research Experience Survey: Department of Education and Training (2015g)
[78] DIICCSRTE (2013a), p 16; Department of Education and Training (2015f)
[79] For more detail on employment conditions for casuals, see Andrews, *et al.* (2016).
[80] May (2011)

sector.[81] For aspiring academics studying for a PhD, casual teaching work helps them financially and gives them experience relevant to their future careers. About half of casually employed academics are also students, mostly in PhD programs.[82]

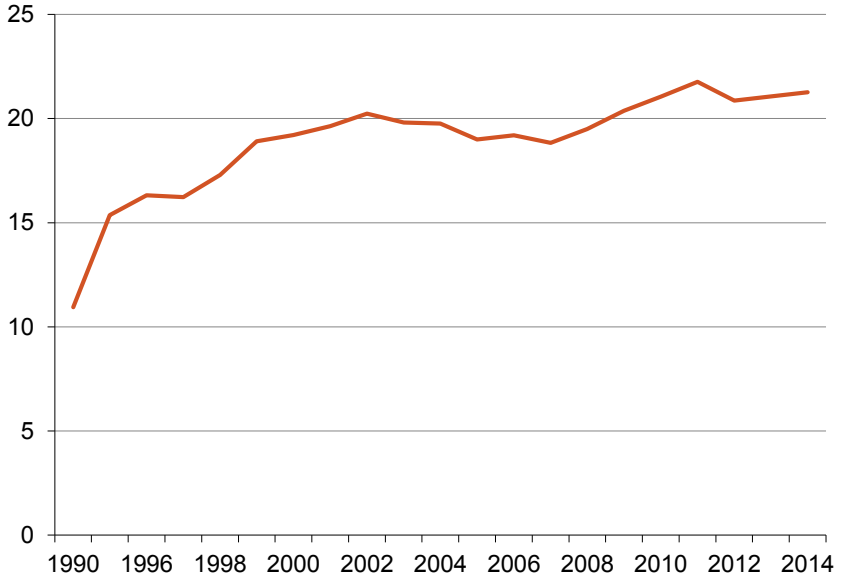
Yet while casual academic employment has benefits, for aspiring academics low pay and job insecurity can produce frustration. Some academics have been employed casually for long periods of time. Of casual staff who responded to a 2015 survey, more than 40 per cent reported having worked on a casual or sessional basis for six years or more.[83] The same survey also found that 22 per cent of casual teaching staff taught at more than one higher education institution.[84]

Although casual employment causes difficulties for affected staff, it will remain common. Casual staff, who can be hired and fired more easily than continuing staff, help universities manage volatility in student numbers.[85] As universities must compete for domestic and international students (section 6.2), enrolment fluctuations will continue.

Casualisation also reflects the unusual schedule of universities. While some teach for most of the year (using trimester systems), most operate two main semesters. Their main undergraduate teaching period runs for six months a year, with about two more months for exams.[86] As research funding policy does not support giving all academic staff research time in non-teaching periods (section 5.2.4), it is cheaper to hire staff only for teaching periods, rather than all year round.

**Figure 15: Casual employment as a share of the full-time equivalent academic workforce, 1990–2014**

Per cent




*Sources: May et al. (2013), DETYA (1999); Department of Education and Training (2015l)*

[81] May, *et al.* (2013), p 264
[82] Bexley, *et al.* (2011), p 38; Strachan, *et al.* (2012), p 59
[83] NTEU (2015b), p 22
[84] Ibid. p 22
[85] Andrews, *et al.* (2016), p 1

[86] It is common for summer or winter school subjects to be offered outside main semester periods, but the range is usually limited. Universities are able to charge full fees for these subjects, so they can be expensive for students.

University enterprise agreements restrict the use of fixed-term contracts for staff, but they are still widespread.[87] On a full-time equivalent basis, in 2013 35 per cent of academic staff were employed on fixed-term contracts.[88] In part, this is because the major research agencies – the Australian Research Council and the National Health and Medical Research Council (section 5.2.4) – award project funding of only a few years. Fixed-term contract employment can continue for extended periods. In 2015, 40 per cent of these employees had been on fixed-term contracts for six years or more.[89]

Within universities, permanent academic appointments on a teaching and research or research-only basis are seen as the ideal. But the way universities are organised and funded does not support this ideal. Chapter 5 explores funding issues in detail.

## 3.4 Pay and job satisfaction

For research students, pay is one of the few aspects of work life that they believe will be worse in academia compared to alternative careers.[90] Academic salary ranges in 2016 are reported in Table 4. Some universities have higher base pay rates than others. In practice, loadings are sometimes paid on top of these rates to make universities more competitive in the labour market. In a 2011 survey, 15 per cent of female and 22 percent of male academics reported receiving a loading.[91]

**Table 4: Academic pay ranges, 2016**

| Rank | Minimum | Maximum |
|---|---|---|
| Professor | $165,000 | $188,000 |
| Reader/Associate Professor | $128,000 | $161,000 |
| Senior Lecturer | $106,000 | $140,000 |
| Lecturer | $87,000 | $118,000 |
| Associate Lecturer | $61,000 | $94,000 |

*Notes: There are ranges of salary associated with each rank as well as differences between universities. This helps explain why salaries for different levels can overlap. For associate lecturers ('level A') completion of a PhD leads to pay at a higher increment. Employer superannuation contributions of 17 per cent are common.*
*Source: University enterprise agreements*

Various surveys of academics since the early 1990s have shown issues with academic job satisfaction.[92] In some surveys as few as half of academics are satisfied with their jobs. Australian academics also appeared less satisfied with their jobs than their peers in other countries.[93] In 2011, 69 per cent of academic staff were satisfied with their job overall.[94] The most recent academic staff survey, conducted by the National Tertiary Education Union (NTEU) in 2015, found 76 per cent agreement with the proposition that "my work gives me satisfaction", with little difference between full time, casual and fixed-term contracted staff.[95] But this may be satisfaction with their core academic work, rather than their overall employment. The same survey showed dissatisfaction with workloads, promotion and senior management.[96]

[87] Andrews, *et al.* (2016), p 2-4
[88] Ibid., p 11-2
[89] Grattan calculations from NTEU (2016), p 4.
[90] Edwards, *et al.* (2011), p 39
[91] Strachan, *et al.* (2012), p 56
[92] Bentley, *et al.* (2013b), p 30
[93] Bentley, *et al.* (2013a), p 247
[94] Strachan, *et al.* (2012), p 39
[95] NTEU (2015b), p 15
[96] Ibid., p 19

# 4. Research in higher education institutions

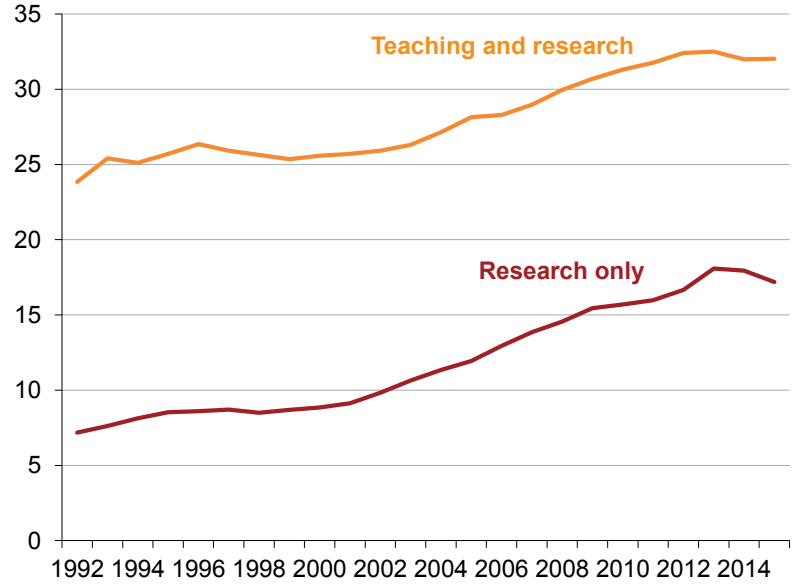
Research is a central activity of universities. Without it, they could not use the 'university' title (section 1.3.1). The research workforce and research output have both increased significantly over the last 20 years. Research can be about advancing knowledge as an end in itself, aimed at particular problems or practical goals, or a mix of both.

## 4.1 How many researchers are there?

In 2015, 49,220 academics had a research or teaching and research function, the second year of declining numbers since 2013 (figure 16). Despite recent decreases, over the longer term research-only academic staff have increased their share of the total academic workforce. Research-only staff made up 21 per cent of the academic workforce in 1992, increasing to 33 per cent by 2015.

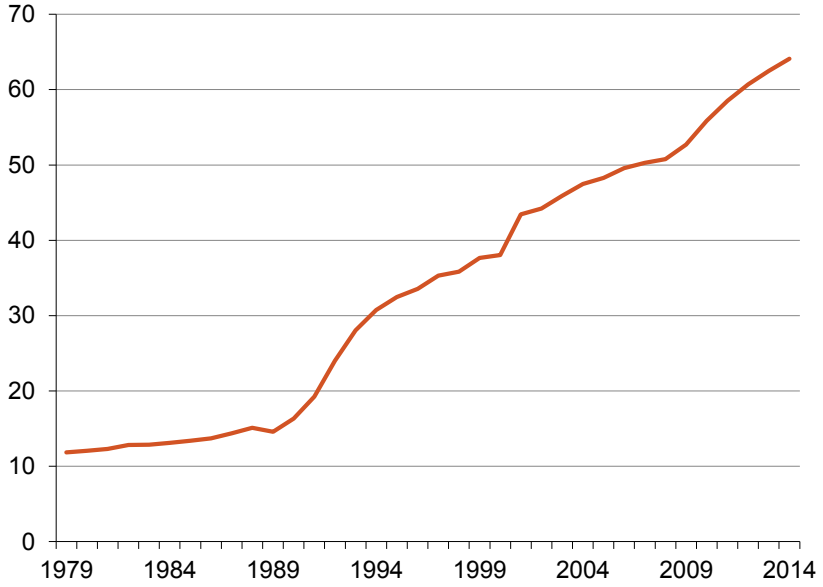
The same period has seen a substantial increase in research students (Figure 16), who in effect make up a large proportion of the research workforce. Including overseas students, there were 64,113 research students in 2014. In that year, 8118 PhDs were completed, along with 1461 masters by research degrees.

**Figure 16: Numbers of teaching and research, and research only staff, 1992–2015**
Thousands of academic staff by responsibilities




*Sources:Department of Education and Training (2015l) and predecessor publications*

**Figure 17: Enrolments in research degrees, 1979–2014**
Thousands of students




*Sources: DEEWR (2000); Department of Education and Training (2015m) and predecessor publications*

## 4.2 What is being researched?

Research spending is strongly skewed towards scientific disciplines, and medical science in particular. Medical and health research accounted for 28 per cent of higher education research spending in 2014, with other sciences together responsible for 32 per cent of expenditure. About 13 per cent of research spending is on the humanities and social sciences.[97] In 2015, the government set research priorities. While they are organised around theme rather than discipline – food, health, soil and water, transport, cybersecurity, energy and resources – they are likely to reinforce the historic discipline emphases of Australian university research.[98]

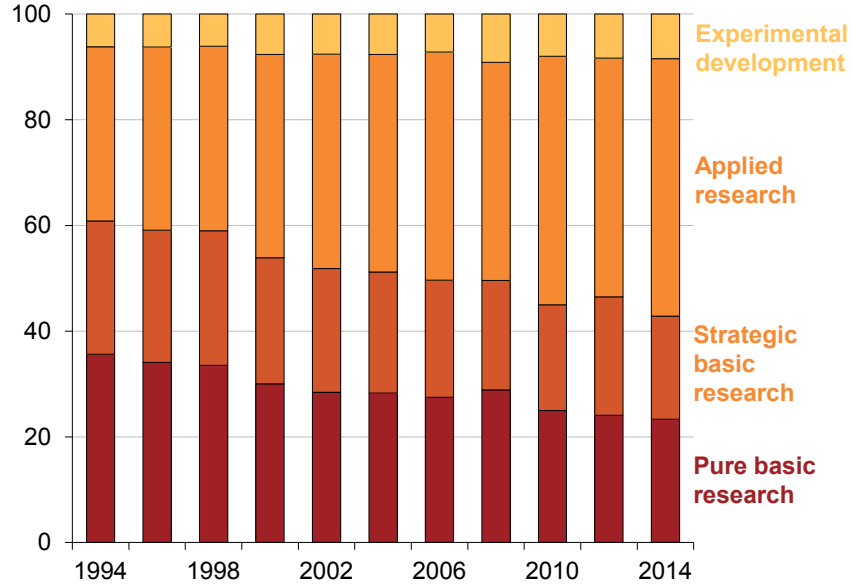
Research is classified using OECD categories according to its approach to knowledge as well as its field. As Figure 19 shows, 'pure basic research', which is the pursuit of knowledge without looking for long-term benefits other than advancing knowledge, has declined as a proportion of all research spending since 1994. In twenty years it went from 36 to 23 per cent of all research expenditure. With total university research spending tripling in this period to $10.2 billion, however, basic research spending increased significantly in real terms.[99] The shift has been to applied research, a category covering research aimed at finding possible uses for basic research or new ways of achieving specific and predetermined objectives. If government policy is successful, the trend towards applied research will continue, with research funding policy favouring collaboration with industry (section 5.2.4).

[97] ABS (2016g). Includes economics and creative arts.

[98] Australian Government (2015)

[99] Basic research declined slightly in real terms between 2012 and 2014 for the first time since statistics began being collected in 1992: calculated from ABS (2016g). Trends in total research spending are reported in more detail in section 5.2.5.

**Figure 18: Research spending by type, 1994–2014**
Per cent




*Source: ABS (2016g)*

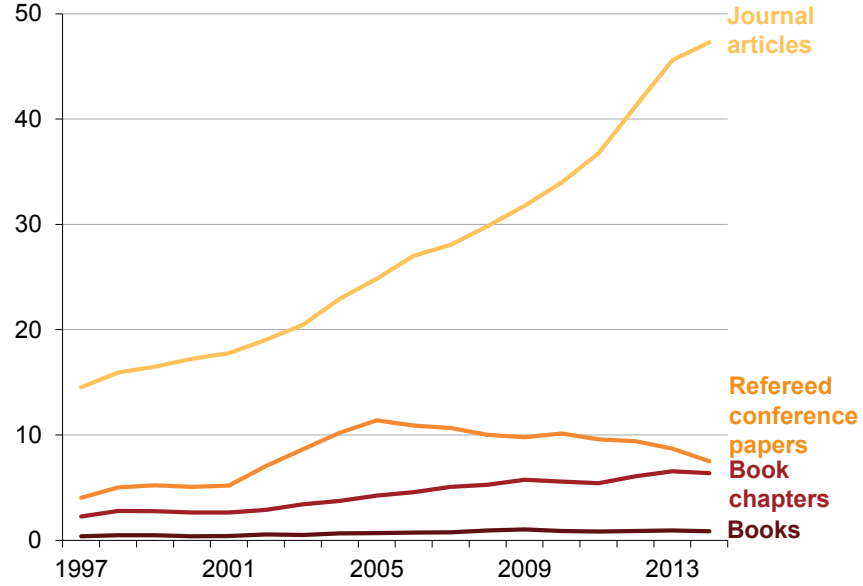
## 4.3 What do research academics produce?

The growth in applied research activity shows in statistics on commercialisation activities by universities. 'Invention disclosures' – a notification of a novel and useful device, material or method to a university's technology transfer office – more than doubled, to 957, between 2000 and 2014.[100] The number of licences or options earning or expected to earn income nearly tripled over the same time period, to 1609.[101] Yet the absolute numbers remain low, and the increase in potential commercial outputs has not translated into major long-term gains in financial returns. University revenue from royalties and licensing was only $121 million in 2014. Revenue from consultancies and contracts was much higher at more than $1.1 billion in 2014, although it is not clear how much of this is related to research.[102] University research is widely used for non-commercial purposes, but measuring this is difficult.[103]

Publications are the main research output. Figure 19 shows the substantial increase in published books, articles and papers since the mid-1990s, although growth paused in 2014.[104] While increasing numbers of staff (Figure 16), and particularly research-only staff, account for some of the increase, research paper productivity has also increased (section 8.3). To date, how much money universities receive from government has depended in part on how many publications their academics produce (see also section 5.2.4). This 'publish or perish' system has been criticised for encouraging quantity over quality. Quality issues are discussed further in section 8.3. The funding system proposed from 2017 will put less direct emphasis on publication numbers (section 5.2.4).

[100] Larkins (2011), p 218; DIIS (2016), p 4
[101] DIIS (2016), p 7; ARC, *et al.* (2002), p 97
[102] Department of Education and Training (2015d)
[103] ARC (2016a)
[104] On a weighted basis in which books count as 5 and all other publications count as 1, total publications were 65,556 in 2013 and 65,441 in 2014: Department of Education and Training (2015j)

**Figure 19: Research publications, 1997–2014**
Thousands of publications




*Sources: Universities Australia (1995-2008); Department of Education and Training (2015j) and preceding years*

# 5. Higher education finance – the macro picture

This section discusses the various sources of finance in the higher education sector, and the relationships between them. These include funding for teaching (both from government and from students), for research (competitive and performance-based), and income support for students.

## 5.1 Higher education as an industry

As participation in higher education has increased, it has become a more economically significant industry. In 2014, universities had revenue of $27.9 billion.[105] This includes income from teaching, research and other sources. The total higher education revenue of NUHEPs in 2014 was about $1.6 billion.[106] NUHEPs often have other business, including vocational education and English language courses.

Over the last twenty years, higher education has become a significant export industry. Publicly-funded universities earned more than $4.7 billion from international students in 2014.[107] The ABS reports international student fee revenue of $5.7 billion in 2014, including from private higher education providers.[108] International students also contribute to other industries, through spending on living and other expenses while in Australia.

## 5.2 Public spending on higher education

Public spending on higher education takes four main forms:

- Direct grants to higher education institutions, primarily for teaching;
- Student loans that are taken out by students but paid to higher education institutions on students' behalf;
- Student income support payments, which are paid direct to students; and
- Direct grants to higher education institutions primarily for research.

[105] Department of Education and Training (2015d); Bond University (2015)
[106] Calculated from TEQSA (2016a), p 6-7
[107] Department of Education and Training (2015d)
[108] ABS (2016c), table 9. For financial year see ABS (2015c), table 9.

**Table 5: Overview of public higher education subsidies, 2015-16**

| Category | Sub-category | Description | Millions |
|---|---|---|---|
| **Teaching grants (~$7bn)** | Commonwealth Grant Scheme | Funding based on the number of supported domestic student places. See section 5.2.1 for more detail | $6,988 |
| **Loan costs (~$2.4bn)** **(Distinct from net lending of ~ $7 bn)** | Higher Education Loan Program: HECS-HELP, FEE-HELP, VET FEE-HELP, OS-HELP, SA-HELP | Costs include interest subsidies, debt not expected to be repaid, and discounts for upfront payment or early repayment. Section 5.2.2 for more detail. | $2,444 |
| **Income support for students (~$2.4 bn)** | Aus. Postgrad. Awards | Living expense support for postgraduate students. Section 5.2.3 | $282 |
| | Youth Allowance | Living expense support for students aged 16-24. Section 5.2.3 | $1,925 |
| | Austudy | Living expense support for students aged 25 or more. Section 5.2.3 | $435 |
| | Abstudy | Support for living expenses for Indigenous students. Section 5.2.3 | $57 |
| **Research grants (~$3.1 bn),** (Not including 'other recurrent grants') | Competitive research grants | ARC – section 5.2.4 | $816 |
| | | NHMRC – section 5.2.4 | $669 |
| | Performance-based block research grants | Research training and general research funding. Funding is based on research activity. Section 5.2.4 | $1,587 |
| | Other recurrent grants | For example: equity, national institutes, TEQSA. | $463 |
| **Total** | | | **$15,666** |

*Notes: NHMRC is calendar 2015. The table excludes state and local government spending. HELP costs and new loans include VET FEE-HELP, reflecting current HELP reporting practices. Spending on Youth Allowance, Austudy and Abstudy estimated based on share of students in higher education in 2014-15.*
*Sources: Department of Social Services (2015); Department of Education and Training (2016c); Department of Social Services (2016); NHMRC (2016a); Parliamentary Budget Office (2016)*

Table 5 provides an overview of these funding streams. It omits minor grants from other departments, short-term programs and legacy superannuation costs. In total, higher education-related government expenditure for 2015-16 was $15.7 billion.

Eligibility for public funding depends in the first instance on the legal status of each higher education institution. Institutions that meet basic criteria can offer their students FEE-HELP loans (discussed in 5.2.2) and make their students eligible for income support (discussed in 5.2.3). But eligibility for other funding categories is largely restricted to institutions specifically listed in the *Higher Education Support Act 2003*. The 'Table A' list contains all universities to which governments appoint council or senate members, plus the Australian Catholic University and Batchelor Institute of Indigenous Tertiary Education. Though 'public university' is not a legal concept, in common usage the term refers to Table A institutions. They are eligible for all teaching and research funding schemes. Table B contains Bond University, the University of Notre Dame, MCD University of Divinity, and Torrens University. This entitles them to research funding only.[109]

Table C contains Carnegie Mellon University and University College London (registered by TEQSA as 'overseas universities' in Australia).[110] Table C gives FEE-HELP to students in higher education providers operating in Australia but controlled from overseas. An overview of different entitlements to public support is in table 6.

[109] The University of Notre Dame also receives teaching funding under another provision.
[110] University College London has announced it will cease its operations in Australia effective from 2017, see Brewer (2015).

**Table 6: Overview of funding eligibility**

| Funding Type | Table A | Table B | Table C | Other HE providers | OUA^ |
|---|---|---|---|---|---|
| FEE-HELP loans | ✓ | ✓ | ✓ | ✓ | ✓ |
| Commonwealth supported places and HECS-HELP loans | ✓ | ✓ (provided the place is in a 'national priority' category')* | ✓ (provided the place is in a 'national priority' category')* [none in 2016] | ✓ (provided the place is in a 'national priority' category')* | ~ Indirectly via universities delivering award programs |
| Research block grants | ✓ | ✓ | × | × | × |
| Research training places | ✓ | ✓ | × | × | × |
| ARC competitive grants | ✓ | ✓ | × | × | × |
| NHMRC grants | ✓ | ✓ | ✓ | × | × |
| Student income support | ✓ | ✓ | ✓ | ✓ | ✓ |

*Notes: ^Open Universities Australia; *Based on ministerial decision. Though NHMRC guidelines would permit Table C institutions to receive grants, none do.*

In contrast to the process for higher education providers accessing FEE-HELP, there are no rules determining which institutions are on Tables A, B or C, and no application process. Entitlements are largely a matter of history and politics.

### 5.2.1 Teaching grants for higher education institutions

The single largest source of public subsidy for higher education is the Commonwealth Grant Scheme (CGS). According to Budget estimates, nearly $7 billion will be spent on the CGS in 2015-16 (Table 5). Public universities and their students have the main entitlements to CGS funding, as Table 6 shows.

The CGS funding for each higher education provider is principally calculated according to its number of Commonwealth-supported places. One 'place' is equivalent to the number of subjects normally taken by a full-time student (equivalent full-time student load, or EFTSL, has the same meaning as a place). Payment per place depends on its discipline. All disciplines are allocated to one of eight funding 'clusters', each of which has its own Commonwealth funding rate (these rates and the separate student contribution rates are discussed in section 6.1).

For each cluster, the number of Commonwealth-supported student places is multiplied by its funding rate. These cluster sub-totals are added together to calculate the core CGS funding for each higher education provider. Extra payments for regional locations, medical students and preparatory courses paid out of the CGS add to the total, but these are a small part of overall spending. The two key drivers of CGS funding are therefore the funding rate and the number of places. Current funding rates are discussed in section 6.1.1, and section 6.2.1 outlines how the number of places is set.

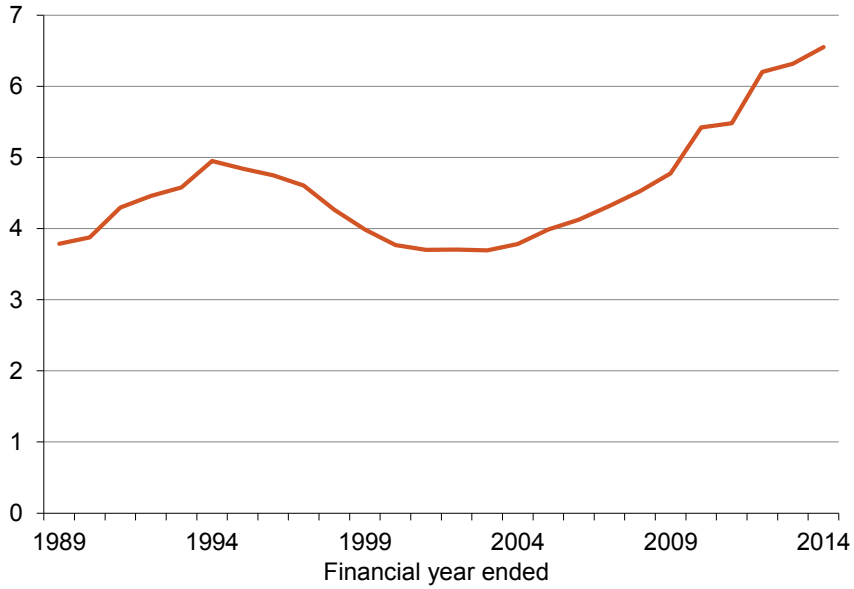
After adjusting for inflation, total CGS spending declined after 1994, and began to recover in 2004 (Figure 20). Several factors explain this fall in expenditure. These include a cut to Commonwealth funding rates in 1997 (replaced by higher

student charges), slow growth and occasional declines in student places, and policy on annual indexation of grants. The indexation system that operated between 1995 and 2011 delivered funding increases that were below inflation levels, although there were some ad hoc increases in this period.

Seemingly arcane matters like indexation are important for university finances. Small annual real cuts through the indexation system have a major cumulative effect on university income. A new indexation system linked to inflation and labour costs, introduced in 2012, was intended to give universities larger annual funding increases. But since 2013 wage growth in professional, scientific and technical services industries, to which university funding is linked, has been low.[111] As a result, recent annual increases in per student funding have also been low.

Growth in student places, driven significantly by removing previous controls on bachelor-degree student numbers (section 6.2), is the largest single reason for the substantial lift in total CGS funding over recent years (Figure 20).

**Figure 20: Core teaching grant funding, 1989–2014**
$2015 billion




*Notes: Operating grant figures are used prior to 2005, less HECS charges and research funding subsequently distributed separately. Adjusted using CPI.*
*Source: Data provided by the Department of Education and Training.*

### 5.2.2 Lending to students

Since 1989, the Commonwealth Government has lent higher education students money to pay for their courses. The loans are called income contingent because repayments depend on the debtor's income. Students or former students who earn $54,869 or more (in 2016-17) pay a share of their income through the tax system each year until the debt is fully paid off. The share is between 4 and 8 per cent of their income, depending on how

[111] ABS (2016h)

much they earn.[112] HELP debtors living overseas had been exempt from this requirement, but are now liable to repay based on their worldwide income. Their first repayments are due by 31 October 2017 for the 2016-17 financial year.[113]

### Student loan schemes

Australia's income-contingent loan scheme, initially known as HECS (Higher Education Contribution Scheme), was renamed HELP (Higher Education Loan Program) in 2005. Since the scheme's inception, other income-contingent loan schemes have proliferated. The most direct descendant of the original scheme, HECS-HELP, lends money to pay student contributions – the student share of the funding rate for a Commonwealth-supported place (see section 6.1.1). Students can borrow unlimited amounts through HECS-HELP, although annual course charges are capped (section 6.1.1).[114]

The FEE-HELP scheme lends money to domestic full-fee students – mainly postgraduate coursework students and students outside the public universities. VET FEE-HELP lends to students taking upper-level qualifications in the vocational sector. FEE-HELP borrowers have a lifetime borrowing limit (for 2016, $124,238 for medicine, dentistry and veterinary science; $99,839 for all other courses). OS-HELP helps finance overseas study by Commonwealth supported students. How much students can borrow under OS-HELP depends on circumstances, but is up to $8800 for a six-month period. Students can borrow twice under OS-HELP. SA-HELP supports a separate charge for student services and amenities. Its maximum annual loan is $290 in 2016 (the price limit on the student amenities fee).

From 2016 the Government converted the previous student start-up scholarship – a lump sum grant for students receiving student income support – into an income contingent loan.[115] The loan is available to students on education-related income support (section 5.2.3). Eligible students can receive lump sums of $1025 up to twice a year. The money is intended to assist them with textbooks, relocation expenses and other education-related costs. Although the start-up loan is separate from HELP, its repayment provisions mirror those applying to HELP debt. Debtors begin repaying start-up loan debt once they finish repaying HELP debt.

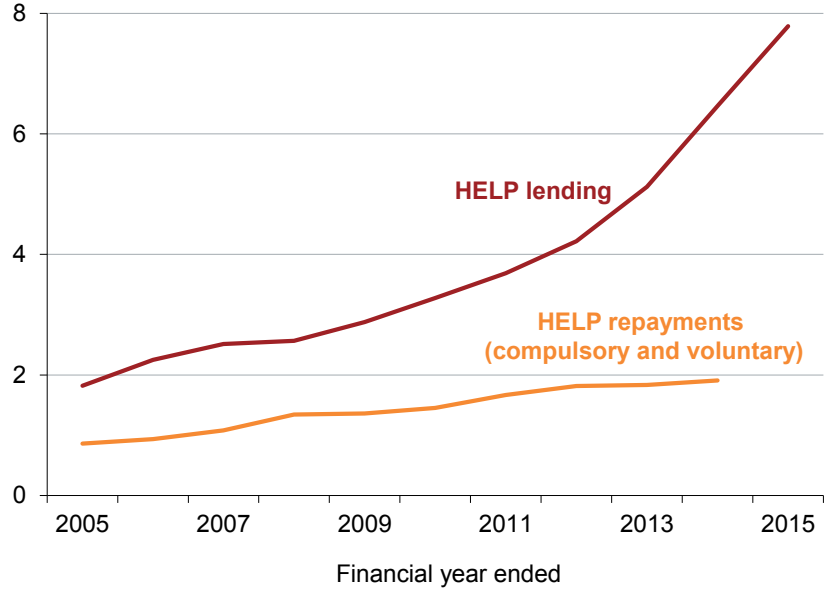
[112] ATO (2016a). Threshold information since 1989 is available in Norton and Cherastidtham (2016), appendix A.
[113] ATO (2016b)
[114] Information on HELP entitlements is available at Department of Education and Training (2016e).
[115] Department of Human Services (2016)

## HELP borrowing and repayment trends

Annual lending through HELP has increased rapidly in recent years, driven principally by increases in the number of Commonwealth supported students and by VET FEE-HELP (Figure 21). In 2014-15, $7.9 billion was lent through the HELP schemes, of which $5.8 billion was to higher education students.[116] All the money borrowed is consolidated into a single HELP debt managed by the Australian Taxation Office.

Growth in HELP repayments has been slow due to time lags between starting courses and entering the workforce, weak growth in graduate employment and wages, and increasing numbers of HELP debtors being exempted from repayment by real growth in the initial threshold below which no repayment is required (Figure 21).[117] In 2013-14, the most recent year available, the ATO collected $1.9 billion in HELP repayments.[118]

**Figure 21: HELP lending and repayment 2005–2015**
$billion, nominal




*Notes: HELP lending includes all HELP programs. In 2014-15, VET FEE-HELP lending was $2.1 billion.*
*Sources: Department of Education and Training (2015e); a); data supplied by the Department of Education and Training*

[116] Information supplied by the Department of Education and Training.
[117] Norton and Cherastidtham (2016), chapter 3
[118] Information supplied by the Department of Education and Training.

## HELP's costs

Government financial statements do not present a clear account of HELP's annual costs.[119] Figure 22 provides Grattan Institute estimates of HELP's component costs, along with offsetting revenue.

HELP's largest cost is debt not expected to be repaid, commonly called doubtful debt. Debt becomes doubtful when debtors are not expected to make sufficient repayments during their life to clear what they owe. Eventually, on death, remaining debt is written off. To date, only a very small percentage of HELP debtors have died without repaying.[120] Doubtful debt costs are therefore estimates, given what we know about current HELP debtors and their repayment prospects. The Government estimates that 18 per cent of new HELP debt issued during 2016-17 will not be repaid.[121] Figure 22's estimate of a $2 billion doubtful debt cost for 2014-15 includes further write downs of money previously lent, as well as lending during 2014-15.

As student numbers increase, doubtful debt will become a more important issue. Grattan Institute reports have investigated ways to reduce doubtful debt, including lowering the threshold for repaying HELP debt and recovering HELP debt from deceased estates valued at more than $100,000.[122] Many lower-income HELP debtors are in affluent households because their partners' incomes are high. This means that they are likely to have asset wealth despite low personal annual income.

HELP's other major cost is an interest subsidy. This occurs because the Government borrows money in the bond markets, and re-lends it to students at the typically lower CPI inflation rate. Taxpayers pay the cost of the difference between the two numbers. For 2014-15 this net interest bill is an estimated $380 million.[123] Grattan Institute has estimated the annual net interest bill on the HELP debt each year since 1994 (Figure 22). Bond rates that are well below their long-term average kept down the interest cost for 2014-15.

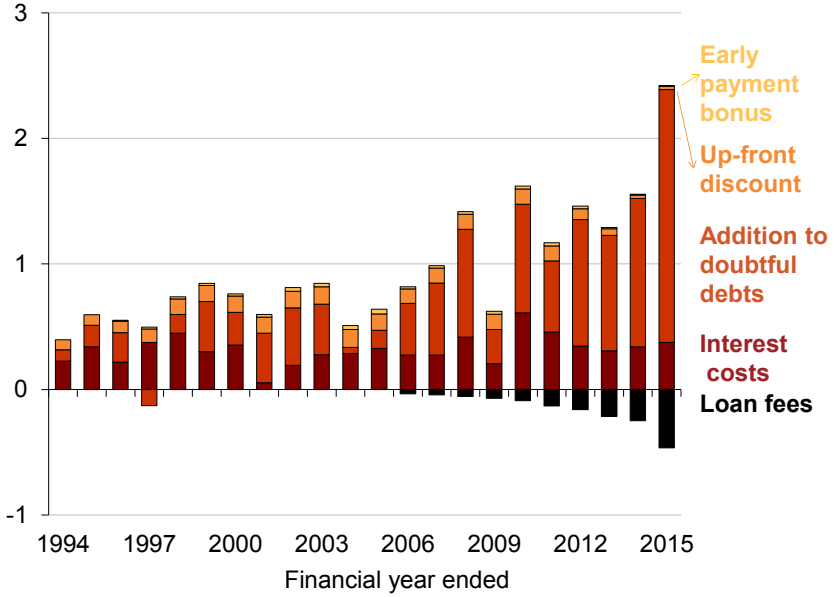
Historically, HELP has had two other minor costs. If students eligible for HECS-HELP loans instead pay their student contribution upfront they receive a 10 per cent discount. The discount is recorded as a cost to the Government, which compensates universities for the lower student contribution (Figure 22). It will be abolished from 1 January 2017.

In 2016 all HELP debtors receive a 5 per cent bonus for voluntary early repayment. For example, if a HELP debtor repays $10,000 the ATO reduces outstanding debt by $10,500. The bonus will also be abolished from 1 January 2017.

[119] While reporting of HELP's finances could be significantly improved, the international accounting standards used in the Commonwealth Budget are an obstacle to clarity. Some of the complexities are discussed in Parliamentary Budget Office (2016).
[120] As of 30 June 2015, 0.35 per cent of those who have ever taken out a HELP debt.
[121] Department of Education and Training (2016c), p 59
[122] Norton and Cherastidtham (2014a); Norton and Cherastidtham (2016)

[123] This figure is an estimate because the government does not specifically borrow for HELP. The notes to Figure 22 explain the assumptions behind this estimate.

**Figure 22: Annual cost of HELP, 1994–2015**
$2015 billion




*Notes: This chart cannot be compared directly to the Department of Education and Training's portfolio Budget papers (Table 5) due to a different methodology. The most important difference is that this chart examines the cost of the historical stock of HELP debt, while the Budget papers incorporate estimates of the future cost of each year's lending. In this figure, addition to doubtful debt is the increase in total doubtful debt since the previous year. The interest cost is calculated as the difference between the ten-year Commonwealth bond rate and the CPI indexation rate, multiplied by the level of outstanding debt. Loan fees include both FEE-HELP and VET-FEE-HELP, based on estimates of loan fee-liable lending. Deflated using CPI.*
*Sources: Based on Department of Education and Training (2015e), annual reports for portfolios responsible for higher education, information supplied by the Department of Education and Training.*

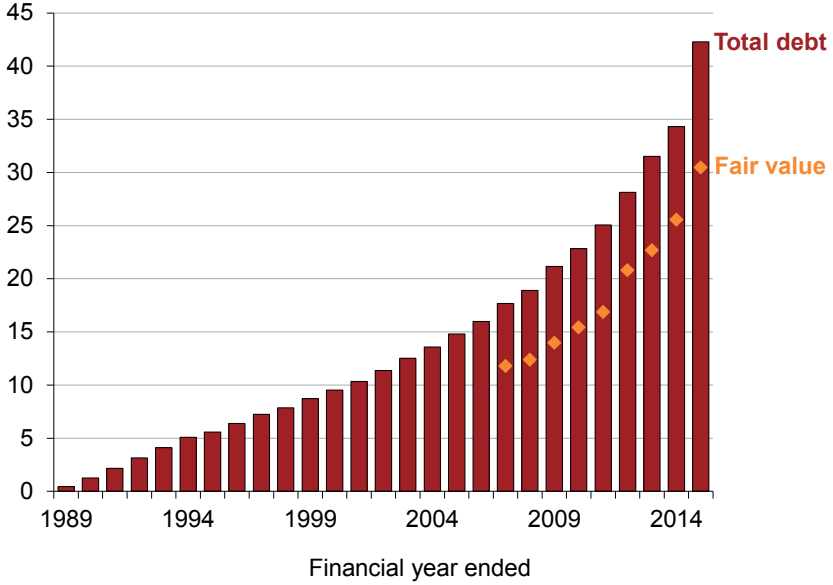
Offsetting these costs are revenues from loan fees. Most full-fee undergraduates – principally at NUHEPs – must pay a 25 per cent loan fee if they take out a FEE-HELP loan. For example, if a full-fee undergraduate student borrows $10,000 the Government records a debt of $12,500. The loan fee is a growing source of revenue for HELP (Figure 22), although much of this is due to VET FEE-HELP.[124]

## Total HELP debt

At 30 June 2015, HELP debtors owed the Commonwealth Government $42.3 billion. Over the last few years, the Government has published the HELP debt's 'fair' value (shown in Figure 23). This is an estimate of how much the HELP debt is worth to the Government. At 30 June 2015, the HELP debt's fair value was $30.4 billion, $11.8 billion less than its nominal value.[125] The main cause of the lower fair value is doubtful debt.

[124] The loan fee for VET FEE-HELP is 20 per cent.
[125] Department of Education and Training (2015b), p 302

**Figure 23: HELP debt (including fair value), 1989–2015**
$2015 billion




*Note: Deflated using CPI*
*Sources: Department of Education and Training (2015b) and preceding publications.*

### 5.2.3 Direct grants to students

Tuition subsidies and loans to students for university charges are paid direct to higher education providers on their behalf. For their living expenses, some students receive additional government support. The biggest student income support scheme is Youth Allowance. On average 171,531 higher education students received Youth Allowance in 2014-15, at a cost of about $1.9 billion.[126]

Students whose parents earn $51,027 a year (2014-15) or less are entitled to the full at-home Youth Allowance rate of $285.20 a fortnight. The payment reduces if parents earn more than $51,027, or if the student earns more than $433 a fortnight.

Youth Allowance recipients are not subject to the parental income test if they meet various criteria indicating independence from their parents or if they turn 22. This makes students in high-income households eligible for Youth Allowance, so long as their personal income is low.

There are two other smaller income support programs. Austudy is for students aged 25 or older, and in 2014-15 cost an estimated $435 million for 31,146 students. Abstudy is for Indigenous students, and in 2014-15 cost an estimated $102 million for 4927 students.[127]

Students receiving Youth Allowance, Austudy and Abstudy can all apply for up to $2050 a year in loans, on top of their benefits (section 5.2.2).

As well as these generally needs-based income support schemes, Australian Postgraduate Awards (APA) are merit-based scholarships for research students. They are funded by the Commonwealth but allocated by universities. In 2016 the APA program will cost about $282 million, with up to 3500 new

[126] Department of Social Services (2015), Table 4.23. Spending by inference from share of students: Department of Social Services (2016)
[127] Ibid.

scholarships awarded each year.[128] From 2017, APAs will be rolled into the Research Training Program (section 5.2.4). Universities will have more discretion on the number and level of scholarships.[129]

### 5.2.4 Grants for research

Universities receive two broad types of research grant. Project-based funding is awarded on a competitive basis. The money awarded needs to be spent on that project. Performance-based block research grants are determined by formulae that include input and output indicators. 'Block' funding means that universities have discretion on its precise use, within the broad parameters of the funding scheme. Though all universities can apply for research grants, the Group of Eight or sandstone universities (listed in appendix A) receive most research funding.

#### Competitive project grants

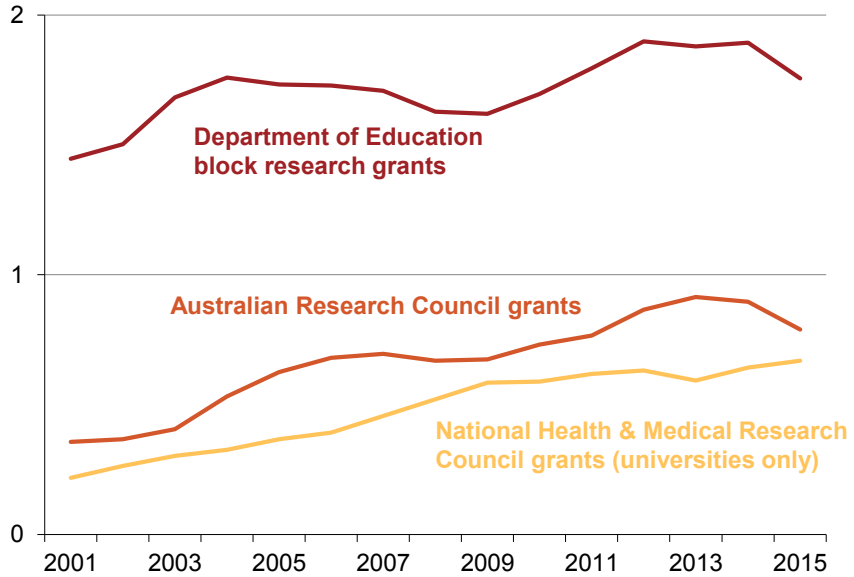
The Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) are the main sources of competitive project funding. Eligibility for ARC grants is largely restricted to universities. Eligibility for NHMRC grants is broader and includes medical research institutes and hospitals, but universities are the main recipients. Figure 24 shows trends in ARC and NHMRC university funding. In real terms, ARC funding has declined since 2013 after a period of significant growth.

For universities, the significance of these competitive grants goes beyond the money they receive – especially as it never covers the project's full cost. Their level of grant income contributes to their performance-based block research funding (see next section), both directly through block grant funding formulae and indirectly through increased research outputs. For academics and their institutions, winning competitive grants brings prestige as well as money.

Winning an ARC grant is difficult. Projects are assessed by academic experts in the relevant field, so that only the highest quality projects are supported. For Discovery Project grants, aimed at supporting excellent basic and applied research, 17.7 per cent of the 3584 applications for funding in 2016 were approved. Funded projects receive between $30,000 and $500,000 a year for up to five years. A researcher applying for a Discovery grant must show a track record in research publications and evidence of research quality, including whether the proposal addresses a significant problem and will advance knowledge. Group of Eight universities won more than 70 per cent of new Discovery Project money for 2016.[130]

[128] Department of Education and Training (2016c), p 61-62
[129] Department of Education and Training (2016d), p 13-23
[130] ARC (2016c)

**Figure 24: ARC, NHMRC and block research grants to universities, 2001–2015**
$2015 billion




*Notes: ARC and block grants are for the financial year ending 30 June, NHMRC is calendar year. Non-university funding has been excluded from the NHMRC figure. Deflated using CPI.*
*Sources: Department of Education and Training (2015h); Department of Industry and Science (2015); NHMRC (2016a)*

Linkage Projects encourage collaboration between higher education providers and other organisations, including industry. Partner organisations are required to contribute to the project. Linkage grants reflect a government emphasis on useful knowledge and universities contributing towards a 'national innovation system'. These grants are one reason why research activity has shifted towards applied research (section 4.2). Because they involve external partners, Linkage grant proposals are more difficult to organise and many fewer applications are made (only 710 in 2015) than for Discovery grants, despite their higher success rate – 31 per cent in 2016. Group of Eight universities also dominate this pool, securing 63 per cent of new funding for 2016.[131]

For NHMRC project grants, the application success rate has declined in recent years – from 23 per cent in 2010 to 14 per cent in 2016.[132] The main criteria for assessing projects are scientific quality, significance and/or innovation, and the researchers' track record in research output and impact. There is no maximum amount of project funding, and projects can be funded for up to five years. The NHMRC also offers program funding for broad areas of health research expected to "contribute new knowledge at a leading international level". Once again, the Group of Eight universities dominate. They secured more than 80 per cent of grant payments in 2015.[133]

## Performance-based block grants

Block grants help sustain research capacity for the competitive grant system. They provide indirect support for competitive grants, by helping to fund general research infrastructure such as laboratories and libraries that can be used in many different research projects. This encourages universities to invest in infrastructure with multiple uses. Project grants do not cover 100 per cent of project costs, on the assumption that block grants cover part of the total cost. Block grants are, however, widely regarded as too low to cover all the indirect costs associated with

[131] ARC (2016b)
[132] NHMRC (2016b)
[133] NHMRC (2015)

competitive grants.[134] Figure 24 shows that project grant funding increases have outpaced block grant funding since 2003.

Typically, several block grant programs have operated with different purposes and funding formulae.[135] The Joint Research Engagement Program (JRE) finances any activity related to research and more than $363 million was dispersed for 2016. The Sustainable Research Excellence (SRE) program supports indirect research costs associated with competitive grants and $210 million was provided in 2016. Research infrastructure is supported by the Research Infrastructure Block Grant scheme (RIBG), which paid $244 million in 2016. The Research Training Scheme (RTS) is the major block funding for domestic research students, and it provided $690 million in 2016.[136]

In late 2015 the Australian Government announced that existing research block grants will be consolidated into two programs, as recommended in a review of research funding arrangements chaired by Ian Watt.[137] The JRE, SRE, and RIBG schemes will be streamlined into the Research Support Program (RSP), with approximately $885 million funding in 2017. The Australian Postgraduate Awards, the International Postgraduate Research Scheme, and the Research Training Scheme will become the Research Training Program (RTP), costing an estimated $1 billion in 2017. The new programs will have simplified formulae for calculating how much money each university receives. The new formulae are also intended to encourage university engagement with industry, by dropping publication numbers and increasing the significance of income from industry.[138]

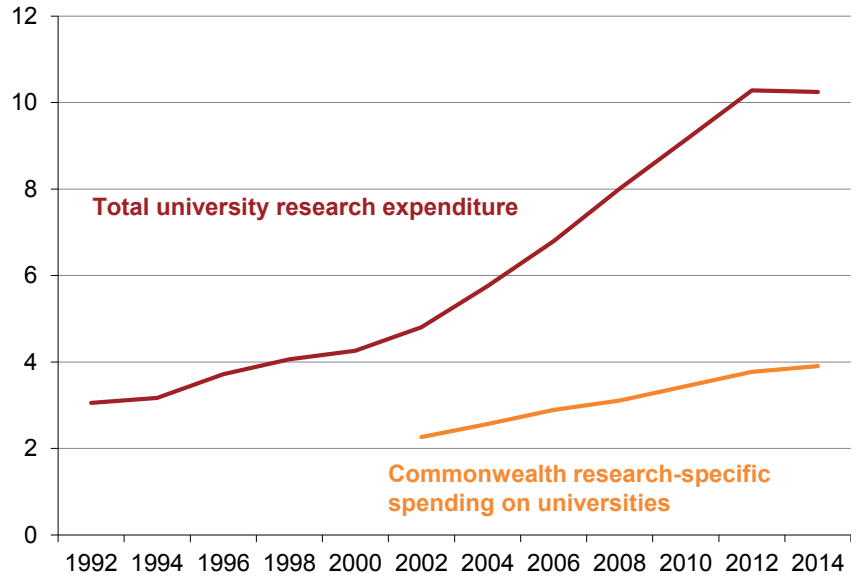
The grants described in this section are the largest recurrent sources of specific research funding. There are also other smaller research funding programs, contract research from government agencies, once-off capital grants for research infrastructure and various other funding sources from all levels of government.[139]

### 5.2.5 Other sources of research funding

Government funding specifically for research only partially explains the long boom in research expenditure shown in Figure 25, which ended between 2012 and 2014. In that year the Commonwealth spent about $10.3 billion. Competitive and block research grants financed 38 per cent of university research expenditure. Universities also draw on international and private sources of research funding, including industry contracts and donations.[140]

[134] Watt (2015), p 13-14
[135] Larkins (2011)
[136] Department of Education and Training (2015i)
[137] DIIS (2015b); Watt (2015)
[138] Department of Education and Training (2016d). The precise formulae are yet to be finalised as of August 2016.
[139] Department of Industry and Science (2015); Department of Education and Training (2015d)
[140] Department of Education and Training (2015j)

**Figure 25: Total university research expenditure, 1992–2014**
$2015 billion




*Note: Deflated using CPI.*
*Sources: Universities Australia (2015); ABS (2016g); Department of Education and Training (various years-b)*

The Commonwealth Grant Scheme discussed in section 5.2.1 is not specifically for research, but is used for it. Its predecessor funding program, the operating grant, was explicitly for teaching and research, and this combination established university practices. Along with CGS money, universities make profits on full-fee students (section 5.3). Grattan Institute analysis for 2013 estimated that overall at least one dollar in every five spent on research came from teaching-driven funding. Financial transfers occur between disciplines as well as between teaching and research. Surpluses from teaching business-related courses support research in other faculties.[141]

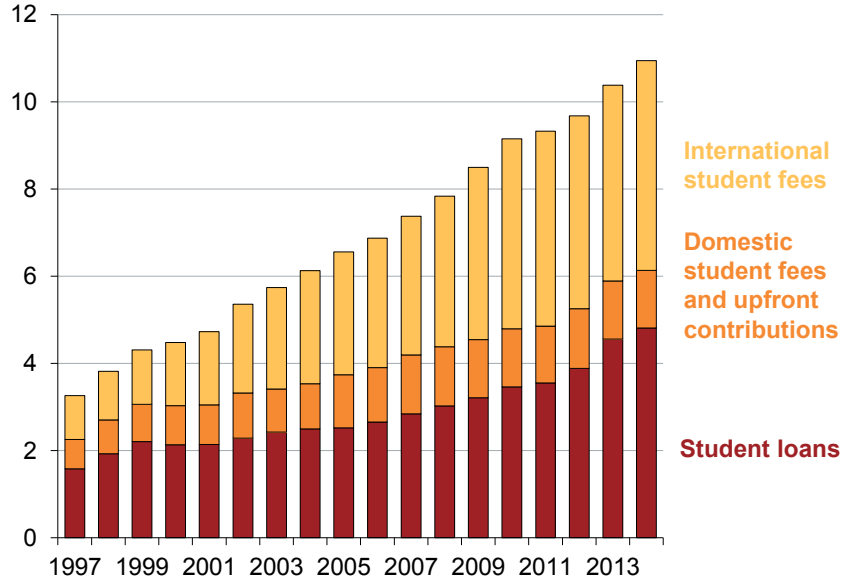
While using student-derived revenue for research is sometimes controversial, it is unavoidable given the current structure of Australian higher education. Most permanent academic staff are employed to teach and to research (section 4.1), but the combined teaching-research staffing model is not supported by funding policy. Teaching staff and funding reflect student choices by institution and field of study. Yet the main research funding schemes distribute money using criteria that are unrelated to undergraduate student numbers. Government funding policy drives teaching and research resources in divergent directions. Research spending funded by surpluses on teaching preserve teaching-research academic employment.

## 5.3 Private spending by students

Private higher education spending by students has increased every year since 1997, reaching $10.9 billion in 2014, although more than 40 per cent of this revenue still comes from the government through HELP loans (Figure 26). The different sources of student revenue are discussed in the next chapter.

[141] Norton and Cherastidtham (2015a)

**Figure 26: Teaching revenue from students, 1997–2014**
$2015 billion

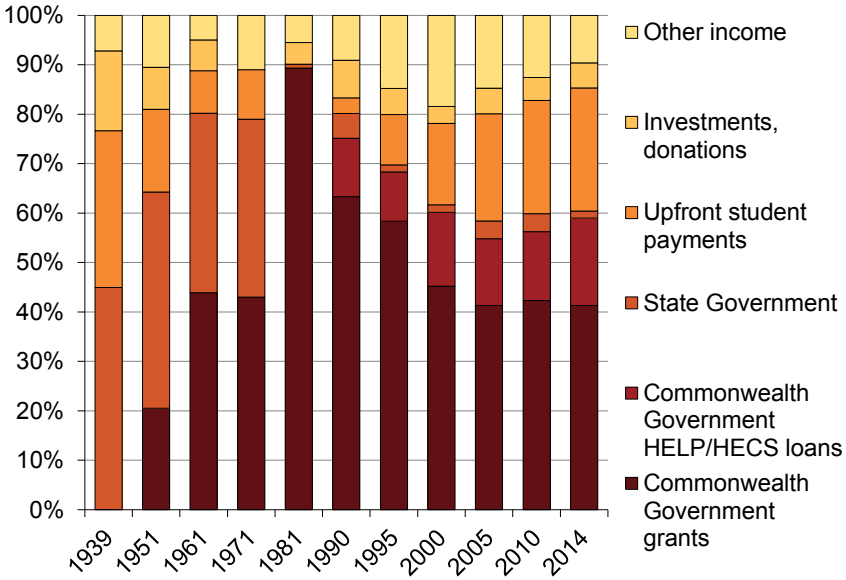



*Note: Does not include fees or charges paid by students for non-teaching services such as student amenities or accommodation. Deflated using CPI.*
*Source: Department of Education and Training (2015d), various years*

## 5.4 Public and private spending over the long run

Over the long run, total public spending on higher education has increased in most years. From the perspective of universities, it has two distinct phases over the last 70 years, as Figure 27 shows. Until the late 1980s public funding complemented and then replaced income from students. From that period private funding grew more quickly, due to the introduction of HECS and full-fee courses, especially for international students. Despite the growth of private funding, universities remain reliant on government. In recent years, about 60 per cent of university cash flow – counting both grants and HECS or HELP revenue – has come from government.

**Figure 27: Public and private spending shares of universities, 1939–2014**




*Note: Upfront student payments include fees and HECS or student contribution payments.*
*Sources: DEET (1993); Department of Education and Training (various years-a)*

## 5.5 Overall financial position

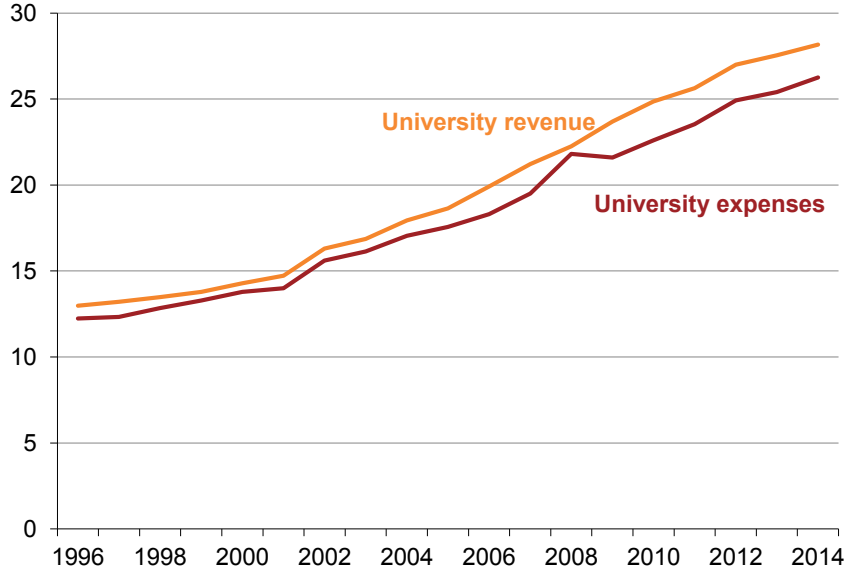
From the mid-1990s to the mid-2000s public universities often experienced financial difficulties, but their position has improved

in recent years (Figure 28). Additional government grant income (Figure 20, Figure 24) and private revenue (Figure 26) each contributed to larger annual surpluses despite rising expenses.

Although the last decade has been better financially for universities than the previous decade, there are signs of strain. Stalling research expenditure (Figure 25) suggests that universities have less discretionary income. Stabilising staff numbers despite on-going growth in student numbers suggests cost control (section 3.1).

Recovering international student numbers (section 2.3) will deliver profits to universities. But other financial pressures will persist into the near future at least. The method of indexing government grants and student contributions (section 5.2.1) is delivering annual grant adjustments well below the wage increases required under university enterprise agreements. As universities still get most of their revenue from government, surpluses will shrink unless universities can contain their costs.

**Figure 28: Public university revenue and expenses, 1996–2014**
$2015 billion




*Note: Deflated using CPI.*
*Source: Department of Education and Training (various years-a)*

# 6. Higher education finance – the micro picture

This chapter investigates the financing arrangements at the micro level of how resources are allocated to students. It discusses how policy and history influence funding levels for Commonwealth-supported student places. It explains how student places are distributed among higher education providers.

## 6.1 Funding per student

### 6.1.1 Commonwealth-supported students

A 'Commonwealth-supported student' is somebody in a place funded by the Commonwealth Grant Scheme (section 5.2.1) or required to pay a student contribution.[142] The student can pay their student contribution directly to their university or borrow it under the HECS-HELP scheme (section 5.2.2). If the student borrows under HECS-HELP, the Commonwealth Government pays the university on the student's behalf.

Commonwealth and student contributions are both based on the unit of study, or subject. They are the same for undergraduates and postgraduates, but differ according to field of study. There are eight Commonwealth contribution amounts and three student contribution amounts. Table 7 lists fields of study and their funding levels, expressed as the rate for a full year of study.

These rates reflect history and political compromises. A study of higher education expenditure from the late 1980s is the single biggest influence on the total per student amount. Its purpose was to adjust funding rates in a new 'unified' system after higher education colleges became universities (section 1.3.1). A 'relative funding model' was devised, with disciplines funded by a ratio from a base. For example, a nursing place was funded at 1.6 times the base of accounting and law.[143] Though these funding relativities were intended to be a transitional measure, they were brought back in 2005. Whether costs had changed in the intervening 15 years was not initially investigated, though after a limited university expenditure study some disciplines received increased government funding in 2008.[144]

In 2005, universities were also given the power to set student contributions, up to a legislated maximum. They could keep the money (previously, HECS went to the government). For most disciplines, the maximum was 25 per cent more than the previous HECS rates (for new students enrolling from 2005). There was no science to this particular percentage; it was a political compromise to get the higher education reform bills through the Senate. With the supply of student places set well below demand (section 6.2), universities had no need to use low prices to attract students. Maximum student contributions quickly became standard prices charged by all universities.

[142] Most Commonwealth supported students are supported by the CGS and pay a student contribution. However, students in enabling places aimed at preparing them for a higher education course do not pay student contributions, and universities do not receive Commonwealth Grant Scheme payments for enrolments in excess of agreed numbers in courses outside the demand driven system (section 6.2.1).

[143] For the background, see DEEWR (2010) p 24-26.

[144] Access Economics (2007)

**Table 7: Contributions for a 2016 Commonwealth-supported place (student taking out a HELP loan)**

| Discipline | Commonwealth contribution | Maximum student contribution | Total funding rate |
|---|---|---|---|
| Law, business, economics | $2,059 | $10,440 | $12,499 |
| Humanities | $5,724 | $6,256 | $11,980 |
| Mathematics, statistics | $10,127 | $8,917 | $19,044 |
| Computing, other health | $10,127 | $8,917 | $19,044 |
| Behavioural sciences | $10,127 | $6,256 | $16,383 |
| Journalism | $12,455 | $6,256 | $18,711 |
| Social studies | $10,127 | $6,256 | $16,383 |
| Architecture | $10,127 | $8,917 | $19,044 |
| Education | $10,537 | $6,256 | $16,793 |
| Clinical psychology | $12,455 | $6,256 | $18,711 |
| Visual and performing arts | $12,455 | $6,256 | $18,711 |
| Allied health | $12,455 | $8,917 | $21,372 |
| Nursing | $13,905 | $6,256 | $20,161 |
| Engineering | $17,706 | $8,917 | $26,623 |
| Science | $17,706 | $8,917 | $26,623 |
| Dentistry, medicine, veterinary science | $22,472 | $10,440 | $32,912 |
| Agriculture | $22,472 | $8,917 | $31,389 |

*Notes: If students pay their student contribution upfront they get a 10 per cent discount in 2016. This will be abolished from 1 January 2017. The government pays the value of the discount to the student's university. The student contributions listed in the table are the maximum that universities can charge, as legislated in the Higher Education Support Act 2003. They may charge less than this amount if they choose, but in practice this rarely occurs.*
*Source: Department of Education and Training (2016a)*

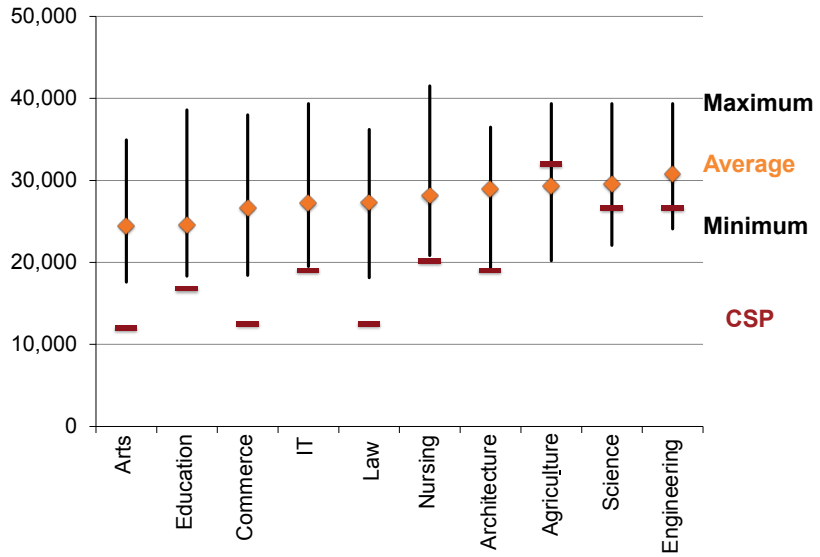
### 6.1.2 Full-fee paying students

In contrast to Commonwealth-supported students, prices for full-fee paying students are lightly regulated. There is a floor price for international students, but no legal ceiling on the fees universities can charge international students or domestic students in full-fee markets. Only market forces regulate maximum fees.

Figure 29 shows average fees charged to international students taking bachelor degrees in 2016, along with the maximum and minimum fee charged. The average fee ranges from $24,500 to $31,000 a year depending on discipline. Fees vary widely around these averages. Students can pay twice as much to attend the most expensive university as the cheapest university offering a similar course. International students often prefer high-fee over low-fee universities.[145] Generally, universities earn more from an international than a domestic student. However, some universities set fees for international students in agriculture, science and engineering that are below the combined Commonwealth and student contributions reported in Table 7.

[145] Norton and Cherastidtham (2015b), chapter 2

**Figure 29: Annual international student bachelor degree fees, 2016**
$2016




*Notes: Course fees were based on comparing similar courses at different universities. Fees are indicative.*
*Source: University websites*

Nearly 60 per cent of the domestic postgraduate coursework market is full fee, supported by FEE-HELP loans (section 5.2.2). Although domestic postgraduates are sometimes charged high fees, these are never more than and usually significantly less than the fees charged to international students in the same course. In disciplines such as nursing and teaching, it is common for domestic postgraduate fees to be less than the funding rates for a Commonwealth-supported place.[146]

### 6.1.3 Spending per student

Although we can identify most revenue coming to public universities from teaching (sections 5.2.1, 5.2.2, and 5.3), spending on students is not easily calculated. There are inherent difficulties in making these calculations. The same staff and facilities are used to produce teaching, research and community engagement. Time and facility use surveys can allocate some costs among activities, but not all expenditures can be neatly classified in this way. Assumptions need to be made, which may inflate or deflate teaching costs.

The 2011 *Higher Education Base Funding Review: Final Report* published some data on costs per student place relative to funding. The review panel found that median undergraduate teaching and scholarship costs were *below* funding rates in eight of ten broad fields of study (though at least one university had costs above funding in each of the ten). The average cost on this basis was about $16,800 per EFTSL. However, if research costs are included then total costs *exceed* revenue in nine of ten broad fields of study. The average cost including research was around $21,900 per EFSTL.[147]

The observed behaviour of public universities suggests that funding for Commonwealth-supported places is usually sufficient, at least on a teaching-only cost basis. Public universities

[146] Ibid., chapter 3
[147] Adjusted to 2015 dollars. Lomax-Smith, *et al.* (2011), p 48-50. Research costs were research not funded by a specific source of research funding, such as the grants described in section 5.2.4.

voluntarily enrolled nearly 170,000 additional Commonwealth-supported places between 2008 and 2015.[148] However, universities need to avoid taking on significant research expenses to ensure costs stay within revenues. As section 3.3 notes, casual employment has become common in academia. Casual and short-term teaching-only jobs are much cheaper for universities than full-time teaching-research positions.

Low marginal costs – the cost of an extra student – may also explain additional enrolments. The marginal cost could be modest when students can be placed in existing classes and infrastructure. Yet it can be high when the additional student requires more teaching staff or significant new infrastructure.

Universities always claim to be under-funded, but it is difficult to evaluate whether this is true, and, if so, by how much. The problems are partly conceptual – to what extent should research be funded through teaching, and what standard of course delivery is acceptable? And they are partly evidential – how should costs be calculated, and what assumptions should be made about reasonable costs?

Activity-based costing is one way to tackle these difficulties. Activity-based costing focuses on why money is spent, rather than what it is spent on. It is used in other publicly supported services such as hospitals. The UK has used it for higher education since 1999. It would cost teaching, research and other services.[149] These costs could be evaluated at the institutional level, or at the departmental, subject or project level for more granular costing.

[148] Data provided by the Department of Education and Training
[149] Norton and Cherastidtham (2015a), chapter 5. Initially, the UK used TRAC for research, extending it to teaching in 2008.

### 6.1.4 Internal allocation of funding

Universities are not obliged to spend teaching revenues in the disciplines or departments that earned them. The funding rates reported in table 7 above are not recommended internal funding rates. They were essentially used – at least until the inception of the demand-driven funding system discussed in section 6.2.1 below – to calculate a block grant, a total sum of money paid to each university. With a block grant, universities can design internal funding systems reflecting their own costs and priorities. The federal funding system does not adjust per-student rates to institutional differences, but it does permit universities to make those adjustments in how they spend their money.

In practice, revenue from Commonwealth supported students tends to be allocated to the faculties or departments where the students are enrolled. If spending on these students exceeds revenues, the faculties or departments are typically described as losing money or receiving cross-subsidies from profitable parts of the university. If costs cannot be contained or other revenues found, 'loss-making' areas risk closure. So in practice Commonwealth-funding rates can shape university behaviour more than policymakers originally intended.

## 6.2 Distributing student places

A higher education system needs a system of distributing student places. Places have to be allocated to higher education providers, disciplines and students. The two broad theoretical models are central allocation and market distribution.

In a central allocation model, the government determines priorities and allocates the student places it funds accordingly.

Priorities could be for particular disciplines, higher education providers, or types of students. While students cannot be forced to take the places created under government-priority setting, the system limits their opportunities. People who want a university place eventually have to take what is available. Priority setting can be supported by student incentives, such as scholarships or lower fees.

In a market distribution model, the government does not set priorities. Higher education providers decide what courses they will offer students, and students decide whether or not to purchase the courses at the fees charged. This is the model that largely applies for international students, for much of the domestic postgraduate market, and among the non-university higher education providers (NUHEPs – see section 1.2).

Compared to a system of central allocation of student places, a market system gives students much more power. Higher education institutions have stronger incentives to respond to student preferences, and to concentrate on the quality of teaching. Yet market systems depend on students paying full fees, which may reduce total demand for higher education, especially from lower-income households. It could also mean students do not choose courses that have low private benefits but provide broad social or economic benefits.[150]

A higher education 'voucher' scheme combines market mechanisms and public subsidies. Under this model, the government broadly steers the higher education market, using subsidies to make higher education generally or particular disciplines more financially attractive. The number of vouchers can be limited or unlimited, and rationed using academic results or other entry criteria. The key point is that higher education providers must compete for students, rather being allocated student places. Voucher schemes may have literal vouchers – documents sent to prospective students that they can redeem at higher education providers. Yet this is not usually necessary. Prospective students can provide higher education providers with evidence of their eligibility.

### 6.2.1 Distributing Commonwealth-supported places

Historically, Australia used a version of the central allocation system. From the mid-1970s, the Commonwealth Government distributed student places among public higher education providers. The government was not usually an activist central planner. Within overall target enrolment levels and funding envelopes, universities had the most influence over what courses were offered. The government's main mechanism for steering the system was through funding new higher education places. While the allocation of new places was sometimes very prescriptive, down to specific courses and campuses, new places were only ever a small percentage of total Commonwealth-supported places.

Central allocation meant that universities could plan around predictable public funding levels. This gave the system stability, but weakened competitive pressures. Universities had few financial incentives to attract additional students. For a few years in the mid-2000s, universities were penalised if they exceeded enrolment targets set out in funding agreements with the Government by more than 5 per cent. With demand exceeding the supply of student places, each publicly-funded university had a virtually guaranteed share of total enrolments.

[150] See Norton (2012a) for a detailed discussion of this argument.

In 2009, the Government announced that it would phase in a 'demand-driven' funding system.[151] For 2010 and 2011, universities would be paid for more students than specified in their funding agreement, capped at a 10 per cent funding increase (section 6.1.1 for per-student funding rates). For all additional Commonwealth-supported students, universities would be paid the student contribution amount. The policy change encouraged universities to enrol more domestic students. By 2011, some universities had enrolments exceeding their funding agreement target by more than 20 per cent.

In 2012 the new 'demand-driven' funding system began. It represented a major shift away from the central allocation model to the voucher model. Most caps on the number of Commonwealth-supported bachelor-degree places at public universities, except for medical places, were lifted. The enrolments in each public university, along with the system as a whole, could now move up and down in line with student demand.

The demand-driven system is not a full voucher system. Commonwealth supported medical places, postgraduate places, and sub-bachelor places (diploma, advanced diploma, associate degree – see section 1.1) are still allocated centrally, using funding agreements between the government and universities. Nevertheless, the publicly-funded university system is now much more competitive. Student choices have real financial consequences for universities.

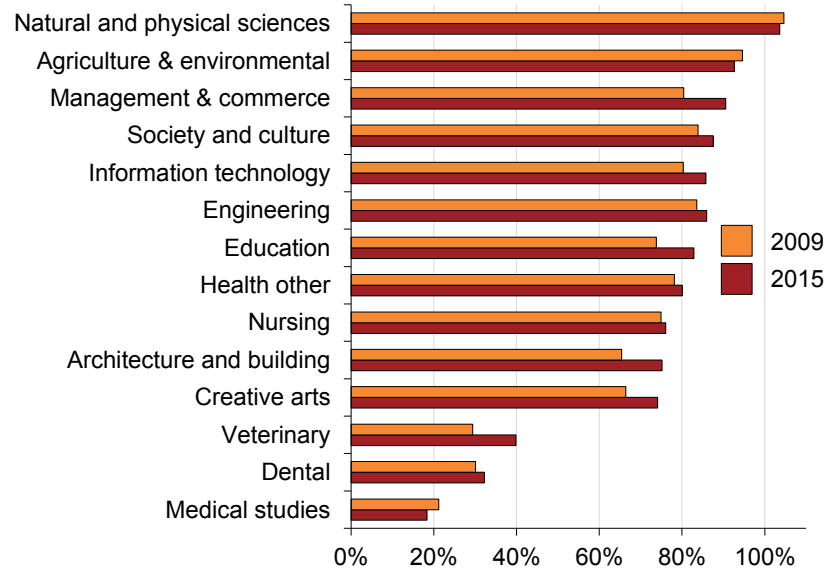
### 6.2.2 Operation of the demand-driven system

A demand-driven system should increase responsiveness to student preferences. At the field of study level, Australia has long had imbalances between demand and supply. Health places, especially in medicine, have been chronically under-supplied relative to student demand. By contrast, places in science courses have been chronically over-supplied relative to demand.

Since 2009 supply has moved closer to demand. The proportion of applicants receiving an offer in their first-preference field increased from 77 per cent in 2009 to 84 per cent in 2015 (see also Figure 10, page 27). In most fields of education, applicants became more likely to receive an offer (Figure 30), although offer rates are low in high-prestige health courses. The proportion of applicants receiving an offer for their highest preference course has increased from 52 per cent in 2009 to 55 per cent in 2015. This number is lower than Figure 30 might suggest, because of second or lower preference offers. For example, someone whose first preference was engineering at one university could be offered an engineering course at another university. This person is matched by field of education but not by university.

[151] DEEWR (2009), p 17-19

**Figure 30: Field of study offer rates, 2009 & 2015**




*Notes: Chart shows offers as a percentage of first-preference applications. Offer rates can exceed 100 per cent as applicants may receive offers for a second or lower preference course. Tertiary admission centre applications only.*
*Sources: Department of Education and Training (2015n)*

# 7. Higher education policymaking

Higher education policymaking has become increasingly centralised in Canberra. This chapter reviews the major higher education policymakers and the interest groups that try to influence policy.

## 7.1 The rise of Commonwealth authority

Australian higher education began as a state responsibility. Except in its territories, the Commonwealth Government lacked clear constitutional power to establish or regulate a higher education institution. The Canberra-based Australian National University, legislated in 1946, is the only university with Commonwealth founding legislation.[152] There was no federal minister for education until 1966.[153]

While the states had full responsibility for education in Australia's early decades, after World War Two the Commonwealth slowly increased its policy involvement in higher education.[154] A 1946 amendment to the Australian Constitution authorised the Federal Government to make laws with respect to 'benefits to students'. This remains the only reference in the Australian Constitution to education, albeit an indirect one. The main constitutional vehicle for funding higher education was through conditional grants to the states. This was replaced in 1993 with direct grants to universities.

The Commonwealth's control of money gave it significant power in higher education, but in law it was a limited power. The rules it imposed were conditions of grants, not laws that had to be followed. The public universities could, in theory, have declined a Commonwealth grant and its associated conditions. In practice, universities have generally accepted whatever funding conditions the Federal Government set. This has allowed the Commonwealth to leverage its limited legal position into extensive control. Until recently the private higher education sector received no money from the Commonwealth, and so was free of Commonwealth control, beyond general laws applying to all.

Recent High Court cases have altered the legal basis of higher education policy. In the 2006 *WorkChoices* case the High Court took an expansive view of the Australian Constitution's corporations power. Since higher education is largely delivered by organisations, including universities, that are legally corporations (as opposed to partnerships or state government departments), the Federal Government now uses the corporations power to regulate higher education accreditation and quality control. The Tertiary Education Quality and Standards Agency (TEQSA) replaced the state higher education accreditation bodies in 2012.[155]

TEQSA is a sign of how higher education policymaking might change. Using the corporations power, the Commonwealth can now mandate rather than buy compliance. It brings all higher

[152] Other universities are established under state or territory legislation or company law.
[153] Parliamentary Library (2014), p 532
[154] See Forsyth (2014), especially chapter 3. Department of Prime Minister and Cabinet (2014), chapter 4.

[155] For more detail on the legal issues see Williams and Pillai (2011).

education institutions, not just those receiving public funds, under Commonwealth Government control.

While the *WorkChoices* case increased Commonwealth power, other High Court cases have complicated it. In a 2014 case on Commonwealth funding of school chaplains, the High Court took a narrow view of the 'benefits to students' power. The benefit needed to be closely related to being a student, and for specific students.[156] On this reading, the 'benefits to students' power, which is explicitly mentioned in the legislative provisions authorising the Commonwealth Grant Scheme (section 5.2.1), almost certainly could not be used to fund research directly.

Complicating matters further, direct Commonwealth research funding lacks an explicit constitutional basis. There is some High Court authority for using an implied 'nationhood' power to support research spending.[157] During 2015, the government strengthened the legal basis of research block grants and some other university programs. They did this by mentioning in higher education funding legislation a list of potential constitutional foundations.[158] If direct Commonwealth research funding were successfully challenged in the High Court, it could be restored through conditional grants to the states.

The more likely outcome is that the states will continue with their current limited role in higher education policy.[159] They still have university establishment acts on their statute books, and impose various reporting and accountability requirements on universities. They must still be consulted about some TEQSA-related matters, including new universities in their jurisdictions. They are still expected to fund special projects at universities within their borders. Yet on key higher education policy matters the states have little influence.

When the Commonwealth sets all important aspects of higher education policy, the relevant ministers and departments matter more than ever to the success of Australian higher education.

## 7.2 Commonwealth departments and agencies

### 7.2.1 The Department of Education and Training

Higher education is primarily the responsibility of the Department of Education and Training. It is responsible for the major teaching and research block grant funding schemes described in chapters 5 and 6. These are authorised by the *Higher Education Support Act 2003.* It also has over-arching policy responsibility for tertiary education standards (discussed below). These are authorised by the *Tertiary Education Quality and Standards Agency Act 2011.* Other important pieces of legislation administered by the Department are the *Education Services for Overseas Students Act 2000* and the *Australian Research Council Act 2001*.

As of August 2016, the Minister for Education and Training is Senator Simon Birmingham. The Labor shadow ministers are Tanya Plibersek for higher education and Senator Kim Carr for research.

[156] Chordia, *et al.* (2015)
[157] See Twomey (2010) for an analysis and critique.
[158] *Higher Education Legislation Amendment (Miscellaneous Measures) Act 2015*, Schedule 4
[159] Charles Darwin University and the University of Canberra have legislation from their respective territories. Although the territories have a lesser constitutional status than the states, the following paragraph applies to them.

### 7.2.2 Higher Education Standards Panel

Under the TEQSA legislation the higher education minister performs the key policy making function, setting threshold standards applying to higher education providers under the Higher Education Standards Framework. The standards cover higher education provider registration, course accreditation, and qualifications. These need to be met to offer courses leading to higher education awards.

The education minister appoints a Higher Education Standards Panel to develop and advise on the standards. Before making a standard, the minister consults state education ministers and TEQSA. In October 2015 the Higher Education Standards Panel released a revised Higher Education Standards Framework. This was approved by the minister and will take effect at the beginning of 2017.[160]

### 7.2.3 Tertiary Education Quality and Standards Agency

TEQSA began operations in early 2012. Its main task is to apply and enforce the TEQSA legislation and the Higher Education Standards Framework. It is also responsible for several regulatory functions under the *Education Services for Overseas Students Act 2000*.

TEQSA registers higher education providers and approves courses offered by non-self-accrediting institutions (chapter 1). It uses a range of risk indicators to monitor higher education providers.[161]

### 7.2.4 The research grant agencies

The two main competitive grant research agencies are the Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) (section 5.2.4). They report respectively to the education minister, Simon Birmingham, and the health minister, Sussan Ley.

The ARC and NHMRC work within broad policy frameworks established by the Government, with priorities set by the relevant ministers. Both organisations use systems of peer review to determine which applications are successful. This approach respects the culture of universities (section 1.3). Although the ministers approve funding for successful grant applications, this is usually a formality. Rare rejections of ARC grant recommendations are always controversial.

The media and politicians sometimes question ARC-funded projects with seemingly obscure, trivial or politicised topics. Academics sometimes claim that the peer view process leads to favouritism (to the detriment of the complainant's application). Yet overall the ARC and NHMRC enjoy high esteem. The most widespread criticism is that given low application success rates, resources are wasted preparing and assessing applications that are rejected.

### 7.2.5 The Chief Scientist

Australia's Chief Scientist advises the Prime Minister and other ministers on science, technology and innovation. Australia's eighth Chief Scientist, Alan Finkel, took office in January 2016.

[160] Department of Education and Training (2015f)
[161] TEQSA (2016e); TEQSA (2016c)

### 7.2.6 Department of Immigration and Border Protection

The Department of Immigration and Border Protection has a major influence on Australian higher education. It controls eligibility for student visas, and the post-study temporary and permanent migration programs that attract international students to Australia. As of August 2016, the minister is Peter Dutton.

In 2009 several changes to student visa requirements and to post-study migration rights contributed to weaker demand from international students for Australian higher education. The rules were changed again in 2012. Students who applied for a visa after 5 November 2011 have an automatic right to work for a period following completion of their degree. This ranges from two to four years depending on the qualification.[162] Former student visa holders also remain in Australia through a range of other temporary visas.[163] Former students with work rights can apply for an independent skilled migration visa or employer sponsorship to continue their employment in Australia beyond this time period.[164]

In 2016, further changes to student visas were introduced. Prospective international students can now apply for a general education visa rather than one specific to their education level. Visa applicants must still show that they meet rules on English language ability, financial capacity and other matters. The amount of evidence needed depends on the applicant's home country and education provider.[165]

### 7.2.7 Austrade

The Australian Trade and Investment Commission, known as Austrade, promotes Australian education to international students. It is a statutory agency in the Foreign Affairs and Trade portfolio.

### 7.2.8 Department of Social Services

The Department of Social Services is responsible for student income support policy (section 5.2.3). As of August 2016, the minister is Christian Porter. Through Centrelink, the Department of Human Services administers payment of student income support, including the start-up loan (section 5.2.2). As of August 2016, the minister is Alan Tudge.

## 7.3 Higher education interest groups

There are higher education interest groups representing universities, private higher education providers, higher education staff, and students.

### 7.3.1 University interest groups

The oldest university interest group is Universities Australia, formerly known as the Australian Vice-Chancellors' Committee (AVCC). All 37 public universities, along with Bond University

[162] Department of Immigration and Border Protection (2016b)
[163] Department of Immigration and Border Protection (2016c), p 68-69
[164] Examples of sponsored visas are the Temporary Work (Skilled) visa (subclass 457), Employer Nomination Scheme (subclass 186) or Regional Sponsored Migration Scheme visa (subclass 187). A Skilled Independent (subclass 189) visa is available to some former international students.

[165] Department of Immigration and Border Protection (2016a); Department of Immigration and Border Protection (2016e)

and the University of Notre Dame, are members of Universities Australia.

In the 1990s, the AVCC struggled to represent the diverging interests of its members, especially on research policy and fees for domestic students. A number of new university organisations have been formed since 1999 to give voice to the different perspectives within the university sector. These include the Australian Technology Network which includes all the universities of technology except Swinburne; the Group of Eight, representing the eight most research-intensive universities; Innovative Research Universities, mostly made up of suburban research-intensive universities founded in the 1960s and 1970s; and the Regional Universities Network, which represents six regional universities. Full membership lists of the university interest groups are in Appendix A.

### 7.3.2 Non-university higher education provider interest groups

The largest private higher education interest group is the Australian Council for Private Education and Training. Its members are involved in all levels of post-compulsory education. The smaller Council of Private Higher Education represents only higher education providers. Both organisations have lobbied for more equal treatment of public and private higher education provision.

### 7.3.3 Staff and student interest groups

The major union representing university staff, the National Tertiary Education Union (NTEU), has more than 27,000 members, equivalent to about a quarter of university staff.[166] It has been a consistent advocate for public funding of higher education.[167]

The National Union of Students (NUS) is a peak body for other student organisations, although some university student associations have decided to disaffiliate.[168] The Council of Australian Postgraduate Associations (CAPA) is another student peak body, representing campus-based postgraduate organisations. The student groups have been consistent advocates of public funding of higher education.

The Council of International Students Australia (CISA) represents international students across the post-compulsory school sector. It was formed in 2010 after the collapse of an earlier body representing international students. Unlike other higher education interest groups, it is active on state-level issues including public transport concessions, crime affecting international students, and access to public hospitals.

[166] NTEU (2015a), p 23. Some non-academic staff are not eligible to join the NTEU.
[167] O'Brien (2015) provides a general history of the NTEU.
[168] Faithfull (2016). Hastings (2003) provides the early history of NUS.

# 8. Benefits of higher education for the public and employers

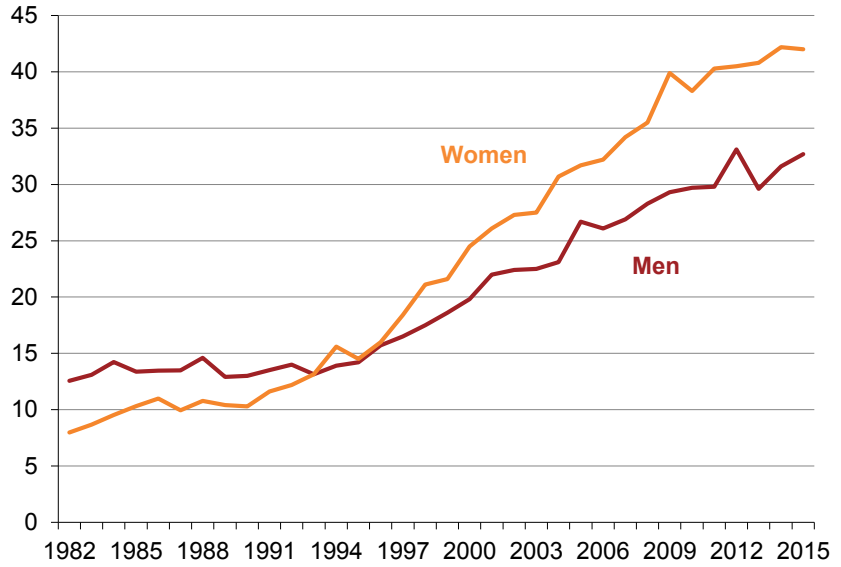
This chapter looks at how well the higher education system meets the needs of the country. Is the population becoming more educated? Are employers' skills needs met? Is university research output meeting expectations? How does the public perceive our higher education sector?

## 8.1 Creating a more educated population

As the enrolment figures in chapter 2 suggest, higher education attainment in Australia has increased over time. In 1983, 645,000 people held a degree; by 2015 that number was nearly 4.2 million.[169] Figure 31 shows the share of Australians aged 25 to 34 with a bachelor degree or higher qualification. Over the last thirty years, the share of young adults, holding a degree has increased dramatically, especially for women, whose attainment level was less than 10 per cent in the early 1980s but 42 per cent in 2015. Men lag well behind on 33 per cent, although if upper-level vocational qualifications are included men and women have nearly equal attainment levels, at just over two-thirds of the population.[170]

While Australia's population has become more educated, this is not solely due to the higher education system. Australia's skilled migration program has also contributed significantly, with 24 per cent of bachelor-degree or higher qualifications completed overseas. The Australian-born population is less educated than migrants, with 36 per cent of women born in Australia and 24 per cent of men aged 25–34 holding a bachelor degree or above in 2015.[171]

**Figure 31: Higher education attainment, men and women aged 25–34, 1982–2015**
Per cent




*Note: Bachelor degree or above. Australian citizens only. The fluctuations observed in some years are due to problems with the statistical sample.*
*Source: ABS (2015b)*

[169] ABS (various years)
[170] Grattan calculations from ABS (2016e). Including diploma and certificates III and IV for upper-level vocational qualifications.
[171] Grattan calculations from ibid.

With the demand driven system of funding higher education (6.2.1), the proportion of young Australians attending university is increasing (section 2.2). Over time, this will increase attainment rates for 25-34 year olds, but the gender gap is unlikely to narrow. Women still dominate university enrolments (section 2.6), and they are more likely to finish the courses they start. Of people who started a bachelor degree in 2005, 25 per cent of men but only 20 per cent of women had left without a degree by 2013.[172] Longer-term non-completion rates seem lower than this, with 21 per cent of men and 16 per cent of women who had ever started a degree never having finished one.[173]

Non-completion is a complex problem for universities. Students considering leaving often say they are doing so for work, health or family reasons, over which universities have little direct control.[174] But there are clear links between academic performance and leaving or considering leaving university.[175]

## 8.2 Meeting skills needs

### 8.2.1 Occupational skills

Although the higher education system is expected to meet skills needs, they have not been a systematic focus of higher education policy. In the pre-2012 system Commonwealth-supported places were sometimes allocated in response to employer complaints about shortages of particular skills (see section 6.2). Similarly, prices of Commonwealth-supported places have sometimes been set to promote demand – for example nursing and teaching between 2005 and 2009, and science and maths between 2009 and 2012. But these were *ad hoc* measures. Most university places have been distributed according to historical allocations, rather than student or labour market demand.

Predicting future skills needs is inherently difficult.[176] Labour supply is also hard to forecast. Graduates enter and leave Australia, change careers from the one they originally trained for, exit the labour force temporarily or permanently, and work varying numbers of hours per week. Even a higher education system that put a priority on skills needs could probably not avoid all skill shortages.

The main available measure of skills shortages is an employer survey conducted by the Department of Employment. An occupation is counted as having a skills shortage if employers cannot fill vacancies, or struggle to fill them, at current pay and condition levels, in reasonably accessible locations. This is not necessarily an absolute skills shortage; appropriately-skilled people may exist but choose other work.

The Department of Employment has published a skills shortage list since 1986. Fifty managerial or professional occupations, of the type typically regarded by the ABS as requiring a university qualification or equivalent experience, have had reported skills shortages at some time since 1986. In the latest ABS occupational list, there are just over 400 different managerial and

[172] Department of Education and Training (2015c), table 1
[173] Grattan calculations from ABS (2016f). True lifetime non-completion is likely to be lower, as the sample includes some younger people who have left university without completing, but will successfully return to study later in life.
[174] Social Research Centre (2016), p 24
[175] Ibid., p 23; Department of Education and Training (2015c), table 1

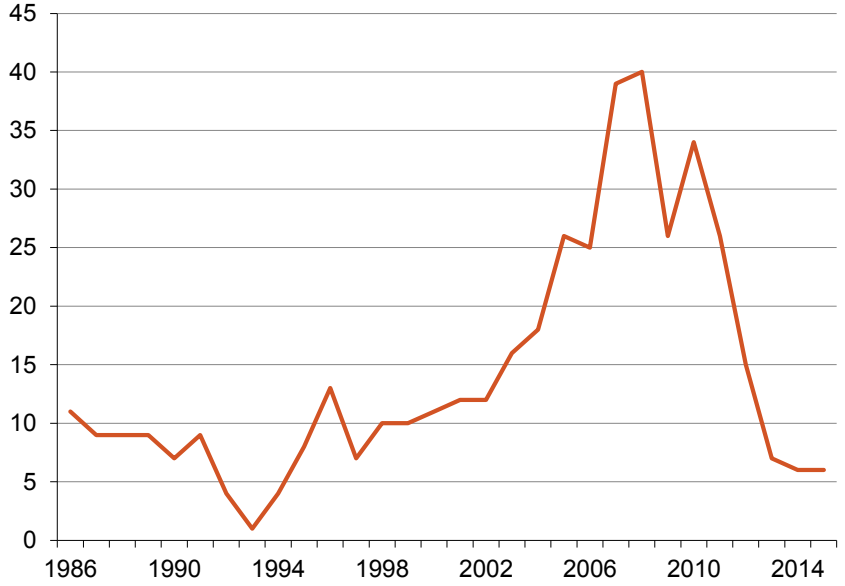
[176] For examples of incorrect predictions, see Norton (2009), p 22.

professional occupations. In the vast majority of professional and managerial occupations we have always had enough graduates.

Over the decade to 2015, 24 occupations, mostly in the health professions or linked to the mining industry, have experienced shortages for 5 years or more.[177] In 2008, a peak of 40 professional or managerial occupations reported shortages. These are now easing. Only six occupations were recorded as experiencing shortages in 2015 (Figure 32).

The demand driven funding system gives universities new freedom to respond to skills shortages. To the extent that applications for university entry shift in the direction of skills shortages, it also creates an incentive for universities to meet this demand. Since the demand driven system was introduced, the largest increase in enrolment share has been in health-related courses (section 2.2.1). The review of the demand driven system examined this issue in more detail. In twelve of the fourteen skills shortage occupations that could be investigated given the available data, the system had responded positively.[178] Chapter 10 looks at science, IT and engineering enrolment and labour market trends.

**Figure 32: Number of managerial and professional occupations experiencing skills shortages, 1986–2015**




*Source: Department of Employment (2016b)*

### 8.2.2 Graduate soft skills

For some occupations, skills shortages exist alongside a pool of relevantly-qualified graduates struggling to find full-time work. Some graduates may lack what are sometimes called soft skills: personal attributes that help them work effectively.

Each year, Graduate Careers Australia surveys graduate employers about their recruitment intentions and the quality of graduate applicants. In 2014, about 23 per cent of employers reported that they would have recruited more graduates had better candidates been available. In these surveys, poor

[177] Department of Employment (2016b)
[178] Kemp and Norton (2014), chapter 3

academic results never rank highly as a negative factor in graduate hiring. The biggest issues for employers are interpersonal and communication skills, motivation, arrogance, and leadership skills.[179] Although universities have long been aware that non-academic factors are important, and list general attributes their graduates should have, these are hard to measure.[180]

One Australian study used a personality survey to see if attending university improved non-cognitive skills. Compared to young people who did not attend university, the students became more sociable and had better overall mental health. Students from low socio-economic backgrounds increased their score on questions measuring cooperation and kindness. The type of university attended did not make a significant difference to non-cognitive skill development.[181]

## 8.3 Research performance

As section 4.3 shows, the quantity of research outputs, especially publications, from Australian universities has increased over time. A measure of research productivity is the average number of annual academic publications per academic. This more than doubled to 1.5 a year between 1997 and 2014, although growth is less rapid if the increasing numbers of research-only staff are considered.[182]

Publication numbers do not measure research quality or significance, but the best Australian research publications are well regarded internationally. One measure of Australian research performance is how often other academics around the world cite Australian publications. In 2014, Australian research publications were 33 per cent more likely to be cited internationally than publications in their discipline and year from other countries. Australian publications were 7 per cent more likely to be cited in 2000.[183]

In recent years, international university rankings have attracted a lot of attention. One, the Shanghai Jiao Tong Academic Ranking of World Universities, focuses exclusively on research performance. Indicators include papers published in certain high-prestige journals, numbers of high-citation researchers, and winners of Nobel Prizes and Fields Medals (a prestigious mathematics award). The most recent ranks for Australian universities are in Table 8. Four are in the top 100 universities in the world, up from two in the first year of the Shanghai Jiao Tong ranking, 2003. American universities dominate the top fifty. Twenty Australian universities are in the top 500 universities in the Shanghai Jiao Tong ranking.

[179] GCA (2015f), p 5. Interpersonal skills also came out as the top job candidate attribute in a survey of STEM employers: Deloitte Access Economics (2014), p 29

[180] Oliver (2011)

[181] Schurer, *et al.* (2015)

[182] Assuming that teaching and research staff spend 40 per cent of their time on research and research staff spend all their time on research, research output per full-time equivalent staff member increased from 1.3 to 2.5 publications a year: calculated from Department of Education and Training (2015l) and Department of Education and Training (2015j).

[183] DIIS (2015a), p 127

**Table 8: Top eight Australian universities, Shanghai Jiao Tong university rankings, 2015**

| | |
|---|---|
| University of Melbourne | 44 |
| Australian National University | 77 |
| University of Queensland | 77 |
| University of Western Australia | 87 |
| Monash University | 101-150 |
| University of New South Wales | 101-150 |
| University of Sydney | 101-150 |
| University of Adelaide | 151-200 |

*Note: A further twelve Australian universities are without specific rank in the 201-300, 301-400, and 401-500 range.*
*Source: ARWU (2015)*

More detailed analysis of research performance by university and discipline is available from the Excellence in Research for Australia (ERA) report from the Australian Research Council. Quality indicators included citations, peer review (other academics assessing the quality of work) and the level of grant income. The ERA also looked at indicators of research volume and activity, indicators of research application (such as patents) and indicators of recognition (for example, a fellowship in a learned academy or editing a prestigious journal).[184]

In the ERA, fields of research in each university that met a minimum threshold of outputs are rated from one to five. Ratings one and two indicate that research performance in that field is 'below world standard'. Rating three indicates average performance at world standard. Rating four is above world standard, and rating five is well above world standard. Table 9 shows the results. On this measure, most research-active departments in Australian universities are at least at world standard. The proportion of research departments rated as below world standard dropped from 22 per cent in the 2012 ERA to 11 per cent in the 2015 ERA. The results suggest that universities find ways to minimise the number of below world standard areas. Not all of their methods are necessarily in the spirit of the exercise.[185]

**Table 9: Excellence in Research for Australia, 2015**

| Rating | Units of evaluation | Percentage |
|---|---|---|
| 1+2 (low) | 198 | 11% |
| 3 | 470 | 26% |
| 4 | 544 | 31% |
| 5 (high) | 563 | 32% |
| Total | 1,775 | 100% |

*Source: ARC (2015b)*

The ERA can also be used to identify disciplinary areas of national strength and weakness. Reflecting the large investment in health research (section 4.2), more than half of medical and health science disciplines were rated as well above world standard. Nearly half of the smaller earth sciences field were also well above world standard. In education and in commerce more than a third of research departments were rated as below world standard.

While Australian university research does reasonably well on quality measures, policymakers believe its social and economic

[184] For some of the background to the ERA and rankings, see Coaldrake and Stedman (2016), chapter 6.

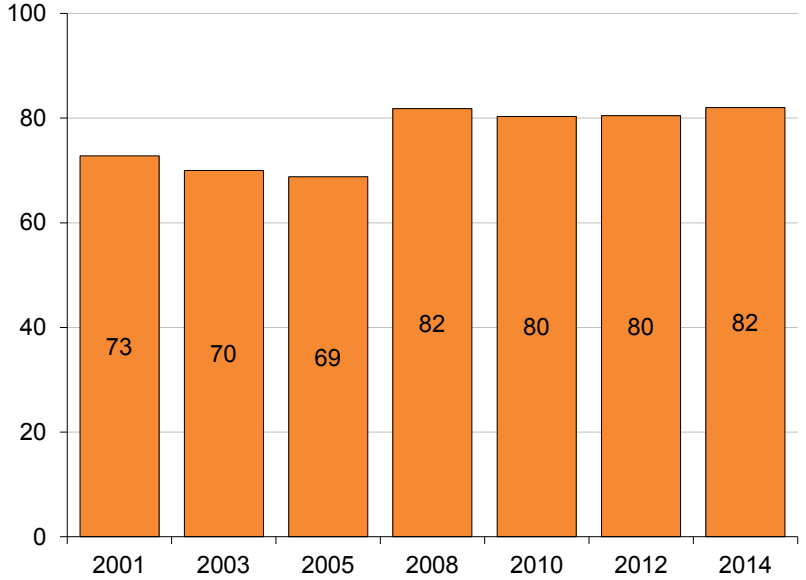
[185] See Henman (2015) for a discussion on universities 'gaming' the ERA. The ARC states that this is not a large problem: ARC (2015a)

impact should increase.[186] Although more research is oriented towards practical uses or specific objectives (section 4.2), this does not necessarily translate into commercial benefits. The number of commercial licences, while increasing over time, remains low (section 4.3). Only 3 per cent of innovating Australian businesses source their ideas directly from universities, although a larger proportion use journals and research papers to which universities in Australia and elsewhere contribute.[187] New funding policies aim to promote research impact (section 5.2.4).

## 8.4 Public perceptions

Various social surveys have asked Australians about their confidence in social institutions, including universities. Universities enjoy high levels of public confidence. In 2014, 82 per cent of respondents who expressed a view said that they had either a 'great deal' of confidence in universities (25 per cent), or 'quite of lot of confidence' (57 per cent) (Figure 33). Universities rated third highest of the nine institutions included in a 2014 ANU Poll. They were below the police and defence forces, but well above the courts, churches and public service.[188]

**Figure 33: Public confidence in universities, 2001–2014**
Percentage of public with a 'great deal' or 'quite a lot' of confidence




*Note: Percentages are of poll respondents who offered a view, omitting those who did not answer the question or gave a 'don't know' response.*
*Sources: Bean et al. (2003); Gibson et al. (2004); Wilson et al. (2006); McAllister (2008); McAllister et al. (2011); McAllister and Pietsch (2012); McAllister (2016)*

[186] Department of Education/Department of Industry (2014)
[187] In 2014-15, 25 per cent of innovating businesses sourced ideas from 'websites, journals, research papers and publications': ABS (2016b).
[188] McAllister (2016). Another poll taken earlier in 2014 found a lower result of 73 per cent: Blunsden (2016). The poll used in the chart is preferred as it is more recent, has a larger sample, and achieved a higher response rate. Using a different question to the surveys in the chart, a 2013 poll by Universities Australia had 78 per cent of respondents express positive perceptions of universities, but in 2015 polling by the Australia Institute showed this proportion had fallen ten percentage points, to 68 per cent: The Australia Institute (2015). Results from the later survey may be affected by questions about the role of universities in the 2014–2015 fee deregulation debate.

# 9. Benefits of higher education for students

This chapter examines how well the higher education system is serving the needs of students. What is the academic quality of their courses? Are they satisfied with teaching? Do they find good jobs at the end?

## 9.1 The educational experience

### 9.1.1 Academic standards

Some people believe that academic standards are in decline. Many academics believe that courses are being 'dumbed down', or that it is becoming easier to pass or get high grades. In a survey, just under half of academics surveyed agreed with the proposition that "academic standards at my university aren't what they used to be".[189] Falling admission standards, poor English-language skills, and students not putting in the necessary work are among the reasons given by academics for this perceived decline.[190] Cheating, especially by international students, has become a high-profile issue, along with claims that universities put their recruitment and retention ahead of standards.[191] Students can share these concerns. Some graduates report that challenging students to achieve high academic standards is an area in which universities could do better.[192]

Governments have acted on standards concerns. A national higher education standards framework enforced by the Tertiary Education Quality and Standards Agency (TEQSA) was established in 2012 (section 7.2.3). Standards in teacher education courses have attracted particular scrutiny. From 1 July 2016, new teaching graduates must pass a literacy and numeracy test.[193] In response to concerns about admission standards, the government has initiated a limited review.[194]

Although standards receive more regulatory attention than previously, debates about them are hard to settle. In schools, published curricula and more recently national and international tests track what students are taught, and how well they have learnt it. Higher education is much more decentralised than school education, leaving the public with limited information on how well students and institutions are doing. The indicators reported in this section give us some idea of the situation, but not conclusive evidence.

If academic standards were dropping significantly across the higher education sector, all other things being equal we would expect to see pass rates going up. Easier courses or softer marking would both make failing less likely.

For domestic commencing students pass rates have declined over the last decade. In 2014, 83.5 per cent of subjects attempted were passed, down from 87 per cent in 2004 (Figure

[189] Bexley, *et al.* (2011), p 30
[190] For example, Economic Society of Australia (2004)
[191] ICAC (2015); NTEU (2015b), p 21
[192] Coates and Edwards (2009), p 52

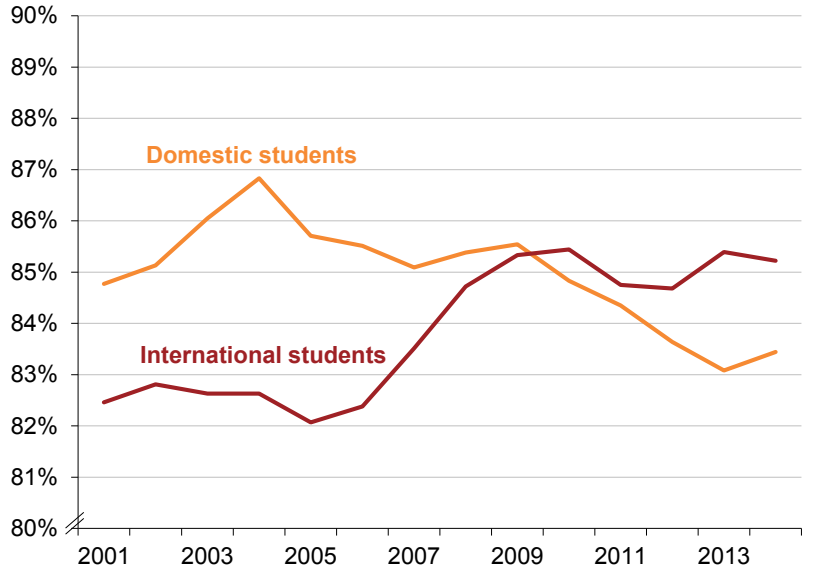
[193] They will need to have results that put them in the top 30 per cent of the population: AITSL (2015)
[194] Higher Education Standards Panel (2016)

34). Pass rate trends are associated with the size of the commencing student intake. When universities take more students, they reduce entry requirements. Lower-ATAR students are more likely to fail or leave without completing assessment tasks, and so reduce the pass rate (see Figure 12, page 30.)[195]

While the domestic commencing student pass rates provide no evidence that subjects are getting easier or marking is getting softer, Figure 34 shows a steep increase in pass rates for international students between 2005 and 2010, with a levelling off since. In 2010, international commencing students were for the first time more likely to pass their subjects than were domestic students.[196]

International students work harder than domestic students, which could explain a higher pass rate.[197] But this effort is not reflected in marks received. The Student Experience Survey asks respondents to self-report average marks. For both international and domestic students, the single most common average mark reported is between 70 and 79 per cent, but international students are substantially more likely to report average marks below 70 per cent (Figure 35). Further analysis shows that academic performance between the two groups diverges over time. Between first and third year, domestic students become slightly less likely to report average marks below 70 per cent, while international students became more likely to do so: up from 44 to 52 per cent.[198] We cannot say whether the results recorded in Figure 35 fairly assess student work, or whether there are long-term trends in marks received.

**Figure 34: Subject pass rates for commencing bachelor domestic and international students, 2001–2014**



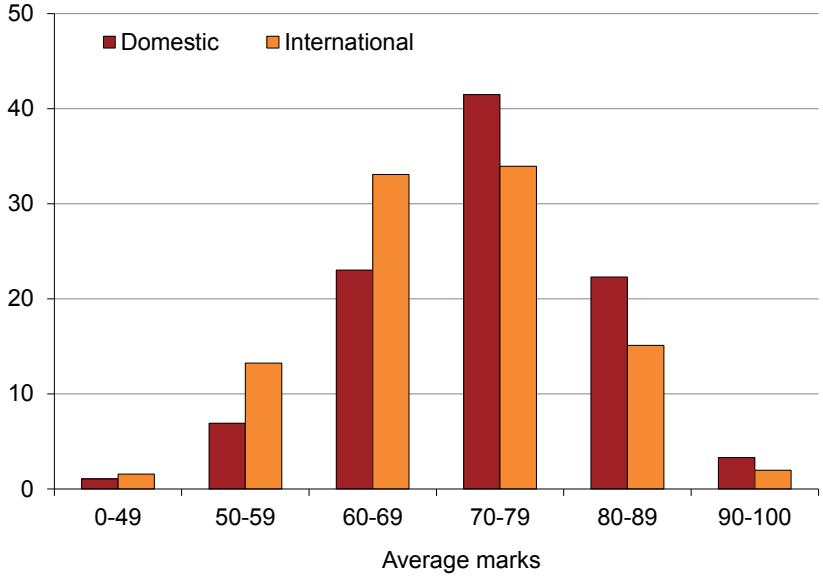

*Note: The calculation is subjects passed as a percentage of all subjects passed, failed and not completed. Subjects dropped before the census date that triggers payment for the course, usually around a month after it starts, are not counted. There is a second date, usually around two months into the subject, before which students can withdraw without a fail on their academic record. Domestic students are more likely than international students to withdraw from a subject – in 2014, 2.3 per cent of subjects compared to 0.7 per cent for international students.*
*Source: Department of Education and Training (2015m)*

[195] See Kemp and Norton (2014) p 15-16 for enrolment numbers by ATAR.
[196] Examining the 2005-2010 increase in international students pass rate data in more detail shows stable rates at most universities, but large increases at others, including some that previously had very low pass rates.
[197] Edwards (2008)

[198] Student Experience Survey 2014, Department of Education and Training (2015g). The 2013 data was checked, and a similar deterioration between first and third year was observed.

**Figure 35: Average self-reported marks, bachelor degree domestic and international students, 2014**

Per cent




*Notes: Bachelor pass degree students only. Survey conducted August-October 2014. A small number of students with no reported results or missing data omitted.*
*Source: Student Experience Survey, Department of Education and Training (2015g)*

### 9.1.2 Student satisfaction with teaching

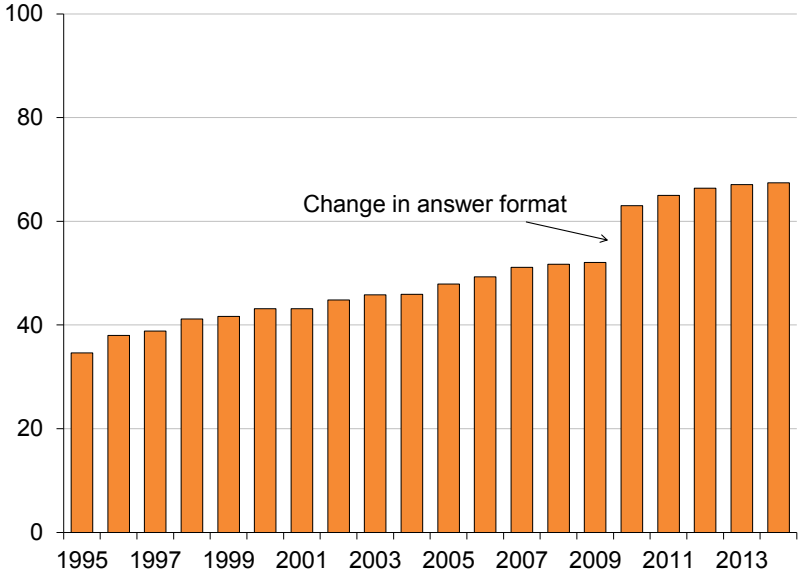
Since the early 1990s, a course experience questionnaire (CEQ) has been sent to completing students at Australian universities. Core questions cover teaching, generic skills and overall satisfaction. As the survey is conducted after the course is finished it is an overview that combines views of many different subjects. Universities have their own surveys of individual subjects.

The initial CEQ surveys revealed low levels of satisfaction with teaching. Yet by the mid-1990s a positive trend had started. In a slow but steady way, each year more completing students indicated satisfaction with elements of university teaching (defined as choosing one of the top two points on a five-point scale). The surveyed elements included the level and helpfulness of feedback, teaching staff effort and effectiveness, whether students were motivated by teaching staff, and whether teaching staff made an effort to understand difficulties students were having.

Figure 36 shows average responses to these questions from completing bachelor-degree students. Though the trend is consistently towards more satisfaction, only in 2007 was majority satisfaction achieved. Due to a survey methodology change, 2010 is hard to interpret.[199] Results continued their upward trend between 2011 and 2014.

[199] A mid-point in a five-point scale, which had previously been unlabelled, was described as 'neither agree nor disagree' with the proposition being offered (for example, 'the staff put a lot of time into commenting on my work'.) Possibly this means that satisfaction using the top two point definition was understated for previous years. However, CEQ respondents may have

**Figure 36: Average student satisfaction with teaching, 1995–2014**
Per cent




*Note: Uses the good teaching scale in the CEQ.*
*Source: GCA (1995-2015)*

Since 2012, Australia has also had a national survey of current students, now called the Student Experience Survey. Its specific questions on curriculum, teaching and assessment differ from those in the CEQ, but the surveys arrive at very similar average results, with about two-thirds of students clearly satisfied with their experience. In each survey, international students are less satisfied with teaching than are domestic students.[200] As with the CEQ, students indicate greater satisfaction with their overall educational experience (more than 80 per cent in each survey) than with its specific features.[201] The 2015 Student Experience Survey included 39 NUHEPs. Their students may not be representative of all NUHEPs, but average overall satisfaction with teaching in NUHEPS matched that of universities.[202] Teaching satisfaction results by university, NUHEP and field of education can be found at the Quality Indicators for Learning and Teaching (QIILT) website.[203]

Possible reasons for long-term improvement in student satisfaction with teaching include research into teaching methods, teacher training, better information from student surveys, linking academic promotion to teaching performance, improved technology, increased regulation of standards, occasional government financial incentives, and more market competition.[204]

Yet despite progress, a two-thirds satisfaction rate suggests that more could be done. Australian university students appear less satisfied with teaching than their American or British counterparts.[205]

interpreted 'neither agree nor disagree' as meaning 'I have no opinion', while they could have interpreted the unmarked mid-point as representing a view, such as 'middling' or 'mediocre' but not unsatisfactory.

[200] GCA (2015d), table H; Social Research Centre (2016), p 12
[201] Calculated from Social Research Centre (2016), p 32; GCA (2015d), table 4.
[202] Social Research Centre (2016), p 18
[203] www.qilt.edu.au
[204] For discussion of possible mechanisms for teaching improvement see Norton, *et al.* (2013), chapter 6; Probert (2015).
[205] Social Research Centre (2016), p 26-27

## 9.2 Employment outcomes

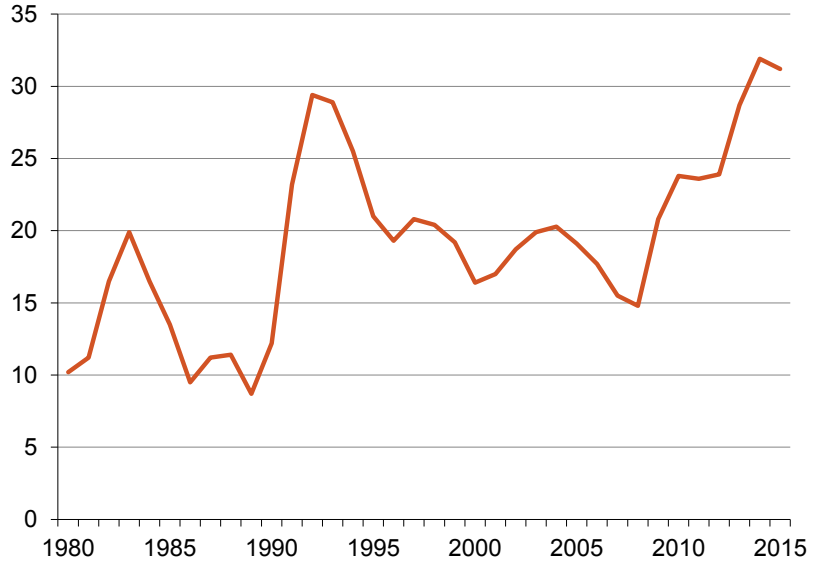
For students, employment is one indicator of the success of their higher education study. While universities help prepare their students for the labour market, broader economic trends and conditions are the main shorter-term influences on outcomes.

For most students, employment is a factor in their decision to enrol in a higher education course. For bachelor-degree students, about 85 per cent give a job-related consideration as their main reason for study.[206]

The short-term graduate labour market – at about four months after completion – has been deteriorating for some years, reaching its lowest point on record in 2014 (Figure 37). The result reflected a large cohort of new graduates, following enrolment increases under the demand driven system, entering a flat overall labour market. In early 2015, the proportion of bachelor-degree graduates looking for full-time work, including those with part-time or casual work, recovered slightly but was still more than 31 per cent. Employment outcomes vary by field of education. Chapter 10 on science, IT and engineering looks at employment in those fields.

**Figure 37: Under- and unemployment for recent graduates, 1980–2015**

Per cent




*Note: Chart shows the proportion of bachelor-degree available for full-time work who are still seeking it approximately four months after completion.*
*Source: GCA (1979-2014); (2015c)*

Employment numbers improve for graduates the longer they are in the labour market. In 2011, 24 per cent of graduates were still looking for work four months out. By 2014 this number had dropped to 11 per cent, according to the Beyond Graduation survey, taken three years after completion. Five per cent of 2011's graduates were unemployed, and another six per cent

[206] Calculated from ABS (2014).

were in part-time or casual work and looking for full-time work.[207]

Although graduate unemployment or under-employment rates decline in the months and years after course completion, all graduate surveys show that outcomes are worse than in the recent past. Employment rates are declining three years after graduation in the Beyond Graduation Survey, and for people with new postgraduate qualifications.[208]

Although graduates' employment prospects have deteriorated, in the longer run a university degree provides good insurance against unemployment (Table 10). People with diploma and certificate III/IV qualifications also have good employment outcomes.

**Table 10: Employment levels by qualification, 2015**

| | Graduate | Diploma | Cert III/IV | No qualification |
|---|---|---|---|---|
| Unemployment rate | 3.4% | 4.0% | 4.8% | 8.7% |
| Not in labour force | 16.7% | 21.5% | 20.0% | 42.2% |

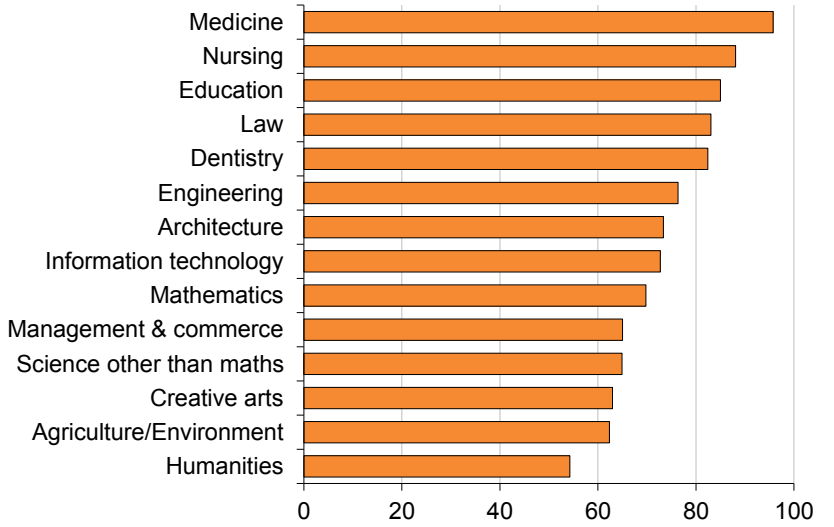
*Notes: Graduate includes bachelor degree and above. Persons aged 15-74.*
*Source: ABS (2015b), table 9*

Being able to get any job protects against very low income. But university education also promises access to jobs requiring higher levels of cognitive and, sometimes, technical skills. The Australian Bureau of Statistics (ABS) classifies most managerial and professional jobs as requiring a "level of skill commensurate with a bachelor degree or higher qualification".[209] In 2015, 71 per cent of university graduates in work had jobs classified as managerial or professional.[210] The 2011 census shows that that the proportion of graduates in these jobs varies significantly among disciplines (Figure 38). People with bachelor degrees in health fields, in education and in law all have rates of professional and managerial employment above 80 per cent. People with bachelor degrees in humanities, science, creative arts, management and commerce or agriculture all have professional or managerial employment rates below two-thirds.

It can take graduates time to find jobs matching their skills. The 2011 census shows that about 60 per cent of employed 22-year old graduates are in managerial and professional jobs, reaching 72 per cent by age 29.[211]

[207] GCA (2015b), p 2
[208] Ibid., p 4; GCA (2015a), table E1a
[209] ABS (2006)
[210] ABS (2015b), table 10
[211] Grattan analysis based on ABS (2012). Analysis was restricted to bachelor-degree graduates not currently enrolled in education.

**Figure 38: Rates of professional and managerial employment by bachelor degree, 2011**




*Note: Excludes graduates not in work and graduates currently enrolled in education.*
*Source: Grattan calculations from ABS Census 2011 using ABS (2012)*

## 9.3 Income from university education

Every study of graduate incomes finds that, on average, graduates earn more than non-graduates.[212] This is partly because graduates are more likely to have jobs, and partly because the jobs they have tend to be high-paying. Higher education itself does not necessarily cause these income differences. Universities typically select students based on prior academic achievement, which in turn reflects their intelligence, their school education, and personal characteristics such as effort and persistence. Employers tend to reward these attributes with or without higher education.[213] Cultural norms, social networks, political pressures and market forces also influence pay, independently of abilities or higher education quality.

One way to analyse higher education's financial benefits is to calculate a 'graduate premium', which tells us how much more graduates earn compared to some other group. The graduate premium can be calculated at a single point in time, or estimated over time.[214] Over a career, higher pay and labour force participation contribute to substantial earnings differences between graduates and non-graduates.

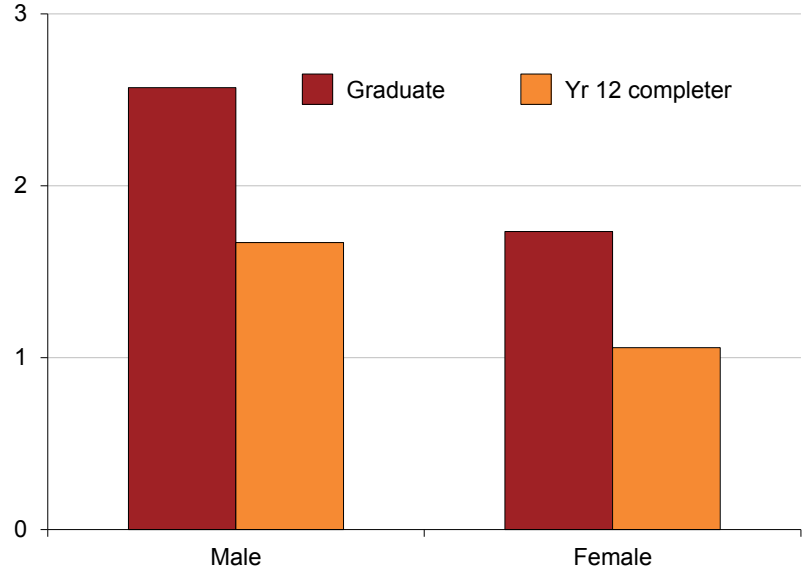
According to Grattan Institute analysis of the 2011 Australian census, the median male bachelor-degree holder has lifetime additional earnings of $1.4 million, compared to the median male who did no further education after Year 12. For women,

[212] For example Wei (2010); Daly, *et al.* (2012); Borland, *et al.* (2000); Wilkins (2016), p 48-51.
[213] See the useful discussion of ability bias in Leigh (2008).
[214] A point in time as of 2009, based on ABS (2010), was reported in Norton (2012b), p 69.

the estimated lifetime earnings premium is just under $1 million, compared to the median female who undertook no further education after Year 12.

The differences narrow if we deduct the costs of education and income tax to $900,000 for men and $700,000 for women (figure 39). Both male and female graduates increased their lifetime earnings by about $80,000 between 2006 and 2011. This analysis has no adjustment for ability other than restricting the comparison to people who finished school. It is therefore an upper estimate of the private financial benefits caused by higher education.

**Figure 39: Median net earnings of bachelor-degree graduates compared to Year 12, 2011**
$2011 million




*Notes: Lifetime earnings are calculated by 'aging' people through the census from age 18 to 65. For example, someone aged 25 at the time of the 2011 census is assumed to earn at age 30 what a 30 year old earned in 2011. Net earnings are calculated by deducting student contribution repayments, direct study costs, income tax, and the Medicare levy. No discount for ability.*
*Source: Grattan calculations based on ABS Census 2011 using ABS (2012)*

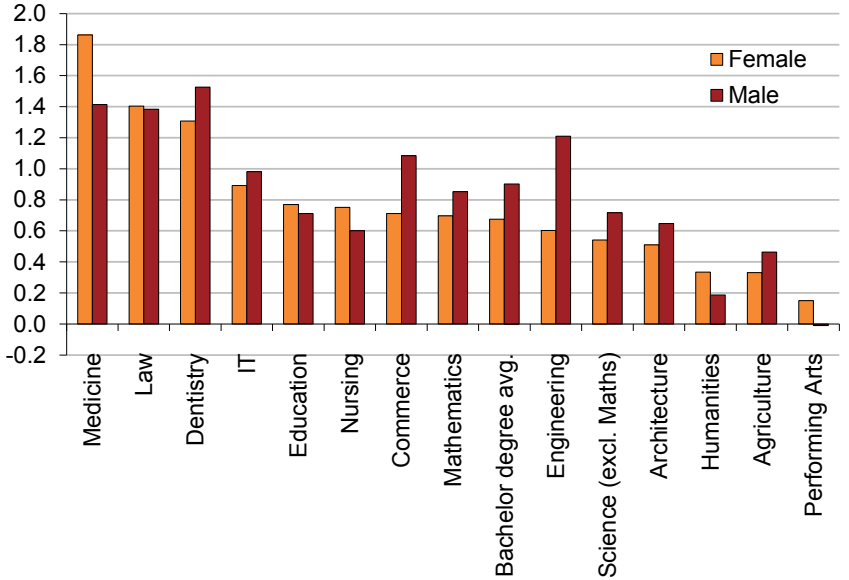
Graduate premiums differ significantly among disciplines, as Figure 40 shows. The most lucrative disciplines for both genders, after income tax and the expenses of education, are medicine, dentistry and law.

For men, engineering and commerce also provide median net earnings exceeding $1 million. For women, education and nursing degrees offer good earnings prospects relative to other qualifications, except for medicine, dentistry and law. Men with education and nursing degrees tend to earn less than other males with most other qualifications. Financially, the worst higher education option for either gender is a degree in the performing arts.

While the largest income differences are linked to gender and course studied, which university a graduate attended also has some effect. One study of starting salaries found significant differences among universities, after taking account of other factors that might influence the results.[215] Most published research groups together the former students of similar universities such as the Group of Eight or the Australian Technology Network (section 7.3.1 and appendix A).[216] This research usually find little difference in salaries or small advantages to graduates of the Group of Eight and technology universities.[217]

**Figure 40: Median graduate earnings premium compared to Year 12, by discipline, 2011**

$2011 million




*Notes: Earnings for medicine, and for male graduates in dentistry, law, engineering and management and commerce are all under-stated due to the top census income category of $2000 a week or more. Male bachelor graduates have a higher Year 12 comparison point than women.*
*Source: Grattan calculations based on ABS Census 2011 using ABS (2012)*

The 2014 edition of *Mapping Australian higher education* estimated lifetime earnings differences among university groupings. It compared graduates from Group of Eight, Innovative Research Universities (IRU) and technology

[215] Carroll, *et al.* (2014)
[216] This is because usually there are too few graduates from each university in the survey to conduct a statistical analysis of outcomes.
[217] Li and Miller (2013); Lee (2014); Birch, *et al.* (2009); Carroll and Norton (2015)

universities with the graduates of other universities.[218] After controlling for course and personal background factors, graduates of Group of Eight and technology universities earn about 6 per cent more than graduates with degrees from institutions in the other universities category. Graduates of IRU universities earn about 2 per cent more.[219]

Differences among universities may not be directly due to teaching quality. Employers may simply believe, rightly or wrongly, that graduates from some universities are better than others, and favour them in job recruitment. Some universities may provide richer social networks than others, which help the careers of their graduates. Also, the research may not fully account for non-university characteristics that affect earnings prospects.

Whatever the explanation, university attended seems less important in Australia than it is overseas. Some American studies estimate that the earnings premium for attending a prestigious private university is over 20 per cent, more than triple our Australian finding.[220] Possibly this is due to the large differences among American universities and colleges compared to Australia.[221] Here, the most prestigious universities are all public institutions. They take a large share of students compared to elite American colleges and universities, and funding differences are much smaller.

[218] Technology universities included ATN universities and Swinburne University; the Innovative Research Universities category included the University of Newcastle, which ended its IRU membership at the end of 2014.
[219] Norton and Cherastidtham (2014b), p 81-91
[220] Brewer*, et al.* (1999); Behrman*, et al.* (1996)
[221] For US system see: Brewer*, et al.* (1999); Thomas (2003); Zhang (2005); Behrman*, et al.* (1996); Hoxby (1997); Heckman (1999); Black*, et al.* (2005)

# 10. STEM degrees and work

In recent years, science, technology, engineering and mathematics education, or STEM, has been a priority for government and industry. Both are concerned that current STEM education will not produce the skills needed for the Australian economy.[222]

Perhaps responding to this emphasis on STEM skills, science enrolments surged from 2009 to 2014. Yet science bachelor degree graduates generally have worse employment outcomes than graduates in most other disciplines: fewer find full time jobs when they graduate, fewer have full time jobs three years after graduation, and fewer use what they learnt in their job.

Particularly since the mining boom ended, job vacancies for science professionals have declined. However, science graduates often continue with further study. Graduates from science research degrees have better employment outcomes, but the number of science research student places and graduate jobs is limited.

IT enrolments have also increased but much less rapidly. Despite rising demand from employers for people with IT skills, employment outcomes for IT graduates are no better than in most other disciplines. Instead, many IT jobs are filled by people with vocational qualifications and skilled migrants. University IT graduates are not well matched with workplace needs.

Engineering enrolments increased quickly during the mining boom. Despite a recent downturn, engineering graduate employment outcomes are better than for most graduates, and engineering students are more likely to use their university learning in their employment.

## 10.1 Science students and graduates

Of all the STEM fields, science enrols the largest number of students – 112,500 in 2014, 94,800 of whom are domestic students. This is a record number. Since 2009, science has also grown more than other STEM fields, adding 26,800 domestic students.[223] Of all other fields of education, both STEM and non-STEM, only health has grown at a faster rate for domestic enrolments.

Within science, biological sciences are the most popular for domestic bachelor degree students. In recent years about 45 per cent of subjects taken by students in science degrees are from the biological sciences. The next largest fields are mathematics (16 per cent) and chemistry (13-14 per cent).[224]

Additional enrolments are now flowing through to degree completions. Since 2009, the annual number of domestic students completing a science bachelor degree has increased by more than 4000, to 15,600.[225]

[222] Chubb (2013); Chief Scientist (2016); AIG (2015); Australian Computer Society (2016); PWC (2015); ALP (2007); Gillard (2008); Education Council (2015)

[223] Department of Education and Training (2016f)

[224] Department of Education and Training (2015g). This analysis is based on a classification of subjects. This approach is necessary as science enrolments are typically classified at a very general level that does not disclose the student's major field of study within science.

[225] Department of Education and Training (2016f)

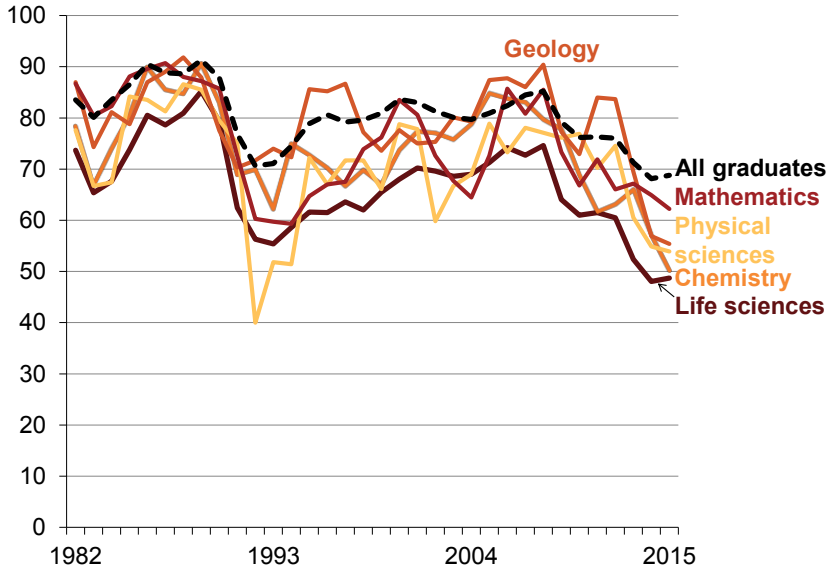
## Recent science graduate employment

About four months after finishing their courses, new graduates are surveyed about their employment. Although the graduate labour market generally has been difficult in recent years (section 9.2), this is especially the case for new science graduates looking for full-time employment (Figure 41). Only 51 per cent of the science graduates looking for full-time work had found it four months after completing their course, 17 percentage points below the national average.

Among the different fields of science, graduates from life sciences bachelor degrees – which include the largest science field, biological sciences – have the lowest full-time employment rate. In early 2015, 49 percent of the 2014 life sciences graduates looking for full-time work had found it.[226] Mathematics and chemistry graduates typically do better, but still usually experience below average full-time employment rates. Geology is also included in the sciences, and jobs were plentiful for graduate geologists during the mining boom, but their full-time employment rate has since fallen to its lowest level in 30 years.

Bachelor degree science graduates who find full-time work are less likely than other graduates to say that their qualification is matched to their job. Again, life science graduates have particularly poor outcomes, with only 53 per cent saying their qualification is a 'formal requirement' or 'important' for their job, 20 percentage points below the national average.[227]

**Figure 41: Full-time employment rates for science graduates compared to the all graduates average, 1982–2015**
Percentage of recent graduates in full-time employment




*Notes: Bachelor degree graduates only. The 'life sciences' category has been used by Graduate Careers Australia to maintain an employment time series. It largely consists of what is now described as 'biological sciences'. Of the categories now classified elsewhere, environmental studies and human movement are the largest in the survey.*
*Sources: GCA (2015e); c)*

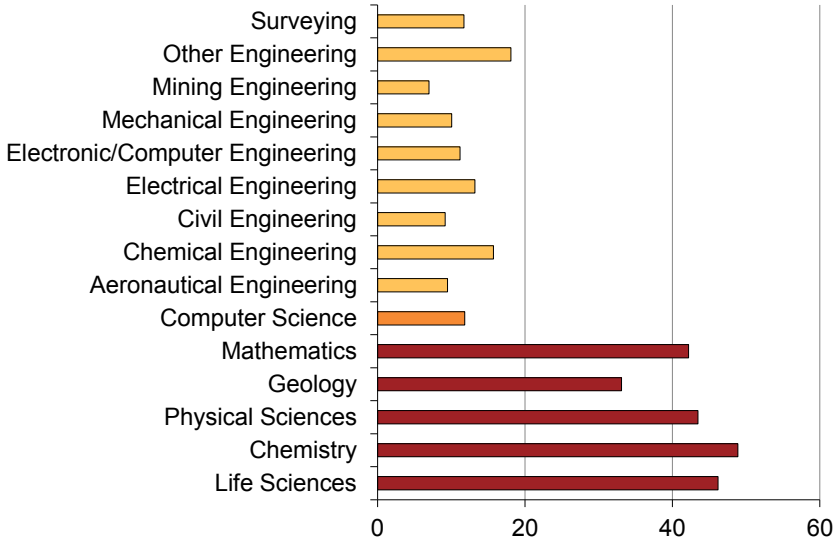
[226] An analysis of the sub-set of biological science graduates within the life science categories for 2014 showed that their employment outcomes were 6 percentage points below the life sciences as a whole, with 43 per cent of those looking for full-time work having found it: Australian Graduate Survey, Department of Education and Training (2015g)

[227] GCA (2015e), table 25

Through not having a full-time job, or not having a matched job, only a minority of bachelor-degree science job seekers utilise their science qualifications at the start of their careers. Proportions range from 25 per cent in the life sciences to 42 per cent in mathematics.

Employment statistics look only at graduates immediately seeking full-time employment, but this is less than half of all students completing science bachelor degrees. More science students continue with full-time study after completing their degree than do students in other STEM fields (Figure 42). Their further study includes bachelor honours programs, other bachelor degrees, and postgraduate study. Students using science as a pathway to medicine contributes to high rates of further study. More than a quarter of science graduates taking another bachelor degree, and 60 per cent of those pursuing masters coursework degrees, enrol in medicine.[228] Finally, a skew towards science in research funding (section 4.2) creates opportunities for postgraduate study. In 2014, almost 8000 domestic research degree students were in science – 18 per cent of the domestic research total compared to science's 11 per cent share of all domestic bachelor degree students.[229]

**Figure 42: Further study rates for people completing STEM bachelor degrees, 2014**




*Notes: The 'life sciences' category has been used by Graduate Careers Australia to maintain an employment time series. It largely consists of what is now described as 'biological sciences'. Of the categories now classified elsewhere, environmental studies and human movement are the largest in the survey.*
*Source: GCA (2015e)*

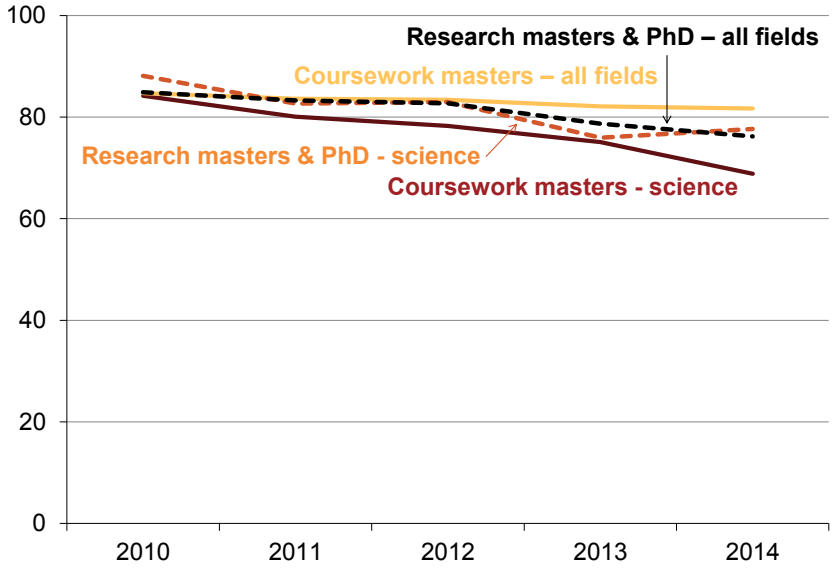
[228] Australian Graduate Survey, Department of Education and Training (2015g)
[229] Department of Education and Training (2016f)

Postgraduate study in science significantly improves job prospects. In 2014, 69 per cent of recent coursework masters graduates and 78 per cent of research masters or PhD science graduates who wanted full-time work had found it (Figure 43). A science research degree also significantly improves job matching, with 78 per cent of those in full-time work describing their qualification as a formal requirement or important to their job. For science coursework graduates, by contrast, 55 per cent reported a well-matched job, only slightly above the undergraduate rate.[230]

Although many recent science graduates struggle in the labour market, things improve over time. For 2011 bachelor degree science graduates, their full-time employment rate four months later was 65 per cent, but three years later, in 2014, 82 per cent of those who were looking for full-time work had found it.[231] While this is a considerable increase, it is below the 89 per cent rate for all graduates. Job matching rates for science graduates also slightly improve over three years. [232]

**Figure 43: Employment trends for science postgraduates, 2010–2014**

Percentage of recent graduates in full-time employment




*Note: Science includes life sciences, chemistry, physical science and geology.*
*Source: GCA (2015a) and preceding years*

## Longer-term science graduate job prospects

While recent science graduates have usually found it harder to find work than other graduates, over the longer term their job prospects improve. As with graduates generally (section 9.2), unemployment after the early transition phase from university is

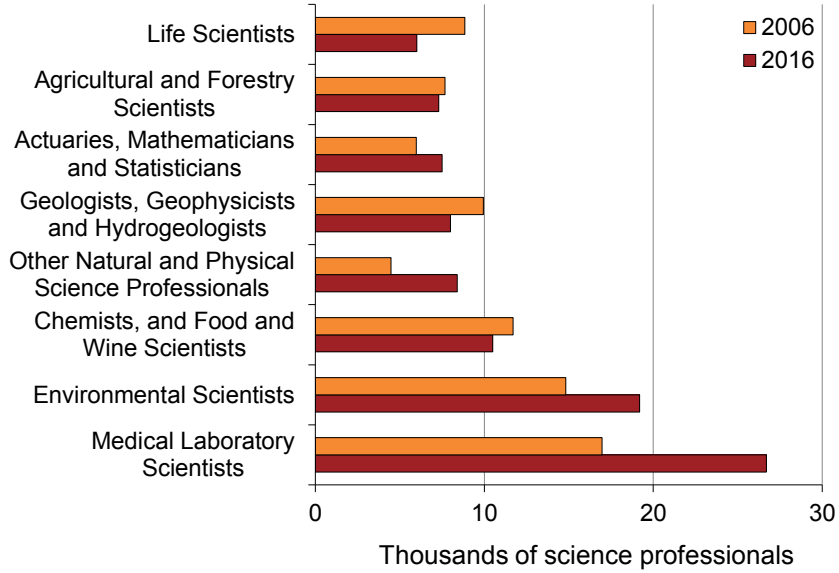
[230] GCA (2015a), calculated from table v
[231] As a proportion of all graduates looking for full-time work; GCA (2015b)
[232] Ibid., p 6

low. In 2011 unemployment was 3 per cent or less for science graduates aged 30 or older.[233]

Yet while science graduates find work, their jobs are not necessarily closely matched with their science expertise. The number of scientist positions remains small, at less than 100,000 in 2016 (Figure 44). The largest groups are medical laboratory scientists and environmental scientists. These two occupations have also grown by the largest number since 2006. Life scientist jobs have declined by a third since 2006. These are the scientist jobs most likely to be held by PhD graduates, making them less open to people with bachelor degrees.[234] In the 2011 census, 44 per cent of professionals with science degrees reported working in an occupation listed in Figure 44.[235]

Employment directly related to science expertise is unlikely to increase substantially in the near future. Monthly job vacancies for science-related positions advertised online have been continually low since 2013 (Figure 45). Before then, large numbers of monthly vacancies occurred only in occupations, such as geologists and environmental scientists, that were influenced by the mining boom. Over the last decade, relatively few open positions have been directly related to the fields studied by most science undergraduates – biological sciences, chemical sciences, and mathematics.

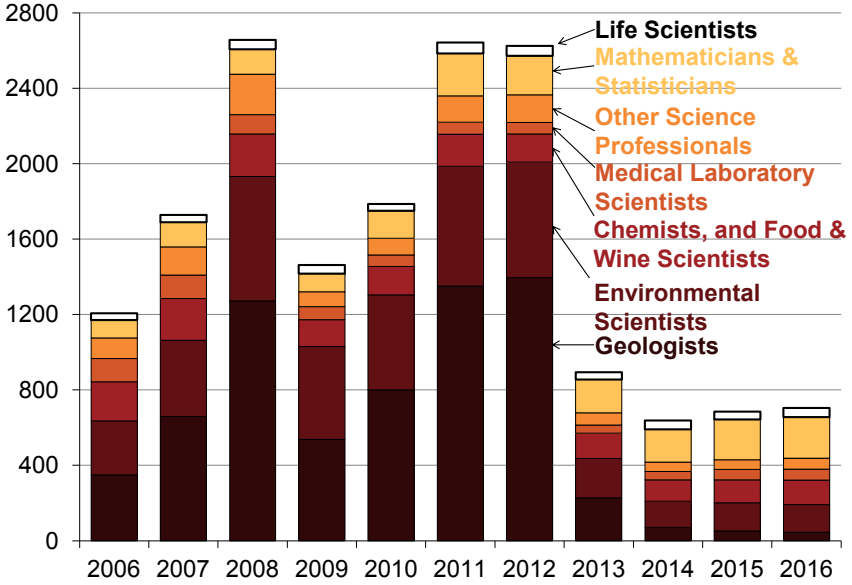
**Figure 44: Employment for science professionals, 2006/2016**




*Notes: Uses the ABS occupational category of 'natural and physical science professionals'. Analysis of census data shows that in 2011 more than half of environmental scientists had qualifications classified in the ABS 'agriculture, environmental and related studies' broad field of education rather than 'natural and physical sciences'. Actuaries are not normally trained in science faculties, but cannot be disaggregated in this data source.*
*Sources: ABS (2016d), Data Cube EQ08*

[233] ABS (2012)
[234] Calculated from ibid. In 2011, 36 per cent of life scientists had PhDs, and a further 13 per cent had masters qualifications. Less than 15 per cent of geologists and environmental scientists held PhDs in 2011.
[235] Ibid.

**Figure 45: Job vacancies for science professionals, 2006–2016**
Monthly vacancies (online job advertisements)




*Notes: Uses the ABS occupational category of 'natural and physical science professionals'. Vacancies are a count of job advertisements newly lodged each month on the SEEK, CareerOne and JobSearch sites. As these sites do not include all available jobs, the data is stronger for trends than the absolute number of vacancies. Monthly vacancies have been calculated as an annual average, except for 2006 which begins in March, and 2016 which is to the end of April. 'Geologists' includes geophysicists and hydrogeologists, 'mathematicians & statisticians' also includes actuaries. 'Other science professionals' includes agricultural and forestry scientists.*
*Source: Department of Employment (2016a)*

Primary, secondary, and tertiary education professions are another career path for people with science qualifications. In 2015, about 25,000 education professionals had a science qualification.[236] At the time of the 2011 census, 17 per cent of professionals with a science degree worked in education-related occupations.[237] School teaching opportunities for science graduates should improve as the school-age population increases and as STEM school education is promoted around Australia.[238]

University-level education work is likely to be harder to find. Science enrolment growth since 2008 has not translated into equivalent growth in the academic workforce.[239] Overall university research funding and expenditure has been flat in recent years (section 5.2.4). Any new academic jobs are likely to be dominated by people with PhD-level qualifications.

Policymakers want universities to commercialise more research. New products and services are a potential source of science graduate employment. As part of the Government's innovation agenda, incentives for university-industry collaboration will be increased from 2017 (section 5.2.4). This should reinforce trends towards applied research (section 4.2) and commercial activity flowing from university research (sections 4.3 and 8.3). But scientific and research skills are not a major on-going need for innovating businesses.[240]

[236] ABS (2016e). Due to sample size issues, this figure is a guide only.
[237] ABS (2012) . See also Office of the Chief Scientist (2016a) for more detail on where science graduates were employed at the time of the 2011 Census.
[238] Education Council (2015); Weldon (2015)
[239] Department of Education and Training (2015l) appendix 1.11 and preceding years.
[240] ABS (2015d), skills spreadsheet. The survey asks about skills used in core business activities.

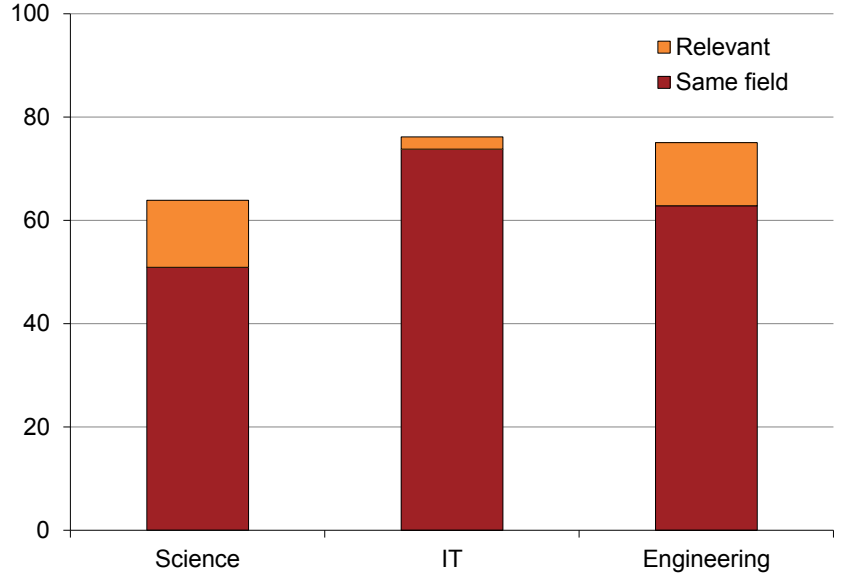
Another mining boom would lift science graduate employment. Between 2006 and 2012, the mining boom produced strong demand for environmental scientists and geologists (Figure 45). But a new boom is unlikely, unless commodity prices increase substantially. In any case, student places in geology and related fields (earth sciences) made up only 6 per cent of all science places in 2014.

Future science graduates will work in a range of occupations, as they have always done. In 2015, just over half of science graduates worked in the same field as their degree, significantly below the rates for other STEM graduates (Figure 46). Another 13 per cent of science graduates regard their degree as relevant to their work, even though it is not directly in a science field. Still, science graduates remain less likely than other STEM graduates to use their qualifications at work.

Because degrees help develop generic but high-level skills that find uses in many jobs, graduates in all fields move into occupations other than those directly linked to their original qualifications. STEM employers report that their employees with STEM qualifications are better at problem solving and critical thinking than are employees without STEM qualifications.[241] But skill under-utilisation is a problem in the graduate labour market, showing up in the proportion of graduates working in occupations that do not typically require degrees – that is, not in professional or managerial employment (section 9.2). While some graduates working as technicians or trades workers are in a matching field, only 10 per cent of all such workers have degrees.[242]

**Figure 46: Relevance of STEM degrees to current employment, 2015**

Per cent of graduates working in the same field as their degree, or saying it is highly relevant or relevant




*Notes: All bachelor degree and above qualification levels. The survey sample size was not large enough to differentiate between bachelor and postgraduate degree level by field of education.*
*Source: ABS (2016f)*

For bachelor degree graduates, skill under-utilisation is more common for science than for other STEM fields. As Figure 47 shows, 64 per cent of science graduates with bachelor degrees work in managerial or professional jobs, compared to 69 per cent of IT graduates and 73 per cent of engineering graduates. But when postgraduate qualifications are included, science and IT have the same level of managerial and professional employment.

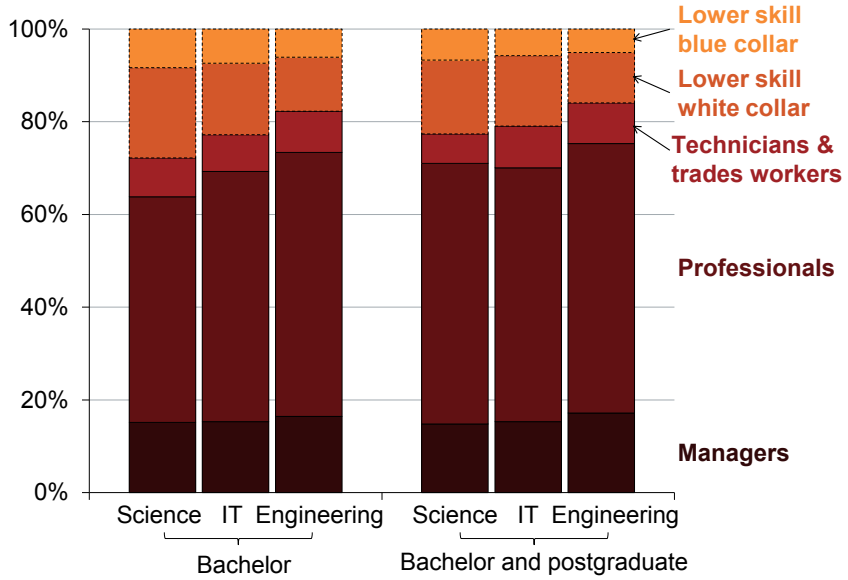
[241] Deloitte Access Economics (2014), p 25. This was of all STEM qualified employees, not science qualified employees in particular.
[242] ABS (2015b), table 10

For masters courses and above, science managerial and professional employment is high (89 per cent of workers).

Science bachelor degree graduates realise that second qualifications improve their professional employment opportunities. Their rates of further study (Figure 42) are high, and in the life sciences rose by six percentage points between 2010 and 2014.[243] But there are limits to how many science graduates can pursue postgraduate study without paying full fees. Both Commonwealth supported postgraduate science coursework and research places have capped numbers. Medical courses have caps on both Commonwealth supported and full fee places.

While most science graduates will eventually find work, their employment situation is troubling. Their low rates of full-time employment shortly after finishing their bachelor degrees suggests that the labour market was overwhelmed by the 35 per cent increase in domestic completions between 2008 and 2014.[244] The number of science enrolments, and on-going increases in applications and offers for undergraduate science courses, mean that completions will keep growing, making it hard for employment rates to improve.[245]

**Figure 47: Employed degree holders by STEM discipline and broad occupation, 2015**
Bachelor degree only and all higher education




*Notes: Lower skill blue collar workers includes the ABS occupational categories of machinery operators and labourers. Lower skill white collar workers includes the ABS categories of sales workers, clerical and administrative workers, and community and personal service workers.*
*Source: ABS (2016e)*

[243] GCA (2015e) and preceding years
[244] Department of Education and Training (2016f)
[245] Department of Education and Training (2016g), p 24

## 10.2 Information technology students and graduates

Unlike in science, there is no shortage of jobs directly related to IT relative to the number of graduates. But weaknesses in IT university education, and strong competition from a globalised IT labour force, mean that IT graduates do not easily find full-time work.

### Supply of IT graduates is low but increasing

In contrast to science, IT student numbers are not setting new records. Domestic commencing bachelor degree enrolments are recovering from a deep and prolonged decline that began in the early 2000s (Figure 48). In 2014, these enrolments reached their highest level since 2003. Applications and offers data from early 2016 suggest that the recovery is continuing.[246] Yet while trending upwards, IT has the smallest STEM applicant pool, attracting less than half the numbers of engineering, and less than a third of science.

Relatively low ATARs are also a sign of weak demand for IT courses. In 2016, only 7 per cent of IT university offers went to applicants with an ATAR above 90, compared to 28 per cent of science offers and 30 per cent of engineering offers.[247]

According to the CEO of the Australian Computer Society, "Australian students do not see ICT as an attractive course of study leading to a rewarding career."[248] School students are heavy ICT users, but when surveyed students considering future career paths often believe ICT careers to be "desk-bound" and "boring".[249]

**Box 1: IT or ICT?**

Sometimes our text refers to IT, at other times to ICT (information and communications technology). ICT reflects an industry that integrates information and communications technology. In higher education, the relevant courses are classified as 'information technology' (IT) or 'electrical and electronic engineering and technology', a sub-category of engineering. Together, they are ICT. To evaluate the performance and prospects of IT students and faculties, wherever possible the analysis is IT only. Where this is not possible, material on ICT is used. Further information on classifications is in appendix C.

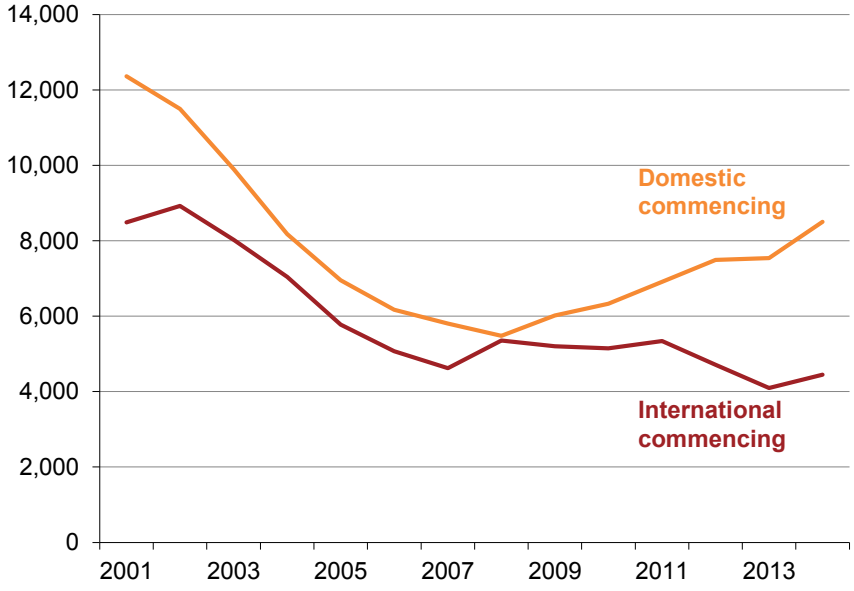
Completions for domestic IT students have risen gradually since 2010, but the annual number of graduates is still low compared to other disciplines, with 3300 domestic bachelor degree completions in 2014.[250] Attrition, which is higher for IT degrees than any other field of education, keeps completions down. Just over 63 per cent of the students who started an IT degree in 2005 had completed eight years later, compared to nearly 74 per cent for all undergraduates.[251] Attrition rates for later cohorts are improving, however.[252]

[246] Ibid., p 24
[247] Ibid., p 14
[248] AWPA (2013), p 64

[249] Macpherson (2013), p vi
[250] Department of Education and Training (2016f)
[251] Department of Education and Training (2015c)
[252] Attrition counts students that never returned after their first year, or re-enrolled then dropped out. Attrition after four years for the cohort beginning in 2005 was 30 per cent, dropping to 25 per for the cohort beginning in 2010: ibid., table 2

International students comprise a high proportion of IT enrolments compared to other STEM disciplines, but their numbers remain below those of the recent past.

**Figure 48: IT bachelor degree commencing students, 2001–2014**
Bachelor commencements




*Source: Department of Education and Training (2016f)*

## IT graduates have employment problems despite job growth

Although demand for IT courses has been weak for many years, IT is the largest STEM labour market (Figure 49), and has grown by the most over the last decade. In 2016 more than 200,000 people were employed as IT professionals. Monthly job vacancies are significantly higher for IT than for other STEM fields, although often for specific projects rather than ongoing positions.[253]

Despite job growth, the proportion of recent IT graduates in full-time employment is at its lowest since 1982.[254] In 2015, just 67 per cent of recent graduates in computer science who were looking for full-time employment had found it, slightly below the level of all graduates. In 2014, of those IT graduates who had found full-time employment, only 64 per cent were in jobs matched to their qualification.[255]

## Employer are dissatisfied with IT graduates

Employers in Australia are dissatisfied with the quality of IT graduates. Despite the many new IT graduates looking for full-time work, 53 per cent of employers looking for computer science graduates in 2014 indicated they had difficulty finding suitable staff.[256] IT graduate skills and attributes are mismatched with the labour market.

As is the case for graduates generally, interpersonal and communication shortcomings may hold IT graduates back (section 8.2.2). An analysis, using LinkedIn data, of the top skills of ICT workers moving jobs found that they included relationship management, customer service, and contract negotiation.[257] Graduates who lack these skills are at a disadvantage.[258]

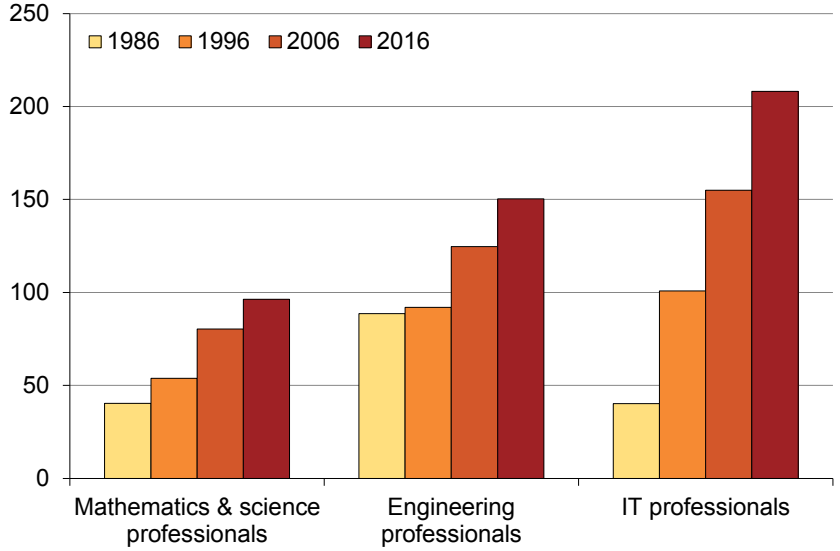
[253] Department of Employment (2016a)
[254] GCA (2015c); GCA (2015g)
[255] GCA (various years)
[256] GCA (2015f), p 6
[257] Deloitte Access Economics (2016), p 29
[258] Deloitte Access Economics (2014), p 27

IT courses are a likely further issue in graduate employability. IT industry and professional bodies suggest that university IT courses need to improve.[259] IT students express less satisfaction with their skills development than do those in any other discipline.[260] As noted, IT courses have high attrition rates.

## Domestic IT graduates face strong competition

Domestic IT graduates enter a very competitive labour market. Higher education is less essential to professional employment than in other fields. Only two-thirds of ICT professionals born in Australia have a university degree. About a quarter hold upper-level vocational qualifications, enough to enter the industry and prove themselves in the workplace. [261] Industry-based credentials that are not part of the Australian Qualifications Framework (section 1.1), such as those offered by Microsoft and Cisco, may also be a factor.

**Figure 49: Professional employment in STEM, 1986–2016**
Thousands of employed professionals




*Notes: See box 1 for our distinction between IT and ICT. The practical effect of this is that approximately 10,000 communications engineers who would normally appear in the ABS 'ICT' category have for this chart been transferred to 'engineering professionals'. See appendix C for the occupations included in each category. Annual figures are an average of monthly numbers, except for 1986 which begins in June, and 2016 which is to the end of May.*
*Sources: ABS (2016d), Data Cube EQ08*

Migration has transformed the IT labour force, affecting the opportunities of domestic graduates. In 2015 workers with qualifications from overseas made up 30 per cent of employed IT professionals, compared to 23 per cent of engineering professionals and 20 per cent of science professionals.[262] Domestic IT graduates face continued competition from skilled

[259] AIIA (2015), p 13; Australian Computer Society (2016), p 8
[260] Social Research Centre (2016), p 21. However, satisfaction was still at 76 per cent.
[261] ABS (2016e). Compared to 90 per cent of science professionals. 72 per cent of engineering professionals hold a degree, but due to professional admission requirements it is now difficult to enter the engineering profession without a university qualification: section 10.3.

[262] Ibid.

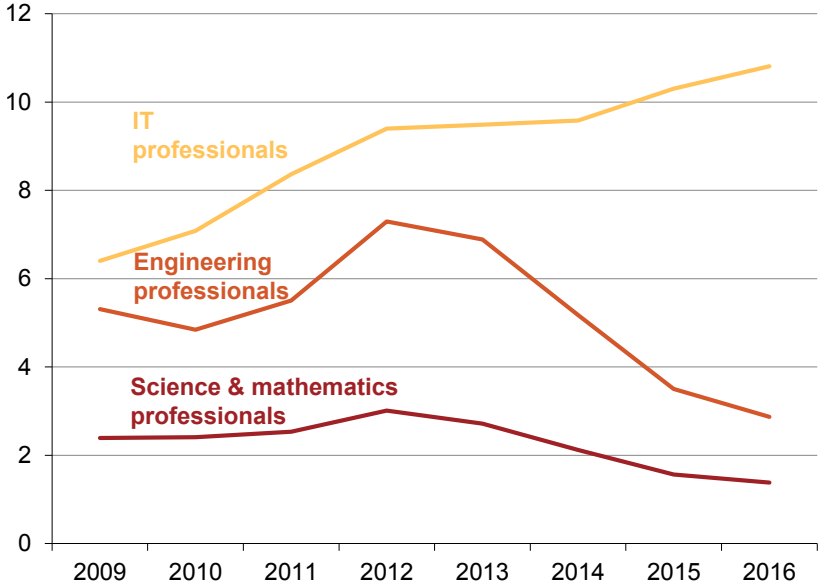
migrants.[263] A significant proportion of IT students are from overseas (Figure 48) and can stay in Australia and look for work after finishing their degrees (section 7.2.6). Australian businesses facing skills shortages can bring workers from overseas for up to four years, using subclass 457 visas. For engineering and science professions, 457 visa holders have steadily declined since 2012 (Figure 50). By contrast, the number of IT professionals on 457 visas has grown, to nearly 11,000 in 2016.

Once other visa holders and departing ICT workers are taken into account, there was a net migration into Australia of 19,600 ICT workers, including people with vocational education qualifications, in 2014-15. Employers especially need to recruit software and application programmers from overseas.[264] Net migration of ICT workers is about six times the number of completing domestic bachelor graduates.

ICT businesses and graduates also face strong competition from firms and workers overseas. Australia has been a net importer of ICT services since 2009.[265] In 2014-15 about $2.6 billion of ICT services were imported, and $2.3 billion exported.[266] Especially when the Australian dollar is high, the expense of in-house ICT services compared to cheaper alternatives overseas affects the way the ICT industry operates in Australia.[267]

**Figure 50: Temporary skilled migration (457) visas for STEM professionals, 2009–2016**

Thousands




*Note: The numbers of 457 visas have been calculated as an annual average, to smooth out monthly fluctuations. 2016 data is to 31 March.*
*Source: DIBP (2016b)*

[263] Birrell (2015), p 75. See DIBP (2016a) for a list of occupations that can be used for independent or employer-sponsored migration.
[264] Deloitte Access Economics (2016), p 24
[265] Ibid., p 22
[266] Ibid., p 90
[267] For a discussion of the global competition Australian IT services face, see Birrell (2015).

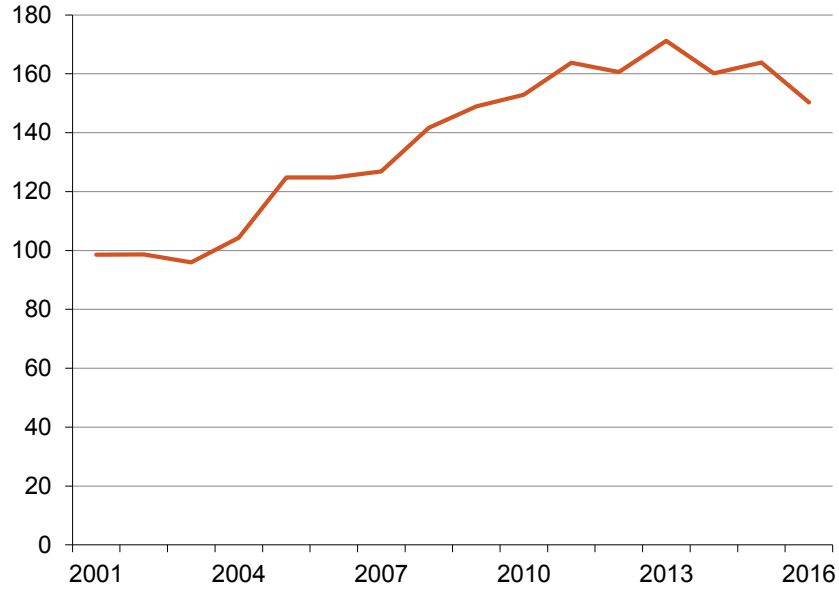
## 10.3 Engineering students and graduates

As with other STEM fields, recent engineering graduates face declining short-term job prospects. But of all the STEM fields, engineering graduates are in the best labour market position. While engineering jobs are cyclical, engineering graduates find it easier to obtain alternative high-skill work than do other STEM graduates.

### Engineering graduate outcomes are declining but still better than other fields

During the mining boom, engineering employment expanded significantly (Figure 51). Several engineering specialities experienced skills shortages.[268] In mining and civil engineering, recent graduate employment rates exceeded 90 per cent.[269] Employers also brought in workers from overseas (Figure 50). In response to labour market demand, applications for engineering courses rose each year until 2013.[270] Domestic student bachelor degree commencing student numbers grew by almost 50 per cent between 2005 and 2013.[271] Annual domestic bachelor degree completions, which had been around 6000 a year since 2001, started increasing in 2010, reaching 7400 in 2014.

**Figure 51: Professional engineering jobs, 2001–2016**
Thousands of jobs




*Note: Averaged monthly data, except for 2016 to May 2016*
*Source: ABS (2016d)*

But as the mining boom ended, the number of engineering jobs has dropped (Figure 51). With completions still increasing, the level of recent engineering graduates in full-time employment declined from its peak of 93 per cent in 2008 to 74 per cent in 2015.[272] Yet engineering graduates still find work more easily than do other STEM graduates and graduates generally. Despite the decline in professional engineering jobs in the economy, 80 per cent of engineering graduates employed full-time in 2014

[268] Department of Employment (2016b)
[269] GCA (2015e), table 5
[270] Department of Education and Training (2015n), appendix table A4.1
[271] Department of Education and Training (2016f)

[272] Weighted average from GCA (2015e); GCA (2015c)

were in jobs closely matched to their qualification, compared to 53 per cent for science and 64 per cent for IT graduates.[273]

Engineering faculties make more effort to prepare students for work than do IT or science faculties. Engineers Australia, which controls entry to the engineering profession, requires graduates to undertake some form of professional experience or work placement.[274] Universities offer work integrated learning (WIL) opportunities to meet this requirement, sometimes with course credit attached. As a result, engineering students are more likely to undertake a professional placement than are students from other STEM disciplines.[275] Despite this, engineering students are less likely than other STEM students to say that their course has developed their work-related knowledge and skills.[276] Not all engineering WIL placements are of high quality.[277]

The future employability of engineering graduates should be protected by graduate numbers responding to labour market conditions. Applications for engineering courses have declined, as have offers of places made to prospective students.[278] As this translates into fewer enrolments and completions in future years, engineering graduates will face less competition in the labour market.

[273] GCA (2015e)
[274] Edwards, *et al.* (2015), p 14
[275] Ibid., p 56
[276] Student Experience Survey, 2013 and 2014: Department of Education and Training (2015g).
[277] Edwards, *et al.* (2015), p 57-59
[278] Department of Education and Training (2015n); Department of Education and Training (2016g)

### Long-term engineering graduate employability

The number of engineering jobs is not likely to increase significantly in the next few years. In early 2016, engineering construction activity was well below its peak in 2012 and trending down. The value of new work for the private sector was also declining.[279] Future spending on public infrastructure and other public sector projects may, however, be an important source of employment for engineers in the coming years.[280]

While engineering jobs move with the economic cycle, people with engineering qualifications remain more likely to be in high-skill managerial or professional employment than do other STEM graduates (Figure 47). Census data from 2011 show that engineering bachelor degree holders are more likely to be working as managers than as engineers by their 40s, suggesting that their skills transfer to other occupations.[281]

## 10.4 Conclusion

In engineering, Australia's higher education system has performed reasonably well. Demand for and supply of engineering places respond to labour market conditions, although the time taken to complete degrees inevitably means

[279] ABS (2016a)
[280] Engineers Australia (2015), p 4
[281] Calculated from ABS (2012). The true proportion of people who studied engineering who are in other occupations is higher due to postgraduate business qualifications. In ABS (2016f) an estimated 35 per cent of the 65,100 people reporting a bachelor degree in engineering as their second highest qualification had a postgraduate business qualification. Due to sample size issues, this figure is a guide only. By contrast, employed persons with IT bachelor degrees in their 40s are more than twice as likely to be ICT professionals as managers (ABS (2012).

periodic under- or over-supply of graduates. Despite fluctuating demand for engineering professionals, engineering graduates find high-skill jobs more easily than do other STEM graduates.

In IT, universities are not supplying the graduates needed by a fast-moving industry. Although IT has the largest labour market of any of the STEM fields, many graduates struggle to compete in a global market for IT staff and services. This may help explain why domestic enrolments have never fully recovered from a crash 15 years ago.

In science, the labour market is over-supplied with coursework graduates. The number of science graduates is higher than for engineering or IT, but the number of jobs that directly use discipline expertise is lower for science than for engineering or IT. Science graduates are pushed into a general labour market in which they must compete with graduates from other fields.

Universities could do more to prepare their students for the labour market – something they accept in STEM, and generally.[282] But in science at least, fewer students would ease competition in the limited market for bachelor-level science graduates. Ideally, more of the science students who would already prefer another course could take it instead.

Applications data for people who accepted a science offer shows that two-thirds of higher preferences were for health courses, about 40 per cent of which were for medicine.[283] The demand driven system has – with the exception of medicine, which is excluded – led to increased places in health courses (Figure 30 and Figure 5 on page 23). But demand for health courses still exceeds supply, and science faculties take students who miss out.

Some science students succeed on a second, graduate entry, attempt to study health (section 10.1). Others pursue postgraduate science or bachelor degrees in other fields to improve their job prospects. But these are inefficiencies in Australia's higher education system. Additional education is costly for students, and for the taxpayers who support it through subsidies and loans.

[282] Office of the Chief Scientist (2016b); ACDS (2016); Universities Australia & others (2016); Edwards*, et al.* (2015)
[283] Tertiary admissions centre data only: Department of Education and Training (2015g). The analysis counts all preferences above the accepted preference, so the same person could have multiple health preferences.

# Glossary

| | |
|---|---|
| ABS | Australian Bureau of Statistics |
| ACER | Australian Council for Educational Research |
| ACPET | Australian Council for Private Education and Training |
| Applied research | Research undertaken primarily to acquire new knowledge with a specific application in view. |
| AQF | Australian Qualifications Framework |
| ANZSCO | Australian and New Zealand Standard Classification of Occupations |
| ARC | Australian Research Council |
| ARWU | Academic Ranking of World Universities |
| ASCED | Australian Standard Classification of Education |
| ATAR | Australian Tertiary Admission Rank |
| ATN | Australian Technology Network |
| ATO | Australian Taxation Office |
| CGS | Commonwealth Grant Scheme |
| Commonwealth contribution | The Federal Government's tuition subsidy |
| COPHE | Council of Private Higher Education |
| Coursework | Courses that do not have a major research component |
| CPI | Consumer Price Index |
| DIPB | Department of Immigration and Border Protection |
| Doubtful debt | HELP debt not expected to be repaid |
| EFTSL | Equivalent full-time student load |
| ERA | Excellence in Research for Australia |
| Experimental development research | Research using existing knowledge gained from research or practical experience, which is directed to producing new materials, products, devices, policies, behaviours or outlooks. |
| FEE-HELP | HELP for full-fee students |
| FTE | Full-time equivalent |
| GCA | Graduate Careers Australia |
| Group of Eight | Coalition of Australia's 'sandstone' universities |
| HECS | Higher Education Contribution Scheme |

| | |
|---|---|
| HECS-HELP | HELP for Commonwealth-supported students |
| HELP | Higher Education Loan Program |
| HEP | Higher Education Provider |
| HILDA | Household, Income and Labour Dynamics in Australia Survey |
| ICT | Information and communications technology |
| IRU | Innovative Research Universities |
| IT | Information technology |
| Load | Subjects taken, expressed in full-time student units. |
| NHMRC | National Health and Medical Research Council |
| NUHEP | Non-university higher education provider |
| OS-HELP | HELP to finance overseas study |
| OUA | Open Universities Australia |
| Pathway college | Institution specialising in diploma level courses aimed at facilitating entry to university courses. |
| Place | A student place is equivalent to the study load of a full-time student |
| Pure basic research | Research to acquire new knowledge without looking for long term benefits other than advancing knowledge. |
| RUN | Regional Universities Network |
| SA-HELP | HELP for the student amenities fee |
| SES | Socio-economic status |
| STEM | Science, technology, engineering and mathematics |
| Strategic basic research | Research in specified areas in the expectation of practical discoveries. |
| Student contribution | The amount paid by a student in a Commonwealth-supported place |
| TAFE | Technical and further education |
| TEQSA | Tertiary Education Quality and Standards Agency |

# Appendix A – Higher education providers offering HELP loans

| Universities | | NUHEPs offering FEE-HELP |
|---|---|---|
| **Group of Eight** | **Regional Universities Network** | Academy of Design Australia |
| Australian National University^ | Central Queensland University* | Academy of Information Technology |
| Monash University^ | Southern Cross University* | Academy of Music and Performing Arts |
| The University of Adelaide^ | Federation University Australia* | Adelaide Central School of Art |
| The University of New South Wales^ | The University of New England | Adelaide College of Divinity |
| The University of Melbourne^ | University of Southern Queensland* | Alphacrucis College° |
| The University of Sydney^ | University of the Sunshine Coast | Australasian College of Health and Wellness |
| The University of Queensland^ | | Australian College of Applied Psychology |
| The University of Western Australia | **Other universities** | Australian College of Physical Education |
| | | Australian College of Theology ° |
| **Australian Technology Network of Universities** | Australian Catholic University* | Australian Film, Television and Radio School° |
| Curtin University of Technology | Charles Sturt University* | Australian Guild of Music Education |
| Queensland University of Technology* | Bond University | Australian Institute of Business |
| RMIT University* | Deakin University^ | Australian Institute of Management (NSW, SA, TAS, VIC) |
| University of South Australia* | Edith Cowan University* | Australian Institute of Professional Counsellors |
| University of Technology, Sydney* | Macquarie University^ | Australian Institute of Professional Education |
| | Swinburne University of Technology*^ | Australian School of Management |
| **Innovative Research Universities** | The University of Newcastle^ | Avondale College of Higher Education° |
| Charles Darwin University* | Torrens University Australia | Batchelor Institute of Indigenous Education° |
| Flinders University | University of Canberra* | Blue Mountains International Hotel Management School |
| Griffith University^ | University of Divinity | Box Hill Institute |
| James Cook University^ | University of Notre Dame, Australia | Cairnmillar Institute |
| La Trobe University^ | University of Tasmania^ | Campion College |
| Murdoch University | University of Wollongong | Canberra Institute of Technology |
| | Victoria University* | Chisholm Institute |
| | Western Sydney University* | Christian Heritage College |
| | | Collarts |
| | **Overseas universities** | Curtin College |
| | Carnegie Mellon University | Deakin College |
| | University College London± | Eastern College Australia |
| | | Endeavour College of Natural Health |

| NUHEPs offering FEE-HELP (continued) | | |
|---|---|---|
| Excelsia College | Macleay College | Stott's Colleges |
| Eynesbury College | Marcus Oldham College | Study Group Australia |
| Gestalt Therapy Brisbane | Melbourne Institute of Technology | Sydney College of Divinity |
| Griffith College | Melbourne Polytechnic | Sydney Institute of Business and Technology |
| Group Colleges Australia | Monash College | Tabor College ( SA, TAS, WA) |
| Harvest Bible College | Moore College° | TAFE NSW |
| Holmes Institute | Morling College | TAFE Queensland |
| Holmesglen Institute | Nan Tien Institute | TAFE SA |
| International College of Hotel Management | National Art School | The Australian Institute of Music |
| International College of Management Sydney | National Institute of Dramatic Art° | The College of Law° |
| Investment Banking Institute Business School | North Metropolitan TAFE | The MIECAT Institute |
| Jazz Music Institute | Paramount College of Natural Medicine | Think Education |
| JMC Academy | Perth Bible College | TOP Education Institute |
| John Paul II Institute for Marriage and Family | Perth Institute of Business and Technology | UOW College |
| Kaplan Business School | Photography Studies College | UTS:INSEARCH |
| Kaplan Professional Education | Raffles College of Design and Commerce | Victorian Institute of Technology |
| Kent Institute | S P Jain School of Global Management | Whitehouse Institute |
| La Trobe Melbourne | SAE Australia | William Angliss Institute |
| Le Cordon Bleu Australia | South Australian Institute of Business and Technology | |
| Leo Cussen Centre for Law | South Metropolitan TAFE | |

*Note: Trading names used.*
*Source: Department of Education and Training (2016e); TEQSA (2016b)*

* Established or given university status as a result of the John Dawkins education reforms
^ Amalgamated with other providers during the John Dawkins education reforms
° Self-accrediting NUHEP
± University College London has announced its intention to leave Australia.
University name changes: Charles Darwin University was the Northern Territory University until 2004. Federation University Australia was the University of Ballarat until 2014. Western Sydney University was the University of Western Sydney until 2016. The University of the Sunshine Coast was established in 1998.
University groups: The Australian Technology Network (ATN) universities teach 227,000 students and emphasise research in collaboration with industry.
The Innovative Research Universities of Australia (IRU) teach 163,000 students. It is mostly comprised of research universities founded in the 1960s and 1970s.
The Group of Eight teaches 359,000 students. Its members are the most research-intensive universities in Australia.
The six members of the Regional Universities Network (RUN) teach 112,000 students.

# Appendix B – Higher education providers not offering HELP loans

| NUHEPs not offering FEE-HELP | | |
|---|---|---|
| Academies Australasia Polytechnic | IKON Institute | Ozford Institute of Higher Education |
| ACER Institute | Institute for Emotionally Focused Therapy | Polytechnic Institute Australia |
| Adelaide College of Ministries | Institute of Chartered Accountants in Australia | Sarino Russo Institute |
| Asia Pacific International College | Institute of Health and Management | Sheridan College |
| Australian College of Nursing | Institute of Internal Auditors | Sydney Institute of Traditional Chinese Medicine |
| Australian Institute of Higher Education | International Institute of Business and Technology | The Australasian College of Dermatologists |
| Australian Institute of Police Management | King's Own Institute | The Tax Institute |
| Bureau of Meteorology Training Centre | Kollel Academy of Advanced Jewish Education | Turning Point Alcohol & Drug Centre |
| Cambridge International College | Mayfield Education | Wentworth Institute |
| Centre for Pavement Engineering Education | Montessori Institute | |
| Elite Education Institute | Newcastle International College | |
| Engineering Institute of Technology | NSW Institute of Psychiatry | |
| Governance Institute of Australia | OASES Graduate School | |

*Note: Trading names used.*
*Sources: Department of Education and Training (2016e); TEQSA (2016b)*

# Appendix C – STEM categories

**Table 11: STEM professional occupations requiring a degree – 4 digit ANZSCO code**

| *Science & Mathematics Professionals* | *Information Technology Professionals* | *Engineering Professionals* |
|---|---|---|
| Actuaries, Mathematicians and Statisticians | ICT Business and Systems Analysts | Surveyors and Spatial Scientists |
| Agricultural and Forestry Scientists[284] | Multimedia Specialists and Web Developers | Chemical and Materials Engineers |
| Chemists, and Food and Wine Scientists | Software and Applications Programmers | Civil Engineering Professionals |
| Environmental Scientists | Database and Systems Administrators, and ICT Security Specialists | Electrical Engineers |
| Geologists and Geophysicists | Computer Network Professionals | Electronics Engineers |
| Life Scientists | ICT Support and Test Engineers | Industrial, Mechanical and Production Engineers |
| Medical Laboratory Scientists | | Mining Engineers |
| Other Natural and Physical Science Professionals | | Other Engineering Professionals |
| | | Telecommunications Engineering Professionals[285] |

*Source: ABS (2006)*

[284] The majority of agricultural and forestry scientists have degrees in environmental science in the ASCED classification, which is part of 'Agricultural, environmental and related studies' rather than 'natural and physical sciences': ABS (2012).
[285] 'Telecommunications Engineering Professionals' are grouped as an ICT profession in the ANZSCO classification system but have been reclassified in this report as an engineering profession because most workers in this profession have engineering rather than IT qualifications.

**Table 12: STEM fields of education, ASCED**

| Natural & Physical Sciences | Information Technology | Engineering |
|---|---|---|
| Mathematical Sciences | Computer Science | Manufacturing Engineering & Technology |
| Physics & Astronomy | Information Systems | Mining Engineering |
| Chemical Sciences | Other Information Technology | Chemical Engineering |
| Earth Sciences (includes geology & geophysics) | | Mechanical & Industrial Engineering & Technology |
| Biological Sciences | | Civil Engineering |
| Medical Science | | Geomatic Engineering (includes surveying) |
| Other Natural & Physical Sciences | | Electronic & Computer Engineering[286] |
| | | Electrical Engineering |
| | | Maritime Engineering & Technology |
| | | Other Engineering & Related Technologies |
| | | Automotive Engineering & Technology |
| | | Aerospace Engineering & Technology |

*Source: ABS (2001)*

[286] In 2011 over 80 per cent of 'Computer Engineering' bachelor degree holders were working in IT professions: ABS (2012)

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ABS (2008) *Australian historical population statistics, Cat. 3105.0.65.001*, Australian Bureau of Statistics

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