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The demand for tertiary education in Australia

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This paper looks at the domestic demand for tertiary education (that is, excluding overseas students). It argues that the concept is problematic because of the dominant role of the government in provision, and discusses the factors that impinge on it: fees, returns to study and demographics. It shows how student demand has been changing and looks at likely trends in coming years. While much has been made of the impact of ageing, in fact other factors will be more important in determining the level of student demand.

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The demand for tertiary education in Australia[1]

The genesis of this paper was an invitation to speak at the higher education summit organised by the *Australian Financial Review* on the topic of (domestic) higher education student demand. I was pleased to accept but, as is a speaker's prerogative, I immediately broadened the topic to cover all of tertiary education; that is, both higher education and vocational education and training (VET).[2] This reflects a personal view that in Australia the two sectors are treated to a large extent as if they operate on different planets, but they shouldn't be. They are inextricably linked, with the two sectors competing for students, while being also complementary.

In covering the topic, I was interested in a number of aspects. The first is the perennial issue of unmet demand (are governments providing sufficient student places?) and the factors that drive demand. The second is descriptive: what has been happening to student demand over the last decade or so? Finally, the outlook: can we expect student demand to continue to increase or are we getting to the point where the market is saturated? Will the imminent ageing of the population have an impact on student demand, given that the biggest inflow of students comes from the school leaver population?

Before getting on to these issues, it is necessary to think about what we mean by student demand, and the factors that affect it.

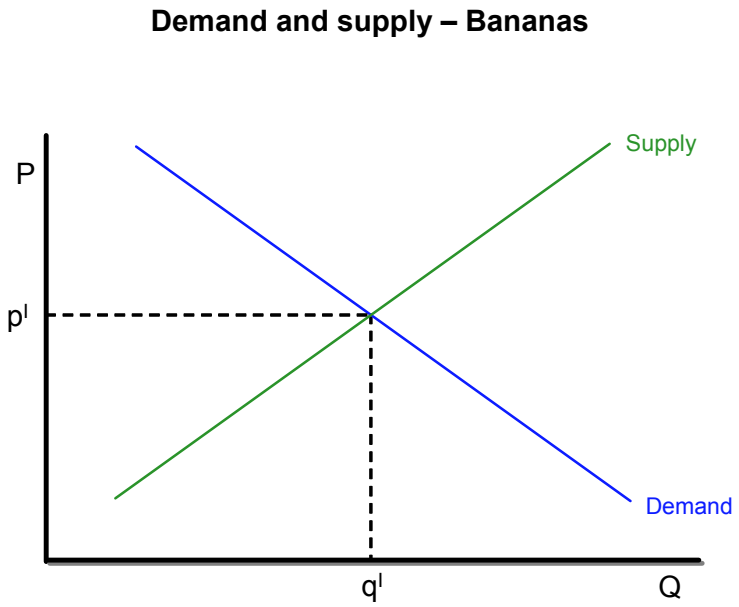
The market for tertiary education is not straightforward. Unlike the market for bananas, it is not a simple matter of the market price adjusting to equalise supply and demand. Hence, we cannot observe the level of student demand by looking at the number of students at the going market price.

In order to make sense of the concept of demand, some theoretical analysis is needed (with apologies for those who have done microeconomics 101). To assist, consider a simple market, say the market for bananas (figure 1). The two variables are the price and the quantity. The demand curve shows the quantity that consumers are prepared to buy at a given price. If the price is high, the demand is low. Similarly, the (long run) supply curve shows the quantity that farmers are prepared to grow and sell at a given price. It is a long-run curve because it takes time for banana plantations to become productive. So in the figure the equilibrium point is where the price is $\$p^1$ per kilo.

1 I wish to acknowledge the assistance of a number of colleagues at the National Centre for Vocational Education Research (NCVER), particularly Suellen Priest who prepared the tables and graphs and undertook the shift-share analysis.

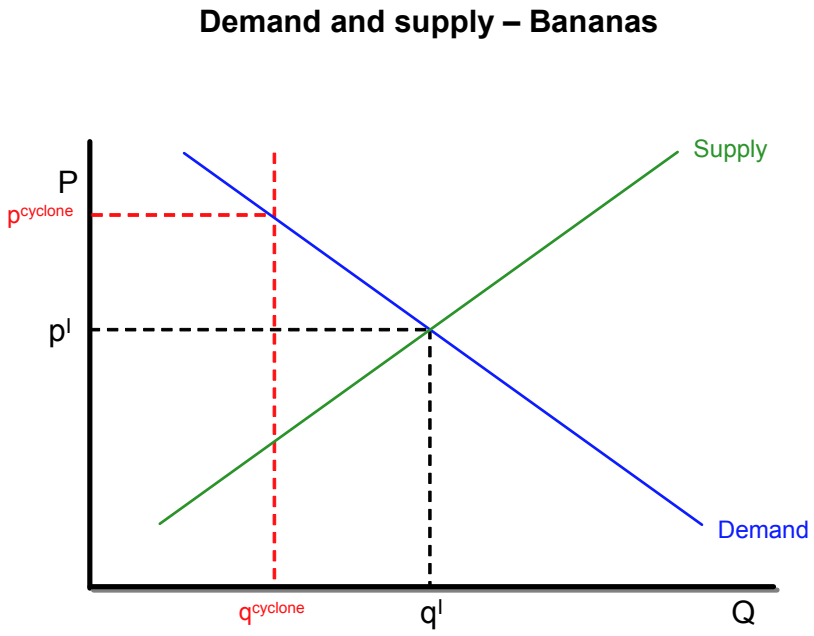
2 By tertiary education, we mean post-school education, covering both higher education (undergraduates and postgraduate qualifications) and vocational education (certificate I to advanced diploma). This paper is concerned with domestic demand and excludes, where possible, overseas students.

Figure 1 Demand and supply: Bananas



Now consider what happened after the 2006 cyclone (figure 2). The immediate supply of bananas was slashed and the price went through the roof. At the new equilibrium there is no unmet demand, in the sense that you could always buy bananas if you were prepared to pay the price. It should also be noted that the reduction in the number of bananas sold did not imply that the demand for bananas had fallen. This would have only occurred if there had been a drop in the number sold at a given price.

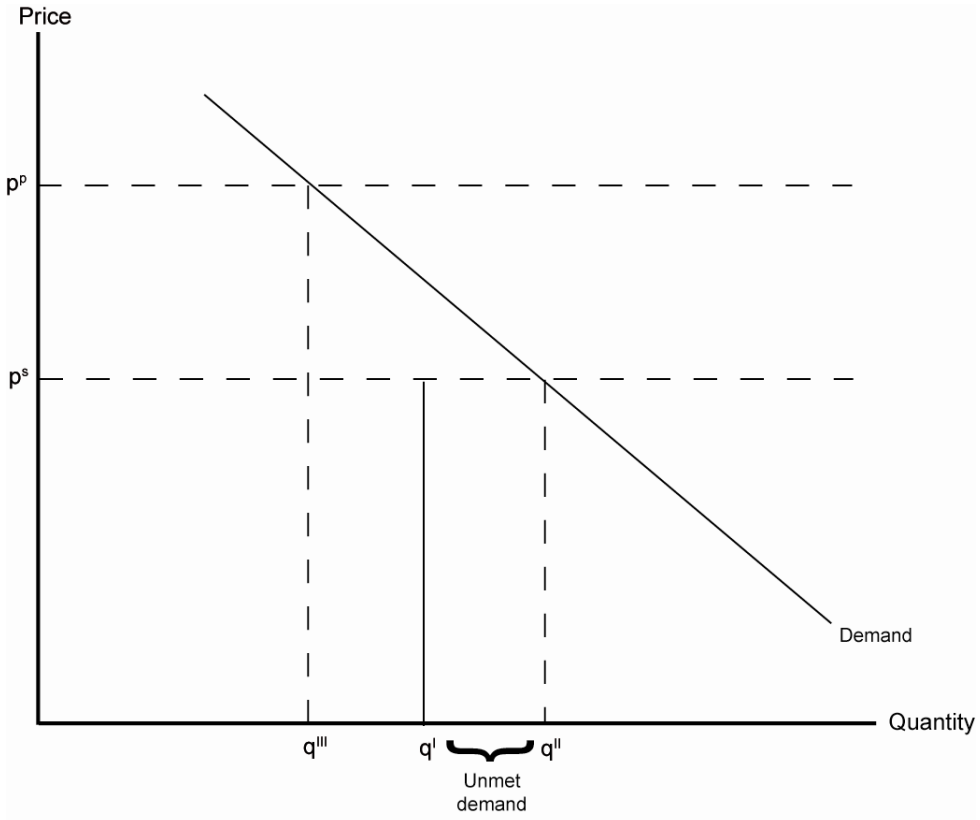
Figure 2 Demand and supply: Bananas



Turning to student demand, we characterise the market for education pretty much the same as for bananas, but with one major difference. This difference is that the government subsidises education, at least for the places it funds. On top of this is the supply of fee-for-service places.

First, consider only government supply. In figure 3, we label q^{I} as the number of places provided by the government at a price to students of p^{s} (the amount going to the provider p^{p} is different—it is equal to the price to students plus the government subsidy). At the price of p^{s} there is unmet demand, and so places are rationed. In this diagram, if the subsidy were removed, then the price to students would go up to p^{p} (if the providers wished to retain the previous level of resources per student) and the quantity demanded would reduce to q^{III}. That would put an end to any unmet demand and, in fact, the number of places demanded would fall to under the number provided by the government.

Figure 3 Demand and supply: Students, no full-fee places



Notes: p^{s} = price paid by student
p^{p} = resources received by provider
qI = government-subsidised places

The main point of this analysis is that the notion of demand and unmet demand is problematic. Only if the price to students is kept artificially low is the concept of unmet demand meaningful. Otherwise, unmet demand can be removed by increasing the price to students. In a fully competitive market, there would be no unmet demand.

In recent years the picture has become even more complicated with the introduction of full-fee paying students. As can be seen from figures 4a and 4b, the introduction of a market supply curve building on top of government-funded places can result in fee-paying students in excess of the level of unmet demand (and paying a lower price than students pay for government-funded

places) or in fee-paying students paying a higher price than students pay for government-funded places (and leaving some unmet demand).[3]

Figure 4a Demand and supply: Students, allowing for full-fee places

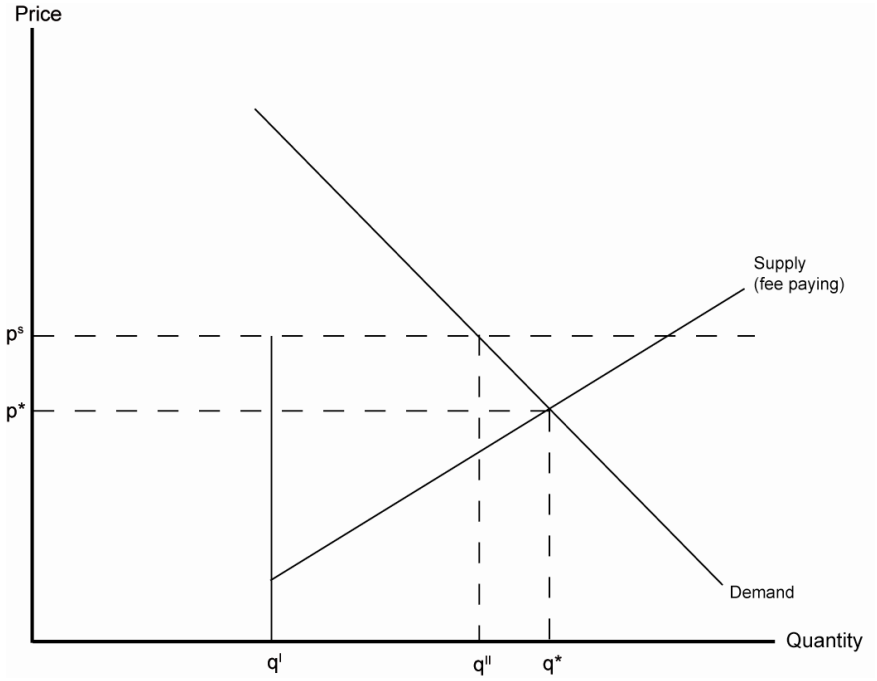
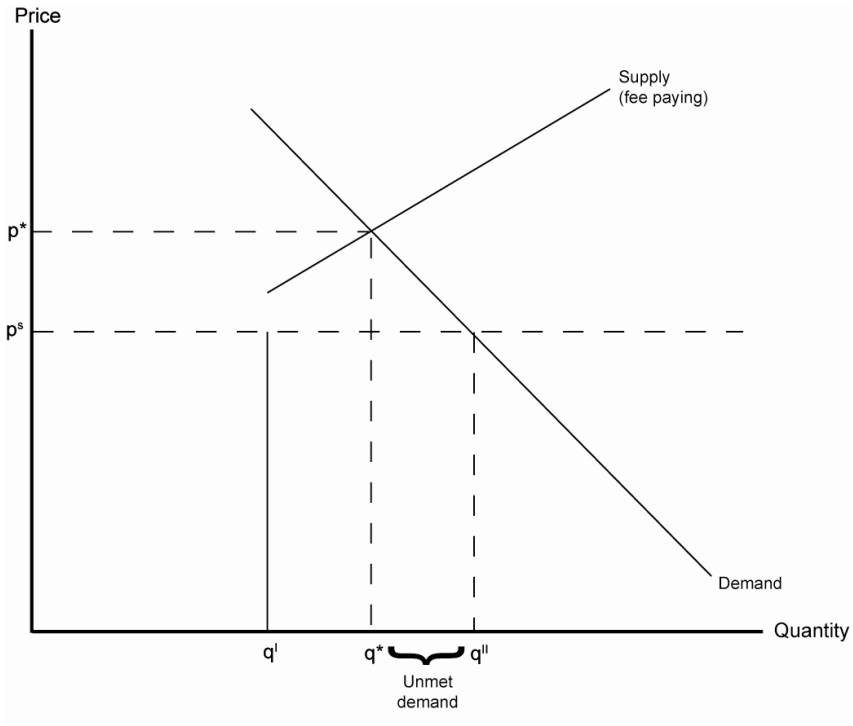


Figure 4b Demand and supply: Students, allowing for full-fee places



Notes: p^s = price paid by student for a government-subsidised place
p^* = fees for a full-fee place
q^I = government-subsidised places

[3] Government places are denoted by q^I. In the absence of full-fee places, unmet demand is (q^{II}- q^I). With full-fee places, the total number of places increases to q^*, which gets rid of unmet demand (figure 4a) or reduces it (figure 4b).

Enough of theory. In the remainder of the paper we first spend a little time on thinking about the determinants of demand. The second section provides data on unmet demand. We then look at the current level of demand, focusing on both numbers and participation rates. In section 3, we look at how student numbers have grown over the last ten years or so, disaggregating the numbers by qualification level. The main point to make is that the demand for tertiary education has grown very significantly in the last decade, but the growth has been very uneven across qualification levels. In section 3 we discuss the demographics and map out their implications for demand. In section 4 we move to the outlook for student demand, and especially the implications of an ageing population for that demand. We end with some broad conclusions.

What drives student demand?

Education is both a consumer item and an investment. Those who enjoy the education process will not be concerned with outcomes so much, but will be affected by the cost. However, the majority of students balance the expected gains with the cost. The gains from education are well documented: in general, education leads to greater employment levels and better jobs. For example, in table 1 the relationship between qualification and wages is quite clear.

Table 1 Employed persons aged 15–64 years by level of highest non-school qualification and current average weekly wage, 2001

	Full-time workers' current average weekly wages ($)
Postgraduate degree	1219.8
Graduate diploma & graduate certificate	1063.9
Bachelor degree	999.3
Advanced diploma or diploma	907.9
Certificate III or IV	798.0
Certificate I or II or certificate nfd	698.0
Level not known	847.7
No qualification – Year 12	724.5
No qualification – less than Year 12 or did not go to school	681.4

Note: nfd = no further defined
Source: Derived from the Australian Bureau of Statistics (ABS) Survey of Education and Training Experience, 2001

The research in this area also supports the obvious: that expected future earnings impact on education decisions. For example, Johnson (2002) finds that (using British data) expected lifetime earnings have a significant impact on educational choice. The situation is no different in China, with students' expected rate of return to higher education having a significant effect on intention to pursue higher education (Hung et al. 2000). The costs to education are less tangible and poorly measured. They include not only the direct cost of fees but also the indirect costs of foregone earnings, not to mention the emotional and intellectual effort that needs to be put into study.

Foregone earnings are rather difficult to estimate because they depend on whether the study is full-time or part-time, the relative value of leisure and work, and on the state of the labour market (the opportunity[4] cost of studying tends to be lower when job prospects are poor).

However, we do have some data on direct tuition fees.

[4] Opportunity cost refers to what is foregone, so the opportunity cost of studying includes foregone leisure and foregone employment.

University fees have fluctuated over time. Before the Whitlam Government abolished fees, students either paid fees (which did not equate to the full cost of the courses) or had a Commonwealth scholarship. For a period over most of the 1970s tuition fees were abolished but there were general service fees and later an administration fee (Higher Education Administration Charge [HEAC]). The Higher Education Contribution Scheme (HECS) was introduced in the late 1980s, with differential charges across fields of study. These were increased in the mid-1990s, and in 2005 universities were allowed to increase them by up to 25%. Around the same time universities were allowed to charge full fees on top of the government-subsidised places.[5]

Table 2 provides some data on fee levels.

Table 2 Current higher education fee levels

Student contribution band	Students commencing on or after 1 January 2005)	Pre-2005 HECS students who began their course on or after 1 January 1997)	Student contribution range (pre-2005 HECS students who began their course before 1 January 1997)
Band 3 (law, dentistry, medicine, veterinary science)	$8,333	$6,665	$3,001
Band 2 (accounting, administration, economics, commerce, mathematics, statistics, computing, built environment, health, engineering, science, surveying, agriculture)	$7,118	$5,694	$3,001
Band 1 (humanities, behavioural science, social studies, foreign languages, visual and performing arts)	$4,996	$3,998	$3,001
National priorities (education, nursing)	$3,998	$3,998	$3,001

Note: HECS = Higher Education Contribution Scheme
Source: Department of Education, Science and Training (2007)

The situation in VET is somewhat different and rather more idiosyncratic. Students in receipt of a government-funded place have to pay fees for all courses, with certain exceptions for the financially disadvantaged. Fees vary quite significantly across states (see Watson 2003). To make comparison with higher education more meaningful, we calculate the fees for a full-time, full-year student, based on the rates provided by Watson; these fees must be treated as notional rather than as the actual fees paid by students.

Table 3 Tuition fees at VET (full-time, full-year), 2003

NSW	$710 (diploma)	$260 (other)
Vic.	$500	
Qld	$715	
SA	$1,200	
WA	$883	
Tas.	$900	

Source: Watson (2003)

[5] This discussion relates to undergraduate courses. The treatment of postgraduate courses was a little different, with fee-paying places (in addition to HECS places) introduced somewhat earlier. It is also worth noting the FEE-HELP was introduced in 2005, allowing students access to income-contingent loans for full fees.

While common sense tells us that the level of fees must affect student demand, the sensitivity of demand to fees is unclear, and the political debate on this issue is somewhat ambivalent. One of the problems here goes back to the nature of the market. If both quantities and prices are fixed, then the level of student demand cannot really be determined from student numbers. Essentially we observe the supply of places rather than the demand, and so evidence tends to be indirect.

The *Campus Review* of 16 January 2007 carried the headline: 'Increasing HECS has little impact: Chapman'. The article refers to findings of Chapman et al. (2007) that the Higher Education Contribution Scheme has not changed demand for university places among school leavers; that the impact of the increase in the scheme may be more significant for mature-age students who are more likely to be earning above the repayment threshold; that the difference in the Higher Education Contribution Scheme levels has little impact on subject choice; and that participation has not fallen among students from any socioeconomic group since the introduction of the scheme in 1988.

These findings echo my own work. In Karmel (1995) I argued that the abolition of university fees had made little difference to the socioeconomic composition of the university student workforce, and later my colleagues and I (Aungles et al. 2002) found that the increase in the levels of the Higher Education Contribution Scheme had some impact on older students, and perhaps some impact on the number of low socioeconomic males in expensive courses (but the numbers were very small).

On the other hand, we see quite strong statements at a political level. For example, Labor has announced a proposal to 'slash the cost of maths and science degrees' in order to meet a shortfall of teachers of those subjects. The response reported from the federal Education Minister Julie Bishop was that the plan would neither attract more students to maths and science nor produce more teachers of the subjects.

The international literature tends to suggest that the level of fees matters (as it must), but is not very helpful in determining by how much. Pennel and West (2005) argue that financial issues constrain the choices of lower-income university students in England. Similarly, Bennett (2004) notes financial pressures as affecting the decision on whether to go to university. Interestingly, both of these papers point to the importance of income support rather than the level of fees as such. Canadian research (Quirke & Davies 2002) found that the representation of students from low socioeconomic backgrounds fell substantially during a decade of rising fees.

So the conclusion from the literature is that fees, income support and social background will affect student demand, but it is difficult to pin down the exact relationships. The importance of fees, income support and social background also brings home the point that student demand will always depend upon government policy settings. Even if we had a competitive market with no government intervention, it could still be argued that it would not give us a true reading of student demand. This is because of imperfect capital markets, meaning that students cannot mortgage their bodies or souls in order to finance their education. Or putting it another way, the level of student demand in an untrammelled market would be less than the economically optimal level.

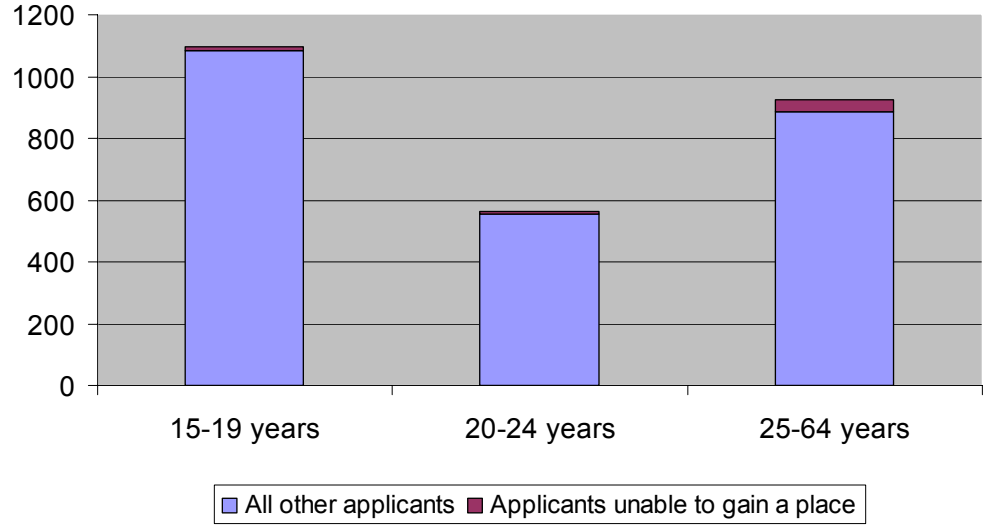
What about unmet demand?

When it comes down to it we are forced to measure demand by looking at the number of students. This is less than desirable but a reality imposed by the availability of data. However, we can get some idea of the size of unmet demand using data from a number of sources: the Australian Bureau of Statistics (ABS) Survey of Education and Work and the Australian Vice-Chancellors' Committee data from the admission centres and university cut-off scores.

First, the ABS Survey of Education and Work: the ABS provides data on people who had applied to enrol in a course and whether they were able or unable to gain a place. This enables us to calculate a simple measure of unmet demand: the proportion who applied and were unable to gain a place. This is a pretty rough figure because we do not know whether the prospective student had the necessary prerequisites or not. Nevertheless, it gives a good indicator of the tightness of the student market.

Figure 5 plots this indicator for three age groups: people aged 15–19 years; those aged 20–24 years; and those aged 25–64 years. On the face of it, unmet demand is pretty low, especially for the younger age groups.

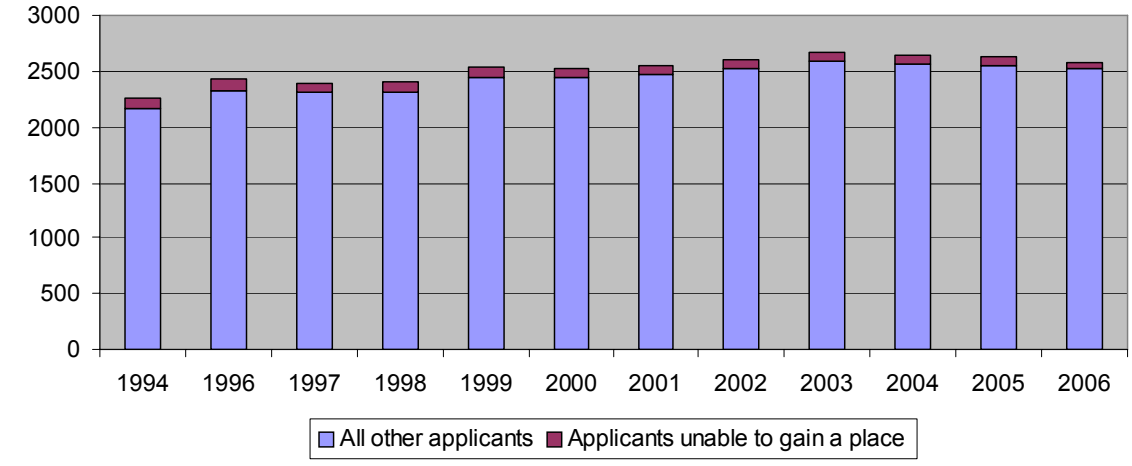
Figure 5 Unsuccessful applicants as a proportion of all applicants ('000), 2006



Source: ABS (2006)

The ABS survey has been running for a number of years. Figure 6 provides a time series, from which it can be concluded that unmet demand is low relative to earlier years. No doubt the strong labour market is relevant here, with good job prospects increasing the opportunity cost of study.

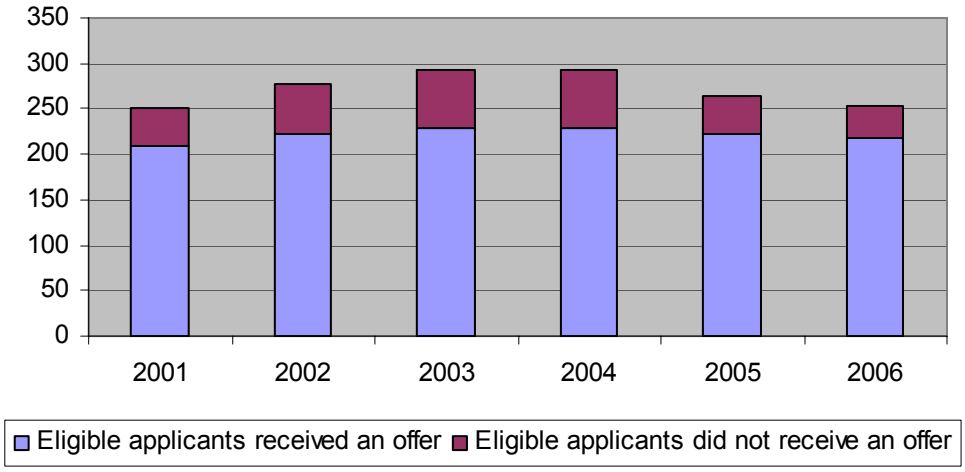
Figure 6 Unsuccessful applicants as a proportion of all applicants ('000), 1994–2006



Source: ABS (1994–97, 1998–2006)

The above is the only data source that covers both higher education and VET. However, we can supplement this with data for the higher education sector from the Australian Vice-Chancellors' Committee. Based on data from the tertiary admissions centres, the Australian Vice-Chancellors' Committee derives an estimate of the number of eligible applicants, with the adjustments to the raw data intended to remove the effects of multiple applications, applications with only one or two preferences (the intent of such students can be questioned), and rejection of offers. While the methodology has a degree of arbitrariness, the data give a good idea of trends and scale. In figure 7, the data are shown for a number of years. The data support the earlier conclusion that unmet demand is currently at a low level.

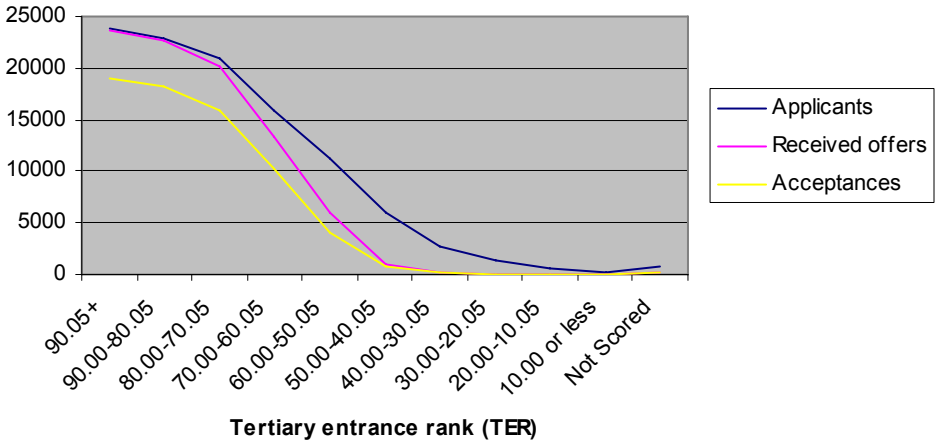
Figure 7 Higher education applications and offers ('000), 2001–06



Source: Australian Vice-Chancellors' Committee 2001–04, time series tables of the Survey of Applicants for Undergraduate Places; Australian Vice-Chancellors' Committee (2005–06)

The Australian Vice-Chancellors' Committee also provides an interesting chart (figure 8) in which applications, offers and acceptances are shown against academic achievement. The academic achievement essentially divides the school leaver cohort into deciles of academic achievement.

Figure 8 Higher education applications, offers and acceptances by tertiary entrance score, 2006



Source: Australian-Vice Chancellors' Committee (2006, appendix table 5)

Based on this figure, it is safe to conclude that there is no real unmet demand among students with high tertiary education scores.[6,7] Only when we get below the top 30% of the cohort do we begin to see students who did not receive a university offer.

How large is student demand?

While acknowledging that the concept is problematic, we have little choice but to focus on student numbers data. However, rather than simply present the total number of students, we cut the data in a number of ways. First, it makes sense to look at the numbers for individual age groups, acknowledging the obvious point that the participation is higher for younger than older people. We also consider males and females separately, to make the point that females dominate higher education. In addition, we look at the data by qualification level and by educational sector; after all, demand for a vocational certificate I is rather different from demand for undergraduate or research postgraduate education. Of course demand also varies by field of education, but that dimension is beyond the scope of this paper. Finally, we present the data using four concepts:

- a student number measure (figure 9)
- a full-time student load measure, in which part-time students or students who study for only part of the year are counted proportionately[8] (figure 10)
- a participation measure, expressing the number of students as a proportion of the relevant population (figure 11)
- a weighted participation measure in which we calculate participation based on the full-time measure load[9] (figure 12).

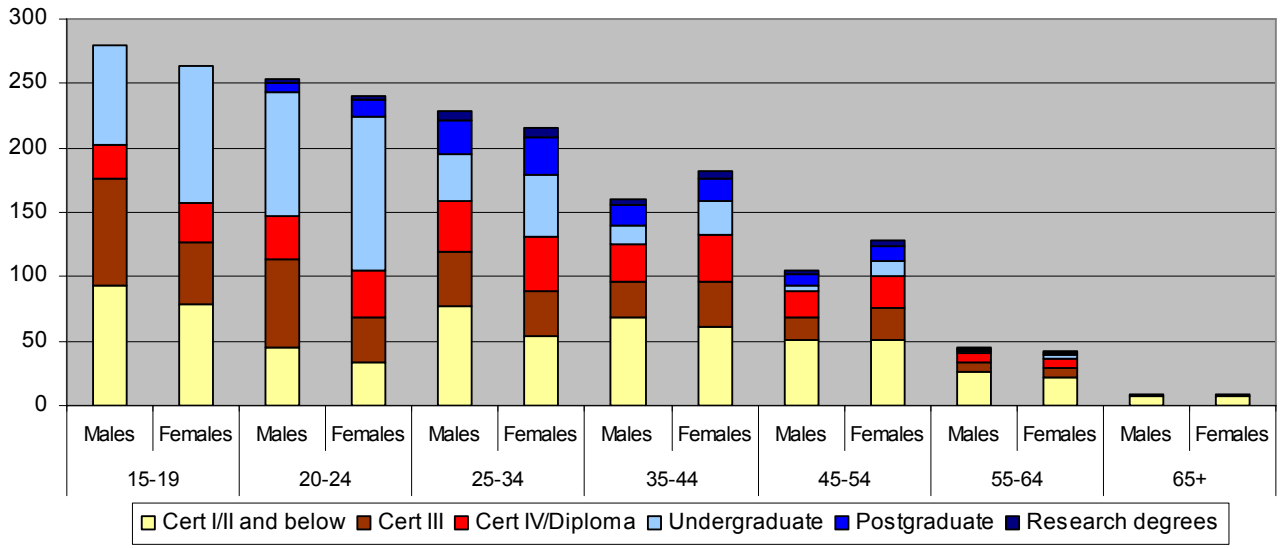
6 The TER (tertiary education rank) is notionally designed to reflect the academic achievement rank of the whole school leaver cohort. A TER of 70+ indicates that the student is among the top 30% of the cohort.

7 This is not to say that there is not unmet demand for some courses at some institutions. Indeed, TER is used as a 'pseudo' price for rationing places in high demand courses.

8 The units are full-time equivalents.

9 Full-time equivalents divided by the population.

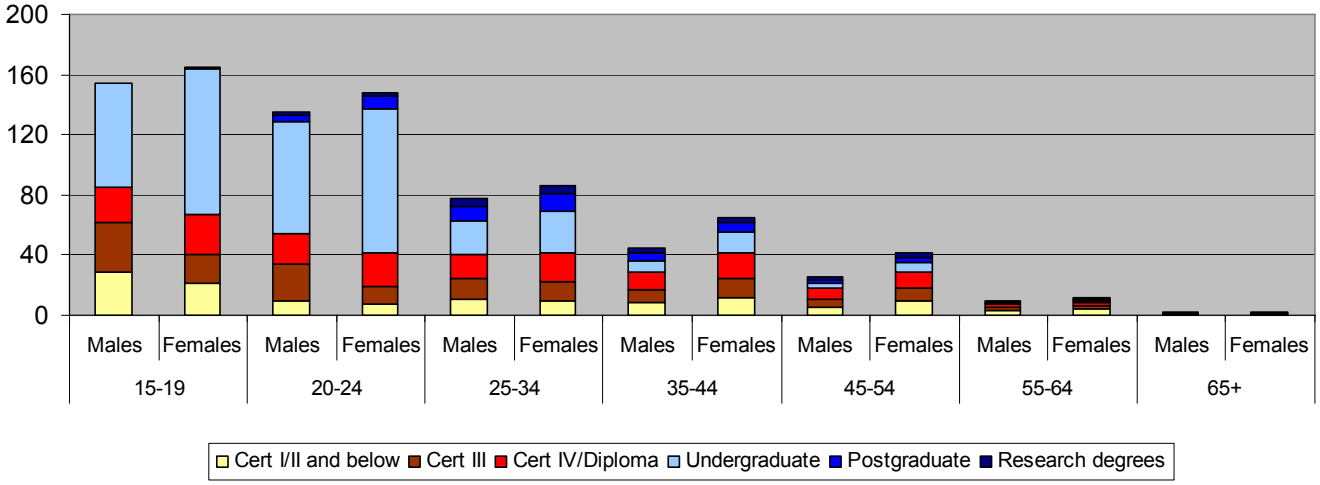
Figure 9 Domestic tertiary student numbers by age and sex, Australia, 2005 ('000)



Note: Certificate I/II and below includes 'other VET qualification'.

Source: Department of Education, Science and Training, Students: Selected higher education statistics, 2005; NCVER National VET Provider Collection, 2005

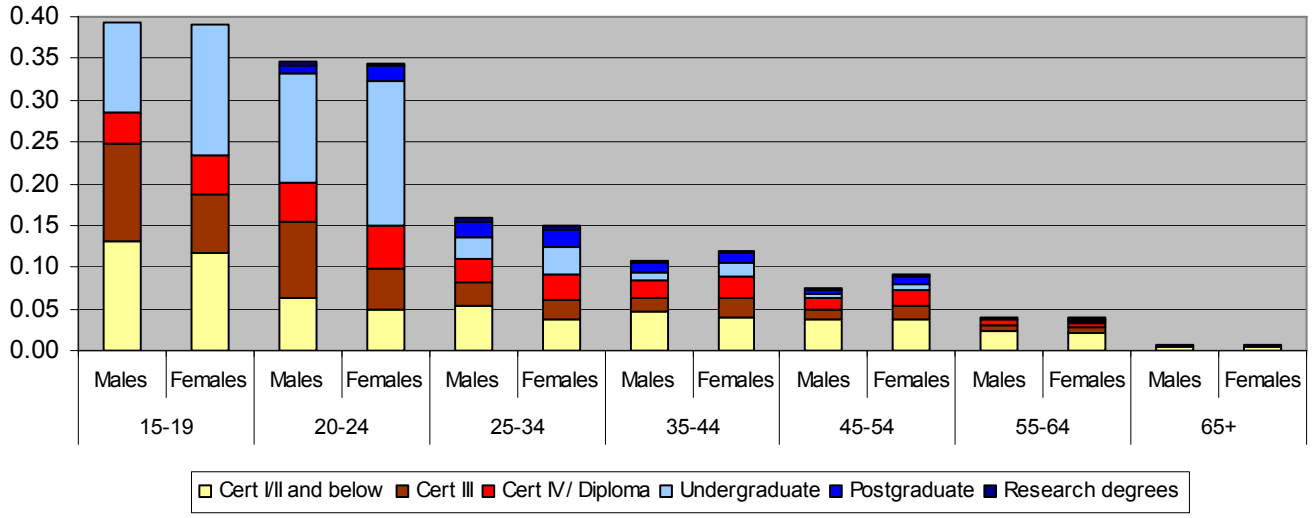
Figure 10 Domestic tertiary student load by age and sex, Australia, 2005 ('000 full-time, full-year equivalents)



Note: Certificate I/II and below includes 'other VET qualification'.

Source: Department of Education, Science and Training, Students: Selected higher education statistics, 2005; derived from NCVER National VET Provider Collection, 2005

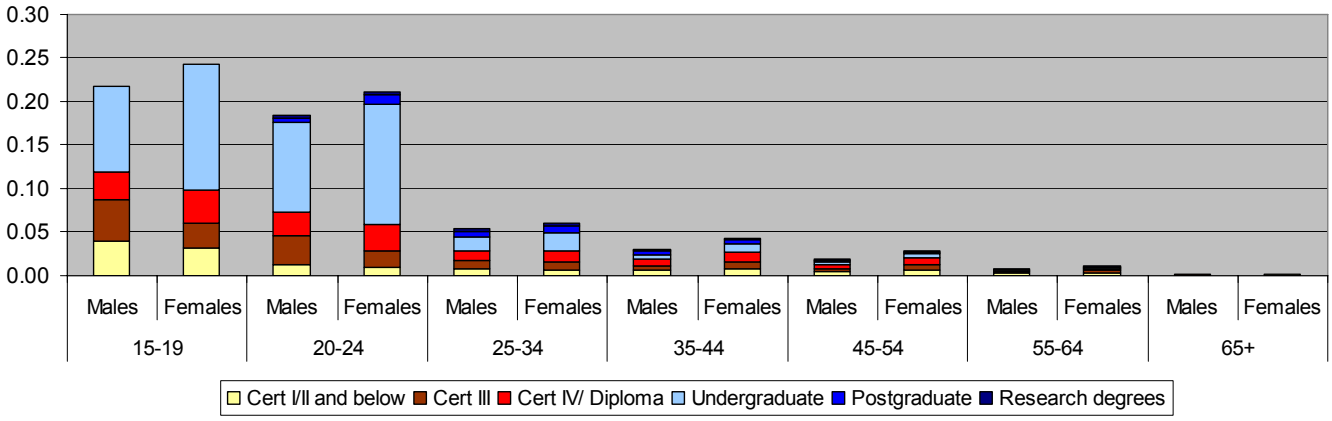
Figure 11 Domestic tertiary participation rates by age and sex, Australia, 2005 (%)



Note: Certificate I/II and below includes 'other VET qualification'.

Source: ABS (2005a); Department of Education, Science and Training, Students: Selected higher education statistics, 2005; NCVER National VET Provider Collection, 2005

Figure 12 Domestic tertiary full-time load participation rates by age and sex, Australia, 2005 (%)



Note: Certificate I/II and below includes 'other VET qualification'.

Source: ABS (2005a); Department of Education, Science and Training, Students: Selected higher education statistics, 2005; derived from NCVER National VET Provider Collection, 2005

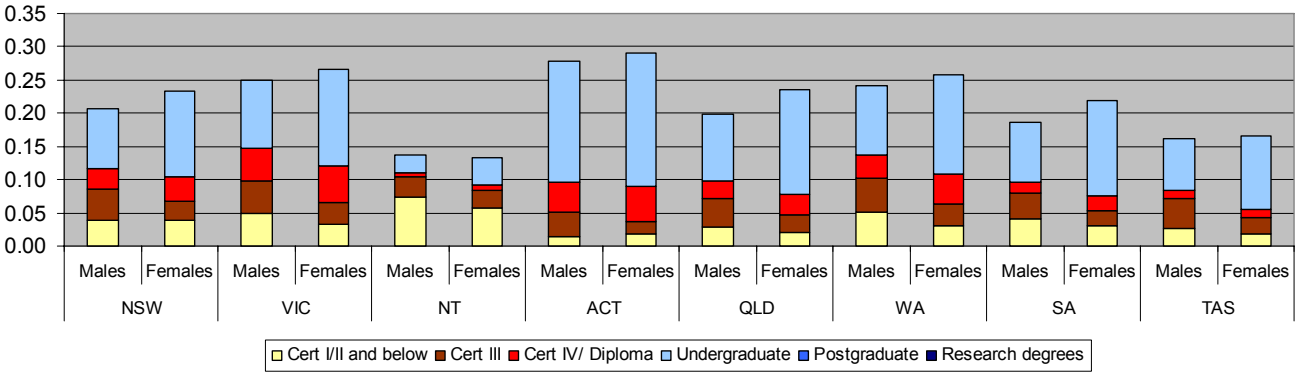
From a resourcing point of view the student load measures are the relevant ones. It is only really worth considering the student number measures if you are interested in the number of people involved.

A couple of comments are worth making here. As one would expect, student numbers are weighted toward young people. However, this is more pronounced for higher education than for vocational education and training. The relationship between numbers and full-time equivalents also varies between the two sectors. Part-time study is more common in VET and also many of the VET courses are relatively short. This means that there are more VET students than higher education students, but the student load is higher for higher education than for VET. In addition,

the bias towards the young is more apparent in the student load data than in the student numbers data. This is because most older students are studying part-time.

The above figures refer to Australia as a whole. We find considerable variation in participation rates across the states, as can be seen from figure 13.

Figure 13 Domestic tertiary full-time load participation rates by state/territory and sex, 15 to 19-year-olds, 2005 (%)



Note: Certificate I/II and below includes 'other VET qualification'.
Source: ABS (2005a); Department of Education, Science and Training, Students: Selected higher education statistics, 2005; NCVER National VET Provider Collection, 2005

Of the states, Victoria has relatively high participation, and Northern Territory and Tasmania relatively low. This reflects all sorts of factors, including history, industrial base and demographic shifts.

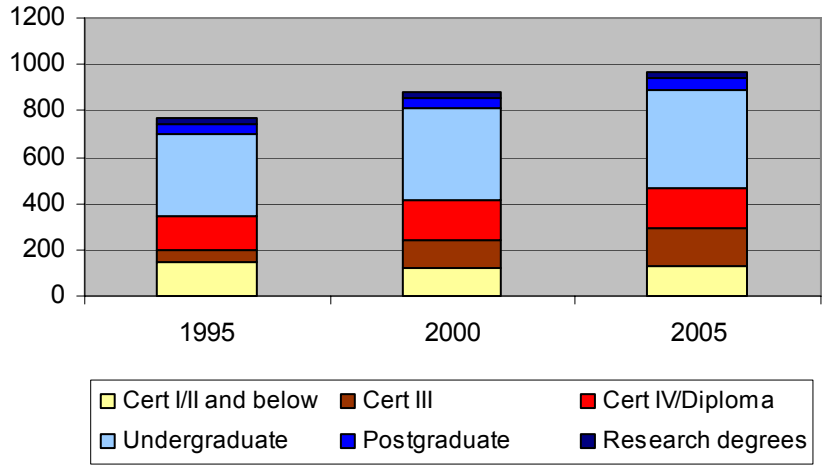
How has student demand changed?

Here we consider how student demand has changed over the last ten years or so. We attempt to go a little further than just how the numbers have changed. We focus on four dimensions, making use of a simple shift-share decomposition (appendix A). The shift-share formula decomposes the overall change in student load into four effects:

- *the study duration effect*: changes in student load that can be attributed to changes in the load undertaken by a student. This captures changes in course duration and changes in the proportions of students who complete courses
- *the age participation effect*: changes in student load that can be attributed to changes in the proportion of an age group undertaking a course
- *the demographic share effect*: changes in student load that can be attributed to changes in the proportion of the population in various age groups. Everything else being equal, a decrease in the proportion of young people in the population will reduce overall student demand
- *the population effect*: changes in student load that are in line with the overall population growth rate.

However, before we get too complicated, we present the raw student load (figure 14). We focus on student load because that is the basis of funding.

Figure 14 Domestic student load ('000), Australia, 1995–2005



Notes: Certificate I/II and below includes 'other VET qualification'.

Source: Department of Education, Science and Training, Students: Selected higher education statistics, 1995, 1990, 2005; derived from NCVER National VET Provider Collection, 1995, 2000, 2005

As can be seen, student load has gone up considerably over the ten-year period, but the growth has been quite uneven across qualification levels.[10] The highest growth has been among certificate III qualifications, and there has been an actual decline at the certificate I/II level. Among university qualifications, growth has been higher at the postgraduate level than at the undergraduate level.

Table 4 contains the results of the shift-share decomposition. To simplify matters we have added the last two effects together and labelled the combined effect as the demographic effect.

Table 4 Changes in domestic tertiary student demand as measured by full-time, full-year student load*

	1995	2005	Change student load	Study duration effect	Age participation effect	Demographic effect
	'000	'000	%	% pts	% pts	% pts
Postgraduate research	22	27	24	21	-4	7
Postgraduate coursework	43	53	20	-10	24	6
Undergraduate	356	421	17	2	10	5
Certificate IV/diploma	142	179	23	20	-4	7
Certificate III	57	156	93	-10	91	7
Certificate I/II and below	138	130	-6	-17	2	9
Total	**759**	**967**	**24**	**1**	**16**	**6**

Note: The percentage changes are expressed relative to the mid-point of the two time periods (this makes the shift-share formula more accurate). It should also be noted that there is a small residual difference between the sum of the four effects and the overall change.

Sources: Derived from National VET Provider Collection, 1995, 2005; Department of Education, Science and Training, Students: Selected higher education statistics 1995, 2005; ABS (2005a).

[10] This is against a background of considerable growth in earlier decades. In the decade prior to 1995, student numbers grew by over 40% in both the VET and higher education sectors (see table B16 in appendix B).

From the table we can see that the variations in growth rates are primarily driven by the study duration and age participation effects. Demographic factors have impacted on the various qualification levels differentially, but these are of little importance compared with the impact of the study duration and age participation effects.

Consider the age participation (that is, the proportion of age cohorts commencing a qualification). The largest increase here is for students undertaking certificate III, but there has also been a large increase in students undertaking postgraduate coursework. The increase in numbers undertaking a certificate III is associated with government policies promoting the expansion of apprenticeships and traineeships into new occupations (and also allowing apprenticeships and traineeships to be taken up by existing workers as well as new entrants). There has been a modest increase in the proportion of the population undertaking a degree. However, research degrees appear to have lost their gloss, and the proportion of the population undertaking them has actually declined. There has also been a decline in the proportion undertaking higher-level VET qualifications; perhaps there has been a shift to degrees.

The study duration effect is also an important driver of growth among students undertaking postgraduate research and certificate IV/diploma qualifications. The former may reflect a shift toward doctorate degrees and away from research masters. Duration has shortened appreciably among those undertaking postgraduate coursework, certificates I/II and certificate III. In all probability this reflects the mix of courses that students are undertaking, rather than a change in duration for particular courses. For example, there has been a substantial increase in apprenticeships and traineeships in non-traditional areas, and typically these are of shorter duration relative to the traditional trades.

The main point to conclude from this analysis is that changes in student demand have not been uniform. There is no general increase (putting aside overall population increase). Rather, different qualification levels have become more or less popular, and the types of courses undertaken within these levels have changed.

One final comment before moving on to future demand. The demographic effect ranges between six and nine percentage points. These numbers are considerably less than the 14% growth in the population over this period, implying that the demographic share effects are all negative. That is, the population feeder groups into tertiary education have all been growing at a much slower rate than the overall population. The ageing of the population has already been having a noticeable effect on student demand.

Future demand

To complete the paper we speculate a little about the future. It would be rather presumptuous to predict what will happen to future demand, but I am able to comment on various aspects. In particular, I wish to comment in some detail on the impact of demographics and then make some broad comments on other factors.

The demographics are relatively easy because we can rely on ABS projections, and if we are only looking out for 10 or 15 years, then all prospective tertiary students have already been born. The only variables we need to predict are death and immigration rates. Going out further means we need to factor in assumptions about birth rates as well.

To look at the impact of demographics we make use of the shift-share formula. The two demographic share and population effects are relevant. We use 2005 as the base and consider the expected growth in demand, which is due to the increasing population and the changing mix of age groups. In this context it is worth remembering that the demographic share effect between 1995 and 2005 was unambiguously negative. This means that the age groups which are the main

feeder groups to tertiary education grew more slowly than the overall population 15 years and over. From table 5, we see that we expect this pattern to continue to 2040 (the limit of our analysis).

Table 5 Five-year contribution to growth: Impact of demographics, 2005–40

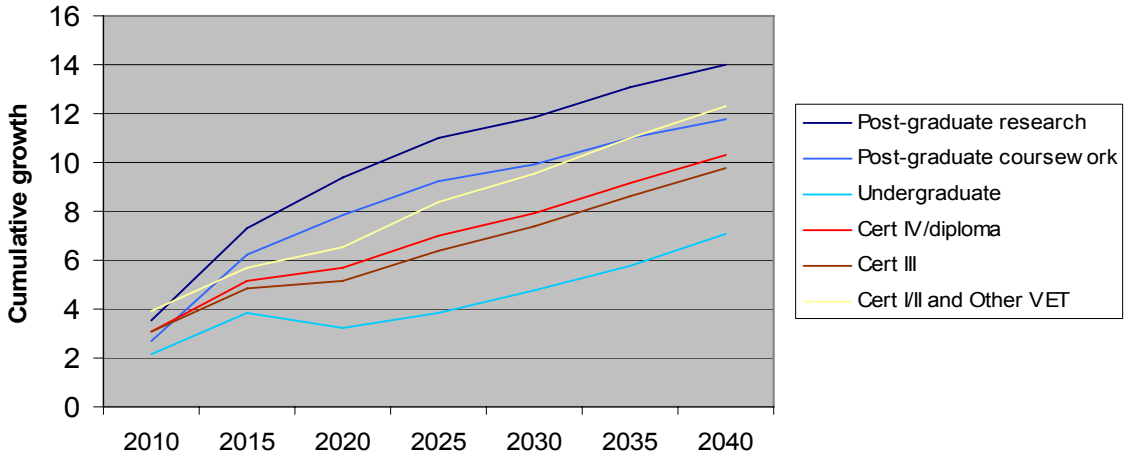
	2010 %	2015 %	2020 %	2025 %	2030 %	2035 %	2040 %
Postgraduate research	3.5	3.8	2.1	1.6	0.8	1.2	1.0
Postgraduate coursework	2.7	3.5	1.6	1.4	0.7	1.0	0.8
Undergraduate	2.2	1.7	-0.6	0.6	1.0	1.0	1.3
Certificate IV/diploma	3.1	2.1	0.6	1.3	1.0	1.2	1.1
Certificate III	3.1	1.8	0.3	1.2	1.0	1.2	1.2
Certificate I/II and other VET	4.0	1.7	0.9	1.8	1.2	1.5	1.3

Source: Derived from ABS (2005b, table B9); NCVER National VET Collection, 2005; Department of Education, Science and Training, Students: Selected higher education statistics, 2005

The numbers in the table refer to the growth over a five-year period. So, for example, we would expect student demand for postgraduate research to increase by 3.5% over the period 2005–10, on the assumption that the proportion of age cohorts undertaking that qualification remains constant, as does the study duration. Growth from this source is expected to be positive in all periods and at all qualification levels, except for undergraduate degrees between 2015 and 2020, where a decline of 0.6% is expected. However, growth in all qualification levels slows considerably over the period and, indeed, is very modest after 2015.

In figure 15 we show the cumulative effects of this growth. When we accumulate the projections, it is clear that the ageing of the population has a very sizable impact on the composition of student demand. Postgraduate research is the clear winner, while undergraduate-level qualifications is the slowest growing category by a fair margin.

Figure 15 Cumulative growth due to change in population shares



Source: Derived from ABS (2005b, table B9); NCVER National VET Collection, 2005: Department of Education, Science and Training, Students: Selected higher education statistics, 2005

However, we need to keep in mind that these demographic factors were not particularly important historically compared with the two other effects: age participation and study duration. The age participation effect was positive and large for postgraduate coursework, certificate III and undergraduate students in that order. The effect was of little consequence for postgraduate

research students, certificate IV and diploma students and lower-level VET students. My judgement is that in coming years this pattern may well continue: the returns of undertaking postgraduate research degrees is uncertain; in relation to lower-level VET qualifications, the returns are relatively poor and current government policy is emphasising the importance of higher-level qualifications. A continuation of a negative effect for higher-level vocational qualifications would be at odds with this policy push, but may well reflect that these qualifications are in direct competition with undergraduate awards, and the latter have proved to be more attractive.

A point to keep in mind is that growth in student numbers will be affected by government policy. While governments cannot mandate particular levels of participation, they can certainly encourage participation through incentives and the provision of government-funded places.

One concern is that the market has become saturated in some age groups and therefore a decline in age-specific participation may well occur. This is unlikely in a literal sense because we are a long way from 100% school completion, let alone everyone having a post-school qualification. What we can say, however, is that the last ten years have seen very different patterns by age and sex groups (table 6). In two qualifications (certificate III and postgraduate coursework) we have seen positive age participation effects over virtually all age and sex groups. However, for other qualification levels we see very different effects. The undergraduate qualification is interesting, in that we have observed a decline in participation in the 35 to 44 years group for both males and females, and perhaps this is reflecting the progression of more educated cohorts as well as a strong labour market. There have also been noticeable declines in participation by men under the age of 45 years in higher-level VET qualifications and in research degrees over all age groups for men up to the age of 55. While we have not reached saturation point for young people (as is evident from the table), at some stage there must be a point in which commencement rates will plateau for the group—there are only so many people. The point is that it would be wrong to assume that age-specific participation rates will continue ever upwards.

Table 6 Age participation effect by age and sex (% pts), 1995–2005

	Certificate I/II and below	Certificate III	Certificate IV/diploma	Under-graduate	Post-graduate	Research degrees
Male						
15–19	7.0	11.7	-2.8	1.0	0.0	0.0
20–24	-0.5	16.2	-1.7	2.1	2.6	-1.4
25–34	-0.7	9.1	-2.0	-0.3	4.4	-4.2
35–44	-0.3	5.3	-0.9	-0.4	-0.5	-4.5
45–54	0.3	3.1	0.4	0.0	0.9	-0.1
55–64	0.7	1.2	0.3	0.1	0.5	1.4
65+	0.2	0.1	0.0	0.0	0.0	0.3
Female						
15–19	2.7	13.1	-2.2	2.4	0.0	0.0
20–24	-1.8	9.1	0.1	5.4	4.9	2.2
25–34	-2.9	7.6	1.0	0.1	7.4	1.4
35–44	-2.6	7.7	1.0	-0.6	0.2	-1.6
45–54	-0.2	5.1	1.8	-0.1	2.3	0.8
55–64	0.4	1.4	0.7	0.1	0.8	1.4
65+	0.0	0.1	0.0	0.0	0.0	0.1
Total	**2.1**	**90.8**	**-4.2**	**9.7**	**23.7**	**-4.1**

Source: Derived from NCVER National VET Provider Collection, 1995, 2005; Department of Education, Science and Training, Students: Selected higher education statistics 1995, 2005; ABS (2005b)

Conclusion

The main points to emerge from the paper are now summarised.

- The concept of student demand is tricky because of the provision of government-subsidised places. The market for tertiary education places is not a simple competitive market.
- Student demand will be affected by the level of fees, although the actual sensitivity is far from clear. Other factors—socioeconomic background, income support and the states of the labour market—also play a part.
- Unmet demand is currently at a very low level.
- Student demand can be measured in terms of student numbers or student load (full-time equivalents). Not surprisingly, it is skewed toward young people and this skew is more noticeable when student load is considered rather than student numbers. The skew is also more pronounced for higher education than for VET. While VET student numbers are higher than higher education numbers, the load is smaller, reflecting the greater incidence of part-time study in VET.
- Student load has increased very significantly over the last ten years or so, but the growth has been quite uneven across qualification levels. The greatest increase has been for certificate IIIs, followed by postgraduate research degrees, higher-level VET qualifications, postgraduate coursework degrees and undergraduate qualifications. There has been a decline in lower-level certificates.
- The main drivers of this growth have been a combination of changes to age-specific participation rates and study duration. So we have seen the largest increases in age-specific participation rates among those undertaking certificate III and postgraduate coursework qualifications, with a modest increase also in those undertaking undergraduate degrees, but falls or little change in the rates of those undertaking postgraduate research, higher-level VET qualifications and lower-level VET qualifications. By contrast, increasing duration of study has been observed among postgraduate research students (probably reflecting the growth of PhDs at the expense of masters degrees) and also higher-level VET qualifications. Study duration has decreased significantly among lower-level VET qualifications, certificate III and postgraduate coursework. No doubt these declines primarily reflect changes in the mix of courses.
- The outlook is difficult to forecast. However, the ageing of the population will have a dampening effect on the growth in demand, particularly after 2015. Undergraduate degrees are the most affected by the demographic trend. Also trends in age-specific participation rates are negative for some age groups (notably the younger and middle-aged male age groups in relation to higher-level VET qualifications and research degrees), and so it should not be assumed that participation rates will continue ever upwards.

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Appendix A Shift-share analysis of changes in student load

Define L student load

C commencements

N population

i qualification level

j age-sex group.

Then $L_i = \sum_j L_{ij}$

$$= \sum_j \frac{L_{ij}}{C_{ij}} \frac{C_{ij}}{N_j} \frac{N_j}{N} N$$

$$= \sum_j \; l_{ij} \; c_{ij} \; n_j \; N$$

where

$l_{ij} = \frac{L_{ij}}{C_{ij}}$ load per commencing student (i.e. duration of study)

$c_{ij} = \frac{C_{ij}}{N_j}$ commencement rate (proportion of age groups commencing in qualification i)

$n_j = \frac{N_j}{N}$ population share of age group j.

Further define $w_{ij} = \frac{L_{ij}}{L_i}$.

Taking percentage changes we get

$$\%\Delta L_i = \sum_j w_{ij} \; \%\Delta l_{ij} + \sum_j w_{ij} \%\Delta c_{ij} + \sum_j w_{ij} \%\Delta n_j + \%\Delta N$$

where $\%\Delta$ is calculated at the mid-point (to improve accuracy).

i.e. $\%\Delta L_i = \frac{L_i^2 - L_i^1}{\frac{1}{2}\left(L_i^1 + L_i^2\right)}$ where the superscript refers to the time point.

The four terms are labelled, respectively, as the study duration effect, age participation effect, demographic effect and the population growth effect. While this is defined at the qualification level, we can add up over qualifications:

$$\%\Delta L = \sum_{lj} w_{ij}^{*} \left\{ \%\Delta l_{ij} + \%\Delta c_{ij} + \%\Delta n_{ij} \right\} + \%\Delta N$$

where $w_{ij}^{*} = \frac{L_{ij}}{L_i} \frac{L_i}{L} = w_{ij} v_i$.

Appendix B
Supporting tables

Table B1 Education enrolment experience: Those unable to gain placement on application as a proportion of all applicants, by age, Australia, 2006

	All other applicants	Applicants unable to gain a place
	'000	'000
15–19 years	1085.4	10
20–24 years	554.9	7.1
25–64 years	886.8	39.1

Source: ABS (2006)

Table B2 Unsuccessful applicants as a proportion of all applicants ('000), Australia, 1994–2006[a]

	1994	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
All other applicants	2168	2328	2314	2319	2445	2442	2474	2524	2593	2570	2555	2527
Applicants unable to gain a place	91	106	75	84	92	86	79	79	82	73	69	56

Note: (a) No survey in 1995.

Source: ABS (1998–2006, 1994–97)

Table B3 Unmet demand for higher education ('000), Australia, 2001–06

	Eligible applicants received an offer	Eligible applicants did not receive an offer
	'000	'000
2001	209.7	40.4
2002	222.7	53.9
2003	229.4	63.1
2004	228.4	63.3
2005	221.6	42.7
2006	218.5	33.7

Source: Australian Vice-Chancellors' Committee, 1985–2004, appendix D: Time series tables of the Survey of Applicants for Undergraduate Places; Australian Vice-Chancellors' Committee, additional tables 2005; Australian Vice-Chancellors' Committee (2006)

Table B4 Higher education applications, offers and acceptances by TER, 2006

	Applicants	Received offers	Acceptances
90.05+	23808	23724	19016
90.00-80.05	22939	22743	18258
80.00-70.05	20891	20131	15870
70.00-60.05	15960	13424	10231
60.00-50.05	11199	5932	4068
50.00-40.05	5956	1010	732
40.00-30.05	2685	230	200
30.00-20.05	1316	75	65
20.00-10.05	638	29	24
10.00 or less	234	7	5
Not Scored	814	279	208

Note: TER = Tertiary Entrance Rank

Source: Australian Vice-Chancellors' Committee: Survey of Applications for Undergraduate University Courses, table 5, 2006

Table B5 Domestic tertiary student numbers by age and sex, Australia, 2005 ('000)

Age	Sex	Resident population	Cert. I/II and below	Cert. III	Cert. IV/Diploma	Under-graduate	Post-graduate	Research degrees
15–19	Males	711262	93	83	27	76	0	0
	Females	677209	79	48	31	106	0	0
20–24	Males	733199	46	68	34	95	8	3
	Females	698164	34	35	36	120	13	3
25–34	Males	1439381	77	42	39	37	25	7
	Females	1430549	55	34	42	48	30	8
35–44	Males	1497245	68	27	30	14	17	5
	Females	1510932	61	35	37	26	17	5
45–54	Males	1387951	51	18	19	5	8	3
	Females	1406217	51	24	26	12	11	4
55-64	Males	1101882	27	7	7	1	2	1
	Females	1088396	23	7	7	2	2	2
65+	Males	1198865	7	1	1	0	0	0
	Females	1469136	7	1	1	0	0	0

Note: Certificate I/II and below includes 'other VET qualification'.

Source: Department of Education, Science and Training, Students: Selected higher education statistics (Table: Commencing and all domestic students by age group, gender, level of course and type of attendance), 2005; NCVER National VET Provider Collection, 2005

Table B6 Domestic tertiary full-time load by age and sex, Australia, 2005 ('000)

Age	Sex	Resident population	Cert. I/II and below	Cert. III	Cert. IV/Diploma	Under-graduate	Post-graduate	Research degrees
15–19	Males	711262	28	33	23	70	0	0
	Females	677209	21	19	27	97	0	0
20–24	Males	733199	9	25	20	75	4	2
	Females	698164	7	13	22	96	8	2
25–34	Males	1439381	11	14	16	22	10	5
	Females	1430549	10	12	19	28	11	5
35–44	Males	1497245	8	9	11	8	6	3
	Females	1510932	12	13	17	15	6	3
45–54	Males	1387951	6	5	7	3	3	2
	Females	1406217	9	9	11	6	4	2
55-64	Males	1101882	3	2	2	1	1	1
	Females	1088396	4	2	3	1	1	1
65+	Males	1198865	1	0	0	0	0	0
	Females	1469136	1	0	0	0	0	0

Note: Certificate I/II and below includes 'other VET qualification'

Source: Department of Education, Science and Training, Students: Selected higher education statistics (Table: Actual student load [EFTSL] for commencing and all domestic students by age group, gender, level of course and state), 2005; derived from NCVER National VET Provider Collection, 2005

Table B7 Domestic student participation rates by age and sex, Australia, 2005

Age	Sex	Cert. I/II and below	Cert. III	Cert IV/ Diploma	Under-graduate	Post— graduate	Research degrees
15–19	Males	0.130	0.117	0.038	0.108	0.000	0.000
	Females	0.117	0.071	0.046	0.157	0.000	0.000
20–24	Males	0.062	0.093	0.047	0.130	0.010	0.004
	Females	0.049	0.050	0.052	0.171	0.019	0.004
25–34	Males	0.054	0.029	0.027	0.026	0.018	0.005
	Females	0.038	0.024	0.030	0.033	0.021	0.005
35–44	Males	0.046	0.018	0.020	0.009	0.011	0.003
	Females	0.041	0.023	0.024	0.018	0.011	0.003
45–54	Males	0.037	0.013	0.014	0.004	0.006	0.002
	Females	0.036	0.017	0.018	0.008	0.008	0.003
55–64	Males	0.024	0.007	0.006	0.001	0.001	0.001
	Females	0.021	0.006	0.006	0.002	0.002	0.001
65+	Males	0.006	0.001	0.001	0.000	0.000	0.000
	Females	0.005	0.001	0.000	0.000	0.000	0.000

Note: Certificate I/II and below includes 'other VET qualification'.

Source: Derived from ABS (2005a); Department of Education, Science and Training, Students: Selected higher education statistics, 2005; NCVER National VET Provider Collection, 2005

Table B8 Domestic tertiary full-time load participation rates by age and sex, Australia, 2005

Age	Sex	Cert. I/II and below	Cert. III	Cert. IV/ Diploma	Under-graduate	Post-graduate	Research degrees
15–19	Males	0.040	0.047	0.032	0.098	0.000	0.000
	Females	0.031	0.028	0.039	0.144	0.000	0.000
20–24	Males	0.012	0.034	0.028	0.102	0.006	0.003
	Females	0.010	0.018	0.031	0.138	0.011	0.004
25–34	Males	0.007	0.010	0.011	0.016	0.007	0.004
	Females	0.007	0.008	0.013	0.020	0.008	0.004
35–44	Males	0.006	0.006	0.008	0.005	0.004	0.002
	Females	0.008	0.008	0.011	0.010	0.004	0.002
45–54	Males	0.004	0.004	0.005	0.002	0.002	0.001
	Females	0.007	0.006	0.008	0.004	0.003	0.002
55–64	Males	0.003	0.002	0.002	0.001	0.000	0.001
	Females	0.003	0.002	0.003	0.001	0.001	0.001
65+	Males	0.001	0.000	0.000	0.000	0.000	0.000
	Females	0.001	0.000	0.000	0.000	0.000	0.000

Note: Certificate I/II and below includes 'other VET qualification'.

Source: Derived from ABS (2005a); Department of Education, Science and Training, Students: Selected higher education statistics, 2005; NCVER National VET Provider Collection, 2005

Table B9 Domestic tertiary full-time load participation rates (EFTSL) by state/territory and sex, 15 to 19-year-olds, Australia, 2005

State	Sex	Cert. I/II and below	Cert. III	Cert. IV/ Diploma	Under-graduate	Post-graduate	Research degrees
NSW	Males	0.038	0.049	0.030	0.089	0.000	0.000
	Females	0.039	0.028	0.037	0.129	0.000	0.000
Vic.	Males	0.049	0.051	0.048	0.103	0.000	0.000
	Females	0.033	0.032	0.056	0.145	0.000	0.000
NT	Males	0.073	0.032	0.006	0.025	0.000	0.000
	Females	0.058	0.025	0.008	0.041	0.000	0.000
ACT	Males	0.015	0.036	0.045	0.182	0.000	0.000
	Females	0.018	0.020	0.052	0.202	0.000	0.000
Qld	Males	0.029	0.044	0.025	0.101	0.000	0.000
	Females	0.020	0.027	0.030	0.157	0.000	0.000
WA	Males	0.050	0.052	0.036	0.105	0.000	0.000
	Females	0.032	0.031	0.045	0.149	0.000	0.000
SA	Males	0.042	0.037	0.017	0.092	0.000	0.000
	Females	0.031	0.022	0.023	0.142	0.000	0.000
Tas.	Males	0.026	0.045	0.013	0.078	0.000	0.000
	Females	0.017	0.025	0.013	0.111	0.000	0.000

Note: Certificate I/II and below includes 'other VET qualification'.

Source: Derived from ABS (2005a); Department of Education, Science and Training, Students: Selected higher education statistics, 2005; NCVER National VET Provider Collection, 2005

Table B10 Domestic tertiary student load, all students, Australia, 1995–2005 ('000)

	Cert. I/II and below	Cert. III	Cert. IV/ Diploma	Under-graduate	Post-graduate	Research degrees
1995	143	57	145	356	44	22
2000	120	118	174	399	40	25
2005	133	157	180	421	53	27

Note: Certificate I/II and below includes 'other VET qualification'.

Source: Department of Education, Science and Training, Students: Selected higher education statistics, 1995–2005; derived from NCVER National VET Provider Collection, 1995–2005

Table B11 Cumulative growth due to change in population shares

	2010	2015	2020	2025	2030	2035	2040
Postgraduate research	3.5	7.3	9.4	11.0	11.8	13.1	14.0
Postgraduate coursework	2.7	6.3	7.8	9.2	9.9	11.0	11.8
Undergraduate	2.2	3.9	3.2	3.8	4.8	5.8	7.1
Cert. IV/diploma	3.1	5.1	5.7	7.0	8.0	9.2	10.3
Cert. III	3.1	4.9	5.2	6.4	7.4	8.6	9.8
Cert. I/II and other VET	4.0	5.7	6.6	8.4	9.5	11.0	12.3

Source: Derived from ABS (2005b, table B9); NCVER National VET Collection, 2005; Department of Education, Science and Training, Students: Selected higher education statistics

Table B12 Percentage change of student load by age and sex

	Cert. I/II and below	Cert. III	Cert. IV/ diploma	Under-graduate	Post-graduate	Research degrees
Males						
15–19	0.256	0.291	0.099	0.085	0.375	-0.462
20–24	-0.233	0.572	0.017	0.176	0.314	-0.049
25–34	-0.302	1.057	0.015	-0.003	0.159	0.056
35–44	-0.198	1.251	0.237	-0.119	-0.071	-0.115
45–54	0.091	1.527	0.759	0.184	0.240	0.415
55–64	0.543	1.703	1.131	0.656	0.853	0.903
65+	0.498	1.335	0.482	0.030	0.301	0.831
Females						
15–19	0.059	1.210	0.113	0.117	0.095	0.667
20–24	-0.531	1.361	0.130	0.362	0.319	0.336
25–34	-0.464	1.528	0.283	0.173	0.287	0.419
35–44	-0.211	1.614	0.460	0.070	-0.045	0.223
45–54	0.214	1.758	0.900	0.241	0.370	0.580
55–64	0.559	1.850	1.218	0.624	0.892	1.088
65+	0.534	1.754	0.420	-0.066	0.198	0.680
Total	**-0.060**	**0.935**	**0.227**	**0.168**	**0.196**	**0.240**

Source: Derived from NCVER National VET Collection, 2005; Department of Education, Science and Training, Students: Selected higher education statistics, 2005

Table B13 Study duration effect by age and sex (% pts)

	Cert. I/II and below	Cert. III	Cert. IV/ diploma	Under-graduate	Post-graduate	Research degrees
Males						
15–19	-0.039	-0.051	0.030	-0.010	0.000	0.000
20–24	-0.014	-0.055	0.017	0.008	-0.003	0.008
25–34	-0.022	-0.006	0.020	0.003	-0.017	0.052
35–44	-0.016	0.002	0.019	0.000	-0.014	0.021
45–54	-0.008	0.005	0.015	0.000	-0.008	0.014
55–64	-0.003	0.002	0.005	0.000	-0.001	-0.003
65+	0.000	0.000	0.000	0.000	0.000	-0.001
Females						
15–19	-0.032	-0.019	0.025	-0.017	0.000	0.000
20–24	-0.019	-0.015	0.017	0.024	-0.003	0.007
25–34	-0.016	0.009	0.019	0.010	-0.017	0.061
35–44	-0.004	0.014	0.021	0.006	-0.019	0.031
45–54	0.000	0.013	0.014	0.001	-0.015	0.016
55–64	0.000	0.004	0.003	0.000	-0.003	0.003
65+	0.003	0.000	0.000	0.000	0.000	0.001
Total	**-0.171**	**-0.097**	**0.205**	**0.022**	**-0.101**	**0.210**

Source: Derived from National VET Provider Collection, 1995, 2005; Department of Education, Science and Training, Students: Selected higher education statistics, 1995, 2005

Table B14 Age participation effect by age and sex (% pts)

	Cert. I/II and below	Cert. III	Cert. IV/ diploma	Under-graduate	Post-graduate	Research degrees
Male						
15–19	0.070	0.117	-0.028	0.010	0.000	0.000
20–24	-0.005	0.162	-0.017	0.021	0.026	-0.014
25–34	-0.007	0.091	-0.020	-0.003	0.044	-0.042
35–44	-0.003	0.053	-0.009	-0.004	-0.005	-0.045
45–54	0.003	0.031	0.004	0.000	0.009	-0.001
55–64	0.007	0.012	0.003	0.001	0.005	0.014
65+	0.002	0.001	0.000	0.000	0.000	0.003
Female						
15–19	0.027	0.131	-0.022	0.024	0.000	0.000
20–24	-0.018	0.091	0.001	0.054	0.049	0.022
25–34	-0.029	0.076	0.010	0.001	0.074	0.014
35–44	-0.026	0.077	0.010	-0.006	0.002	-0.016
45–54	-0.002	0.051	0.018	-0.001	0.023	0.008
55–64	0.004	0.014	0.007	0.001	0.008	0.014
65+	0.000	0.001	0.000	0.000	0.000	0.001
Total	**0.021**	**0.908**	**-0.042**	**0.097**	**0.237**	**-0.041**

Source: Derived from: NCVER National VET Provider Collection, 1995, 2005; Department of Education, Science and Training, Students: Selected higher education statistics, 1995, 2005; ABS (2005a)

Table B15 Demographic effect by age and sex (% pts)

	Cert. I/II and below	Cert. III	Cert. IV/ diploma	Under-graduate	Post-graduate	Research degrees
Males						
15–19	-0.010	-0.018	-0.007	-0.009	0.000	0.000
20–24	-0.010	-0.026	-0.017	-0.023	-0.010	-0.013
25–34	-0.012	-0.011	-0.013	-0.008	-0.024	-0.028
35–44	-0.004	-0.003	-0.004	-0.001	-0.007	-0.007
45–54	0.003	0.001	0.002	0.000	0.003	0.004
55–64	0.004	0.002	0.002	0.000	0.002	0.004
65+	0.001	0.000	0.000	0.000	0.000	0.000
Females						
15–19	-0.008	-0.005	-0.008	-0.012	0.000	0.000
20–24	-0.011	-0.009	-0.019	-0.031	-0.021	-0.013
25–34	-0.013	-0.007	-0.014	-0.009	-0.027	-0.024
35–44	-0.005	-0.003	-0.004	-0.002	-0.007	-0.006
45–54	0.007	0.004	0.005	0.002	0.007	0.008
55–64	0.005	0.002	0.002	0.000	0.002	0.005
65+	0.000	0.000	0.000	0.000	0.000	0.000
Total	**-0.053**	**-0.073**	**-0.075**	**-0.093**	**-0.083**	**-0.070**

Source: Derived from National VET Provider Collection, 1995, 2005; Department of Education, Science and Training, Students: Selected higher education statistics, 1995, 2005

Table B16 Domestic tertiary education participation, Australia, 1976,[(a)] 1986,[(a)] 1995 and 2005

	Higher education	Vocational education and training	% change higher education	% change vocational education and training
1976	291,749	555,867 [(b)]		
1986	389,968	886,679 [©]	33.7	59.5
1995	557,989	1,259,996	43.1	42.1
2005	717,681	1,619,233	28.6	28.5

Notes: (a) Figures for 1976 and 1986 include a small proportion of overseas students. The number of overseas students undertaking higher education in Australia was measured for the first time in 1988 and came to 4% of the proportion of total students. In years prior to this, the proportion of overseas students is expected to have been similar. It is expected that the proportion of overseas students in the VET sector at this time would also have been very small.

(b) This figure is the total number of enrolments for streams 1–5 and excludes stream 6 'adult education'.

(c) This figure is the total number of students for streams 2100–4500.

Source: Department of Education, Science and Training, Students: Selected higher education statistics, Higher education students time series tables, 2000; Department of Education, Science and Training, Students: Selected higher education statistics, 2005; Tertiary Education Commission, Selected TAFE statistics, 1976, 1986; NCVER National VET Provider Collection, 1995, 2005