CONFERENCE PAPER

NCVER

The contribution of vocational education and training to Australia's skills base

TOM KARMEL

This paper formed the basis of presentations made to the Melbourne Institute's public policy forum of 25 March 2009 and the Australian Financial Review conference, *Taking skills to the world*, 7 April 2009.

For clarity in reading figures, please print in colour.

TD/TNC 96.02

Published by NCVER
ABN 87 007 967 311

Level 11, 33 King William Street, Adelaide, SA 5000
PO Box 8288 Station Arcade, Adelaide SA 5000, Australia

ph +61 8 8230 8400 fax +61 8 8212 3436
email ncver@ncver.edu.au
<http://www.ncver.edu.au>
<http://www.ncver.edu.au/publications/2152.html>

About the research

The contribution of vocational education and training to Australia's skills base

Tom Karmel, NCVER

The vocational education and training (VET) sector is not as well understood as the school and university sectors. People understand that it is about giving individuals skills for work and for meeting the skill requirements of business. But many fail to realise that it is very broad and goes far beyond the traditional trades. Indeed, change to management and commerce is the largest area of activity within VET.

The link between the VET sector and the labour market also needs to be considered; it is too easy to simplify the relationship between training and the workforce. For example, while most graduates of trade training work in the trades, this is the exception rather than the rule, since most VET graduates work in occupations other than the field in which they trained. This means that the bulk of VET, while vocational, is of a generic nature, with the skills being used in a wide range of occupations. In addition, we know that skills are also learned on the job. The looseness in the relationship between training and work can also be seen in the spread of qualifications held by people in a particular occupation and the changes in these patterns over time. The paper also points out that not all qualifications are valued equally by the labour market. For example, a certificate III/IV in architecture and building commands a considerable premium relative to other fields. Similarly, high-level qualifications are not valued in some occupations. A transport worker or a plant operator does not need a degree to get a job in their field.

The paper ends with some thoughts on the implications of the current downturn on training. We need to worry about possible skills shortages emerging when the economy moves into a recovery phase. However, this is more an issue for the trades than for most other occupations. A number of reasons can be offered here: trade employment is very cyclical; trade training takes a long time; and apprentices (mostly young men) are the main source of entry into trades. Other occupations are better placed because the link between training and the occupation is looser and the recruitment pool is much larger.

Tom Karmel
Managing Director, NCVER

Contents

Tables and figures

Tables

Figures

The contribution of VET to Australia's skills base

Introduction

Vocational education and training (VET) provides employment-related training at the certificate and diploma levels and is aimed at all occupational groups, with the possible exception of professionals (which higher education has largely tied up). It is delivered within both an institutional and workplace setting. An important element of VET is apprenticeships and traineeships, which incorporate formal training within an employment relationship.

The aim of this paper is to look at the contribution VET makes to the labour market, with the paper focusing on three aspects: the relationship between the training and occupations VET graduates work in; the extent to which the qualified proportion of the workforce has increased (skill deepening); and the link between VET and skills acquisition. The unifying theme of these aspects is that there is no deterministic link between VET and the labour market—skills are not raw materials consumed in a manufacturing process; rather, they are akin to capital that has alternative uses. Before doing this I briefly describe the sector, to show the breadth of its provision. Finally, I reflect on what the slowdown means for VET and the skills base.

The breadth of VET

VET is large. In 2007 there were some 1.67 million students enrolled in the public VET system, representing around one in nine people aged 15–64 years. The majority are enrolled part-time and around 55% are aged 25 years and over. VET covers qualifications that range from basic (certificate I and II), to diplomas and advanced diplomas[1] (table 1), and all fields of study (table 2), although the numbers in the natural and physical sciences are small.

Table 1 Total VET students by qualifications, 2007

AQF qualifications	Students
Diploma or higher	165 965
Certificate IV	188 665
Certificate III	476 785
Certificate II	281 619
Certificate I	100 055
AQF sub-total	*1 213 089*
Non-AQF qualifications	
Other recognised courses	251 097
Non-award courses	87 410
Subject only – no qualification	113 422
Non-AQF sub-total	*451 929*
Total students	**1 665 018**

Source: National VET Provider Collection (2007).

[1] Some technical and further education (TAFE) institutes (public sector VET providers) also offer degrees, but strictly speaking, these are higher education awards.

Table 2 Total VET students by course field of education, 2007

Field of education	Students
01 - Natural and physical sciences	5 871
02 - Information technology	36 598
03 - Engineering and related technologies	278 835
04 - Architecture and building	111 947
05 - Agriculture, environmental and related studies	70 554
06 - Health	85 207
07 - Education	51 460
08 - Management and commerce	337 881
09 - Society and culture	161 945
10 - Creative arts	44 062
11 - Food, hospitality and personal services	169 187
12 - Mixed field programmes	198 049
Subject only – no course field of education	113 422
Total	**1 665 018**

Source: National VET Provider Collection (2007).

These large numbers of students translate into additional skills in the workforce. This can be seen from the flow of qualified people into the workforce each year. Table 3 shows these, but with a small twist. One of the characteristics of VET is that completion rates of full qualifications are relatively low. While this is of policy concern, it needs to be recognised that many attend VET to obtain particular skills and undertake particular units or modules rather than a complete qualification, and these skills do add to the skills base. So in table 3 we present not only complete qualifications but also the total number of modules and units successfully completed, expressed as 'qualifications equivalent'. Thus the output of VET is around 50% higher than indicated by the number of completions. Table 4 shows the number of apprentice and trainee completions; note that apprenticeships and traineeships are a very important part of VET and represent around half of all completions.

Table 3 Qualifications and qualification equivalents completed by total VET students by field of education, 2006

Field of education	Qualifications completed	Qualification equivalents
Natural and physical sciences	1 387	2 230
Information technology	10 099	13 433
Engineering and related technologies	45 391	80 086
Architecture and building	13 208	26 680
Agriculture, environmental and related studies	11 671	21 904
Health	10 729	14 078
Education	10 880	9 598
Management and commerce	84 275	124 285
Society and culture	55 680	65 129
Creative arts	9 961	15 240
Food, hospitality and personal services	25 846	36 414
Mixed field programs	15 518	42 759
Total	**294 645**	**451 835**

Source: National VET Provider Collection (2007).

Table 4 Apprentice and trainee completions in 12 months ending 30 September 2008, Australia ('000)

Occupation (ANZSCO) group	2008
Managers and professionals	4.0
Technicians and trades workers	42.7
Community and personal service workers	25.4
Clerical and administrative workers	28.3
Sales workers	19.8
Machinery operators and drivers	16.2
Labourers	13.6
Total ('000)	**149.9**

Note: ANZSCO = Australian and New Zealand Standard Classification of Occupations.
Source: National Apprentice and Trainee Collection, December 2008 estimates, unpublished.

The numbers in tables 3 and 4 represent additions to the skills base and have resulted in a substantial increase in the proportion of the workforce with formal qualifications. Table 5 presents the stock of skills for 2006. VET qualifications represent the most important component of post-school qualifications.[2]

Table 5 Employed persons by qualification level, 2006

	Per cent
Bachelor degree or above	22.0
Advanced diploma or diploma	9.0
Certificate III or IV	18.2
Certificate I or II	1.4
Level inadequately described/not stated[(a)]	7.4
No-non school qualification/not applicable[(b)]	42.1
Total	**100.0**

Notes: (a) This category includes certificate not further defined and level inadequately described or not stated.
(b) This category also comprises persons who have a qualification out of scope of this classification and persons still studying for a first qualification.
Source: Derived from the Australian Bureau of Statistics (ABS) Census of Population and Housing (2006).

VET and the labour market

It is a mistake to think that there is a tight and deterministic relationship between VET and the labour market. VET provides skills that can be used in a variety of jobs. Most occupations, with the exception of some professions and the licensed trades, do not mandate particular qualifications. Similarly, training for an occupation does not imply that that training must be used only in that occupation, and much education, including VET, has a large component of generic education. This lack of a tight link partly reflects the type of society we live in and also that many skills are learned on the job—skills come from both formal training and experience.

Data from the National Centre for Vocational Education Research's (NCVER) Student Outcomes Survey illustrate the lack of a tight match between training and occupations (table 6).

While the match is high for those completing an apprenticeship in the trades, it is much lower in most fields of study. However, as can be seen from the table, the proportion of VET graduates working in some other occupation reporting that their training is relevant is very substantial, indicating the generic nature of much VET. Overall, the proportion working in 'non-matched'

[2] I have categorised diplomas and qualifications that the ABS could not classify to VET. While diplomas can be delivered as higher education awards, the vast majority of diplomas currently delivered are VET awards.

jobs but reporting their training as useful exceeds the numbers working in the same occupation as their training.

Table 6 Occupational destination and training relevance for graduates[(a)] by various training characteristics, 2008

	Employed				Total employed[(b)]	Not employed[(c)]	Total
	In same occupation group[(d)] (as training course)	In different occupation group (from training course)		Occupation after training not known			
		Training was highly or somewhat relevant to current job	*Training was of very little relevance or not at all relevant to current job*				
	%	%	%	%	%	%	%
Intended occupation of training activity[(d)]							
Managers	10.7	54.4	15.6	1.6*	82.2	17.8	**100.0**
Professionals	20.7	40.4	21.4	0.6*	83.1	16.9	**100.0**
Technicians and trades workers	54.2	21.7	11.2	1.1	88.1	11.9	**100.0**
Community and personal service workers	37.4	22.1	19.3	0.9	79.9	20.1	**100.0**
Clerical and administrative workers	13.5	41.4	17.0	1.3	73.4	26.6	**100.0**
Sales workers	36.3	33.1	13.9	1.0*	84.5	15.5	**100.0**
Machinery operators and drivers	22.7	51.9	18.0	1.8*	94.4	5.6	**100.0**
Labourers	21.8	38.3	19.5	1.2*	81.0	19.0	**100.0**
Training was part of an apprenticeship or traineeship							
In a trade occupation course[(e)]	78.9	10.5	3.9	0.6*	93.9	6.1	**100.0**
In a non-trade occupation course	37.6	37.7	11.4	0.8*	87.7	12.3	**100.0**
All graduates[(f)]	**30.3**	**33.8**	**16.8**	**1.1**	**82.1**	**17.9**	**100.0**

Notes: * The estimate has a relative standard error greater than 25% and therefore should be used with caution.
(a) These questions are not asked of students from community education providers. Therefore, the percentage reported represents the proportion of graduates, excluding those from community education providers.
(b) Total includes instances where training relevance is not known.
(c) 'Not employed' is defined as unemployed (looking for full-time or part-time work), not in the labour force, or not employed (no further information).
(d) Occupation is defined by ANZSCO 2006. This is an ABS classification that identifies occupations according to their primary purpose. Matching between intended and destination occupation occurs at the ANZSCO sub-major group level.
(e) A trade course has an intended occupation code corresponding to 'Technicians and trades workers'.
(f) Totals exclude students from community education providers (for whom occupation after training is not captured). Also excluded are a small number of students with an unknown intended ANZSCO.

Source: NCVER Student Outcomes Survey (2008).

Changes in the proportions of people with qualifications also demonstrate that there is no predetermined qualification profile in most occupations. We illustrate this by comparing the occupation by qualification profiles for 1996 and 2006. As well as showing the proportions with qualifications for the whole workforce, table 7 shows them for the major occupational groups.

Table 7 Changes in the percentage of employed with qualifications, total and selected occupations, 1996–2006

	1996	2006	Change
	%	%	(% points)
All workers			
Bachelor degree or above	15	22	7
Advanced diploma or diploma	8	9	1
Certificate III or IV[(a)]	14	18	4
Certificate I or II[(b)]	4	1	-2
Level inadequately described/not stated[(c)]	7	7	0
No non-school qualification/not applicable[(d)]	51	42	-9
Total	100	100	
1 Managers and administrators			
Bachelor degree or above	22	32	10
Advanced diploma or diploma	10	11	1
Certificate III or IV[(a)]	13	16	3
Certificate I or II[(b)]	3	1	-3
Level inadequately described/not stated[(c)]	6	6	0
No non-school qualification/not applicable[(d)]	45	34	-12
Total	100	100	
2 Professionals			
Bachelor degree or above	56	67	10
Advanced diploma or diploma	18	13	-6
Certificate III or IV[(a)]	3	5	2
Certificate I or II[(b)]	2	0	-2
Level inadequately described/not stated[(c)]	5	5	0
No non-school qualification/not applicable[(d)]	15	10	-5
Total	100	100	
3 Associate professionals			
Bachelor degree or above	12	19	7
Advanced diploma or diploma	12	15	3
Certificate III or IV[(a)]	15	19	4
Certificate I or II[(b)]	6	2	-5
Level inadequately described/not stated[(c)]	7	8	1
No non-school qualification/not applicable[(d)]	48	37	-11
Total	100	100	
4 Tradespersons and related workers			
Bachelor degree or above	2	3	1
Advanced diploma or diploma	3	4	1
Certificate III or IV[(a)]	52	56	4
Certificate I or II[(b)]	2	1	-1
Level inadequately described/not stated[(c)]	6	5	-1
No non-school qualification/not applicable[(d)]	35	32	-3
Total	100	100	
5 Advanced clerical and service workers			
Bachelor degree or above	7	13	6
Advanced diploma or diploma	8	13	5

	1996	2006	Change
	%	%	(% points)
Certificate III or IV[(a)]	3	9	6
Certificate I or II[(b)]	9	2	-7
Level inadequately described/not stated[(c)]	12	12	0
No non-school qualification/not applicable[(d)]	61	51	-9
Total	100	100	
6 Intermediate clerical, sales and service workers			
Bachelor degree or above	7	11	4
Advanced diploma or diploma	7	10	3
Certificate III or IV[(a)]	6	15	9
Certificate I or II[(b)]	6	2	-3
Level inadequately described/not stated[(c)]	8	10	1
No non-school qualification/not applicable[(d)]	65	51	-14
Total	100	100	
7 Intermediate production and transport workers			
Bachelor degree or above	2	3	1
Advanced diploma or diploma	2	3	1
Certificate III or IV[(a)]	14	19	5
Certificate I or II[(b)]	2	1	-1
Level inadequately described/not stated[(c)]	7	8	1
No non-school qualification/not applicable[(d)]	73	65	-8
Total	100	100	
8 Elementary clerical, sales and service workers			
Bachelor degree or above	4	7	3
Advanced diploma or diploma	4	5	2
Certificate III or IV[(a)]	5	9	4
Certificate I or II[(b)]	3	2	0
Level inadequately described/not stated[(c)]	8	7	0
No non-school qualification/not applicable[(d)]	76	69	-7
Total	100	100	
9 Labourers and related workers			
Bachelor degree or above	2	4	1
Advanced diploma or diploma	2	3	1
Certificate III or IV[(a)]	8	14	5
Certificate I or II[(b)]	2	2	0
Level inadequately described/not stated[(c)]	7	8	1
No non-school qualification/not applicable[(d)]	78	70	-8
Total	100	100	

Notes: (a) 'Certificate III or IV' in 1996 includes skilled vocational qualifications.
(b) 'Certificate I or II' in 1996 includes basic vocational qualifications.
(c) This category includes certificate not further defined and level inadequately described or not stated.
(d) This category also comprises persons who have a qualification out of scope of this classification and persons still studying for a first qualification.

Source: Derived from the ABS Census of Population and Housing (1996, 2006).

Over this period the number of people with university qualifications has increased faster than the number with a VET qualification. So the contribution of the VET sector relative to higher education has weakened, at least on this measure. This can be partly explained as a statistical

artefact, with the ABS recording the highest qualification and ranking university qualifications above VET qualifications. This weakening, however, is relative to the proportion of the workforce, with advanced diplomas and diplomas and certificates III and IV increasing by one and four percentage points, respectively. The decline in the proportion of people with low-level certificates reflects the trend toward high-level qualifications.[3]

Two points stand out. The first is that the trades are the one occupational group where there has been relatively little change in qualification levels; the second is that people with degrees are becoming increasingly more important in a wide range of occupations, including those outside the traditional 'degree' jobs.

While I am arguing that there is no predetermined mix of qualifications for particular occupations, I am not arguing that there is no value in qualifications. At an aggregate level, there clearly is, as can be seen from table 8, with, on the whole, those with diplomas and degrees earning the most. There is, however, considerable variation by field of study. For example, we see that a certificate III or IV in architecture and building (covering many of the traditional trades) has a very healthy wage premium compared with Year 12, although the same cannot be said for certificates in agriculture, health, education, society and the creative arts at these levels.

To some extent the return to qualifications will reflect the types of occupations that individuals obtain, and we see that the variation is less at the occupational level (table 9). There are still pay-offs to certain qualifications, but it is not the case that degree holders always get paid more than others within an occupation. This, no doubt, reflects the relative returns to generic and technical education. Thus degrees and diplomas are rewarded in the clerical and service occupations, but not in sales, transport and labouring occupations. By contrast, certificates III and IV appear to have a premium in sales, transport and labouring occupations, while certificates I and II have virtually no wage premium.

[3] There is no doubt that the workforce is becoming more qualified. Whether this has resulted in a more skilled workforce or is a reflection of credentialism is a moot point.

Table 8 Weekly wages for full-time wage and salary earners, by level and field of qualification, 2003–04

	Full-time wage and salary earners	
	Weekly $s	Relative to Year 12
Year 11 or below	687	0.90
Year 12	765	1.00
Certificate I/II		
Science, IT, engineering	715	0.93
Architecture, building, agriculture	667	0.87
Health, education, society and culture, creative arts	723	0.94
Management and commerce	734	0.96
Food, hospitality, personal services	770	1.01
Certificate III/IV		
Science, IT, engineering	798	1.04
Architecture and building	873	1.14
Agriculture	630	0.82
Health	745	0.97
Education, society and culture, creative arts	719	0.94
Management and commerce	800	1.04
Food, hospitality, personal services	760	0.99
Diplomas and degrees		
Science	1 071	1.40
Information technology	1 210	1.58
Engineering	978	1.28
Architecture and building	787	1.03
Agriculture	788	1.03
Health	1 086	1.42
Education	1 022	1.34
Management and commerce	1 040	1.36
Society and culture, food, hospitality and personal services	1 000	1.31
Creative arts	838	1.10

Notes: Calculated for a male, age 30, working 40 hours (for the hourly rate). The relativity to Year 12 is not affected by this assumption.

Source: Derived from modelling by the author, based on the unit record file, ABS Household Expenditure Survey and Survey of Income and Housing, 2003–04.

Table 9 Weekly wages for full-time wage and salary earners, by qualification level and occupation, 2003–04

	Full-time wage and salary earners	
	Weekly $s	Relative to Year 12
5 Advanced clerical and service workers		
Left school before Year 12	832	0.95
Year 12	879	1.00
Certificate I/II	**639**	0.73
Certificate III/IV	897	1.02
Diploma or degree	990	1.13
61+81 Clerical workers		
Left school before Year 12	**697**	0.97
Year 12	**721**	1.00
Certificate I/II	**717**	0.99
Certificate III/IV	**708**	0.98
Diploma or degree	811	1.12
62+82 Sales workers		
Left school before Year 12	700	1.03
Year 12	678	1.00
Certificate I/II	651	0.96
Certificate III/IV	725	1.07
Diploma or degree	651	0.96
63+83 Service workers		
Left school before Year 12	**570**	0.98
Year 12	**583**	1.00
Certificate I/II	608	1.04
Certificate III/IV	685	1.18
Diploma or degree	737	1.26
71+72 Machine and plant operators		
Left school before Year 12	811	0.93
Year 12	868	1.00
Certificate I/II	767	0.88
Certificate III/IV	885	1.02
Diploma or degree	804	0.93
73+79 Transport workers		
Left school before Year 12	737	0.95
Year 12	776	1.00
Certificate I/II	738	0.95
Certificate III/IV	838	1.08
Diploma or degree	770	0.99
9 Labourers and related workers		
Left school before Year 12	552	0.92
Year 12	602	1.00
Certificate I/II	654	1.09
Certificate III/IV	674	1.12
Diploma or degree	577	0.96

Notes: Bold signifies a statistically significant difference relative to an individual with a diploma or degree.
Calculated for a male, aged 30, working 40 hours (for the hourly rate). The relativity to Year 12 is not affected by this assumption.

Source: Derived from modelling by the author, based on the unit record file, ABS Household Expenditure Survey, and Survey of Income and Housing (2003–04).

However, we observe a considerable return to experience, even in lower-skilled occupations, reflecting skills learned on the job (table 10). The point is that skills in many occupations can be learned on the job. Formal qualifications may well be useful but are not necessary in many jobs.

Table 10 Increase in weekly wages due to 10 years experience by selected occupations, 2003–04

	Increase in weekly wages	
	($s)	%
5 Advanced clerical and service workers	148	17.6
61+81 Clerical workers	165	25.5
62+82 Sales workers	173	36.2
63+83 Service workers	107	17.0
71+72 Machine and plant operators	131	19.5
73+79 Transport workers	159	26.1
9 Labourers and related workers	148	34.5

Note: Compares expected earning of a 30-year-old male with a 20-year-old.

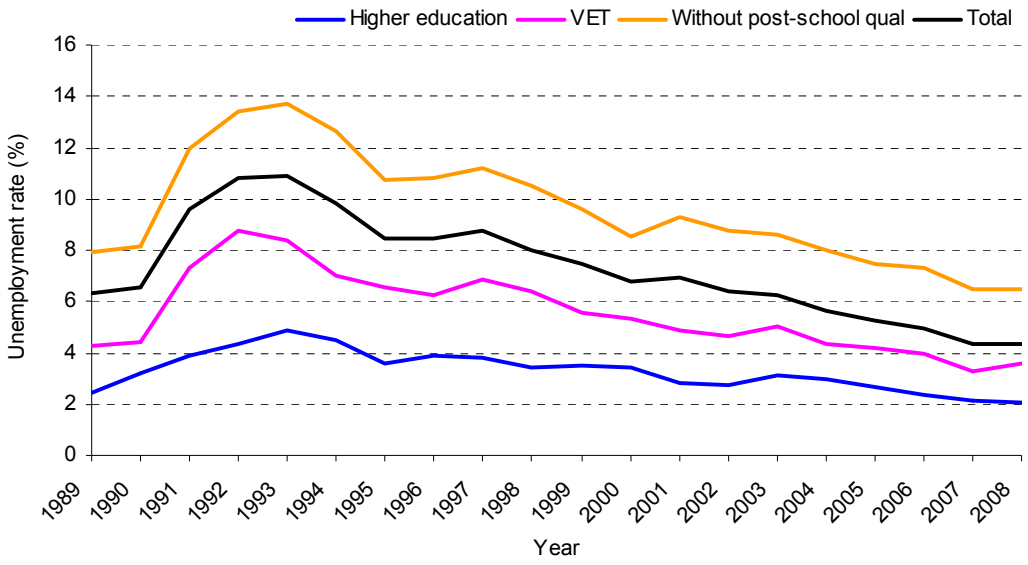
Source: Derived from modelling by the author, based on the unit record file, ABS Household Expenditure Survey, and Survey of Income and Housing, 2003–04.

VET and the slowdown

The economic slowdown has important implications for VET and the skills base. First, the demand for training will be affected. Secondly, there will be long-term ramifications.

On the first point, the implications are ambiguous. On the negative side, firms suffering financial stress will typically reduce the amount of training, although it is better to have workers training than sitting around being underemployed. If previous experience is any guide, the most obvious example of this is a likely downturn in apprenticeship training, with apprentices being laid off and fewer taken on. On the positive side, the opportunity cost of training goes down in an economic downturn. For individuals, study is preferable to unemployment because of its potential to improve employability. Similarly, employees may feel that increasing skills will provide some protection against being laid off and, in any case, will provide greater employment opportunities. Certainly, there is a strong relationship between unemployment rates and level of qualification (figure 1). Those with higher-level qualifications have lower unemployment rates at all stages in the economic cycle, and this is particularly evident in a downturn.

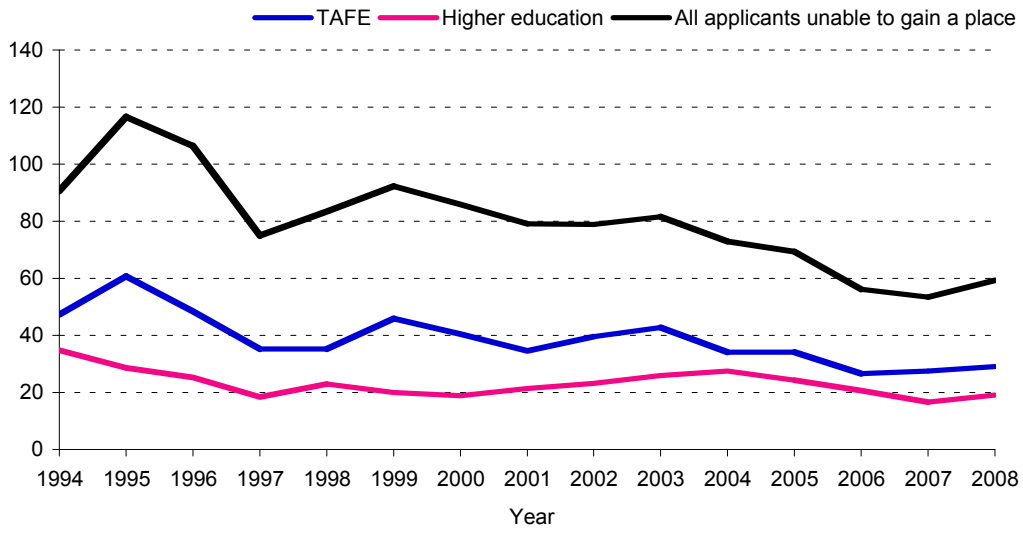
Figure 1 Unemployment rates by level of qualification



Source: ABS Survey of Education and Work.

Quantifying the likely increase in student demand is difficult. I do not have data on student demand to hand. However, the ABS publishes unmet student demand (see figure 2), which shows that unmet student demand was historically at a high level in the mid-1990s following the economic slowdown of the late 1980s to early 1990s. In the same vein, unmet student demand has been at very low levels, at a time when unemployment has been at historically low levels. The reason that unmet demand is not the same as demand is that the supply of training places expanded significantly in the late 1990s (as a response to the high level of unmet demand).

Figure 2 Tertiary education applicants unable to get a place

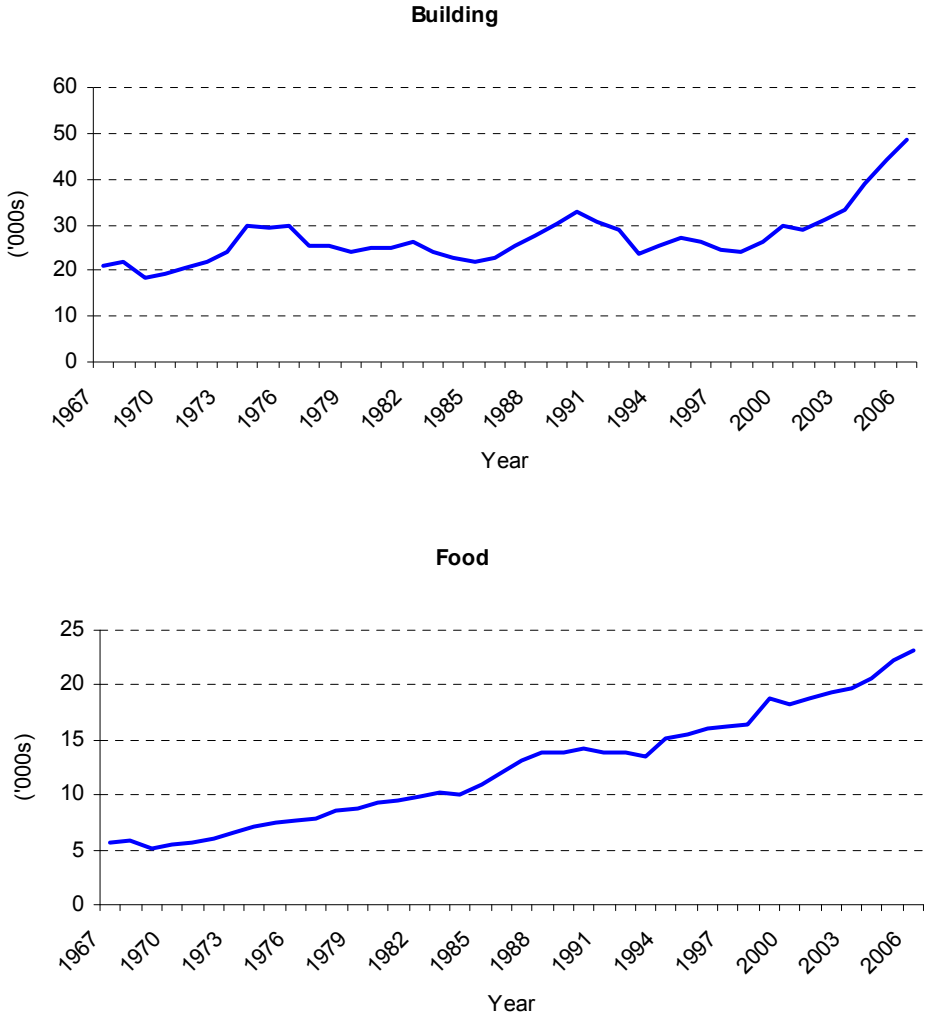


Source: ABS Survey of Education and Work.

Whether the increased demand for education and training by individuals will outweigh the decrease in the demand by firms is difficult to establish and no doubt will vary by occupation and field of study.

There is no doubt that apprenticeship numbers will be affected by a slowdown, and the Commonwealth Government has already introduced incentives for firms to employ apprentices who have been laid off (Department of Education, Employment and Workplace Relations 2009). Historical experience suggests that metal and vehicle, electrical and building apprenticeships are the ones most sensitive to the economic cycle. By contrast, printing is on a downward path because of technological change, while food apprenticeships may be affected but against an upward path. To illustrate the magnitudes, the numbers of apprentices are given for building and food over the last 40 years (figure 3).

Figure 3 Apprentices in-training by trade occupation, selected occupations 1967–2006



Source: Karmel and Mlotkowski (2007).

We have no analogous experience for traineeships to draw on. However, the fact that the implicit wage subsidy is more important for traineeships than apprenticeships (see Cully 2008) may provide a buffer; employers may substitute trainees for workers who would not get the subsidy. In any case, most of the occupations with traineeships are relatively lowly skilled, and therefore skills can be learned on the job. Thus in an upswing such occupations can recruit untrained people.

By contrast, the implications for some of the trades are likely to be more serious. A stylised model of trade training is that entrants to the occupation are young men (under the age of 25, say) and that thereafter there is a steady attrition. This attrition goes up when times are bad because workers are laid off. What makes a response difficult in a subsequent upturn is that trade training is quite

lengthy and relatively few ex-tradesmen return to the trade.[4] The one part of the equation that is amenable to policy intervention is the trade training. While the apprenticeship pathway is tried and true, it is not satisfactory in a downturn, when employers either lay off apprentices or do not take them on. An institutional model may be worth considering; importantly here, intakes are not dependent on employers.

However, it is worth making a final comment on traineeships. From a policy perspective the emphasis has been on traineeships as a model of skill acquisition, but the original conception of traineeships as outlined by Peter Kirby's inquiry into labour market programs (Committee of Inquiry into Labour Market Programs 1985) was one aimed at providing a pathway for young unemployed people. Thus it may well be timely to reconsider traineeships as a labour market program rather than a training program.

[4] I am a little diffident with this characterisation. What we see clearly in the data is relatively few older people undertaking apprenticeships and steady net attrition by age. Thus while some older ex-tradesmen may return to the trades, they are clearly outweighed by older persons leaving. See Karmel and Ong (2007) for a relatively sophisticated modelling of the data.

References

Committee of Inquiry into Labour Market Programs 1985, *Report of the Committee of Inquiry into Labour Market Programs* , Peter Kirby, chair, AGPS, Canberra.

Cully, M 2008, 'Youth wages, training wages and productivity: The economic anatomy of traineeships', *2008 minimum wage research forum proceedings*, vol.1, pp.267–87, Australian Fair Pay Commission, Canberra.

Department of Education, Training and Workplace Relations 2009, *Securing apprenticeships and traineeships: Fact sheet*, DEEWR, Canberra.

Karmel, T & Mlotkowski, P 2007, *Modelling the trades: An empirical analysis of trade apprenticeships in Australia*, 1967–2006, NCVER, Adelaide.

Karmel, T & Ong, K 2007, *Will we run out of young men? Implication of the ageing of the population for the trades in Australia*, NCVER, Adelaide.