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The demand for training

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About the research

The demand for training,
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This paper was presented in Sydney in September 2008 at a seminar conducted by Skills Australia and the Academy of Social Sciences.

This paper examines the demand for training. It concentrates on the factors that affect individual and employer demand and points out that accredited vocational education and training (VET) needs to be considered in the context of extensive use of non-accredited and on-the-job training.

Key messages

- The demand for training by individuals depends on the premium attached to skill, as well as the costs of the training, which may be split into direct costs—such as tuition fees—and the indirect opportunity costs.
- The demand for training by employers is driven by the need to acquire skilled labour (in the case of apprenticeships), and by business needs in most other cases.
- The demand for training by employers is variable across industries and tends to be much higher for large organisations than for small enterprises. The demand for unaccredited training is also much larger than the demand for accredited training.
- The distortion to the prices that individuals pay for training caused by government intervention means that governments do have to steer the provision of training places. Here, they should be guided by labour market signals, in particular, by vacancies, unemployment and wage rates.

Tom Karmel
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The demand for training

Demand for training needs to be considered in a number of dimensions. The first is the type of training. The second is who is the agent (the demander), and the third is the institutional setting. Training can be accredited, formal but not accredited, or informal, such as on-the-job training. It can also be at various levels—in the vocational education and training (VET) sector, from certificates I through to advanced diplomas. It can also cover many fields of study. For example, a very wide range of people undertake occupational health and safety training, while other training could be for very specific technical skills or more generic business and communication skills. Formal training can cover whole qualifications or, as is very common in Australia, a selection of one or more modules.

The 'demanders' of training can either be individuals or employers. Individuals typically undertake training because they see some sort of benefit in it—the benefits outweigh the costs. In VET, almost all individuals undertake training for employment-related reasons (table 1). Most individuals foresee future benefits, although on occasions individuals will undertake training because 'they have to', either because it is mandated by an employer or because it is necessary under an obligation associated with a social security benefit.

Employers demand training for their employees because it will lead to higher skill levels and hence higher productivity, or because it assists in building the quality of their workforce. In relation to the latter, it is worth noting that, while a narrow economic perspective would suggest that employers will only engage in training which directly benefits the firm, we know that many employers are quite happy to support general training for their employees (that is, training which will be useful to the employee in other jobs).[1]

Finally, the institutional setting can range from training at a technical and further education (TAFE) institute or a private provider in a classroom, to an apprenticeship or traineeship combining off-the-job and on-the-job training, to formal training by a provider at the workplace, to computer-based training, and to informal training on the job. The whole notion of flexible delivery has become important in recent years.

In the remainder of this paper we wish to focus on two areas: the extent of training; and factors behind the demand for training. We end with some comments.

The extent of training

One difficulty is that we don't have much data about the demand for training. We observe from our VET statistics the numbers of students undertaking a course, but we do not know how many applied to undertake that course. So to a large extent we are observing the supply of training rather than the demand. However, we know that unmet demand is relatively low at the moment.[2]

[1] Smith, Oczkowski and Selby Smith (2008) argue that skilling employees is a very good strategy to retain staff and superior to merely good wages and conditions.

[2] In 2007, the number of persons unable to gain placement at TAFE institutes was 27 500 compared with 42 800 in 2003 (ABS 2003–07).

Putting this to one side, student statistics do give us an indication of the extent of demand for accredited VET. From table 2 we see, at least for the public sector, that demand is relatively even between males and females, covers the full range of ages, is concentrated at the certificate III level, and covers all fields of study (although there is little VET in the natural and physical sciences). Most students are studying part-time, with presumably most already in employment. The majority of students are studying on their own behalf, with around a quarter of students receiving support from their employers (ABS 2005, table 4).

The demand for training by employers is more difficult to measure. We know that the demand for training is variable across industries (table 3) and tends to be much higher for large organisations than for small enterprises (table 4). In fact, getting small and medium-sized business to recognise the value of training has been a long-standing policy issue.

The most obvious manifestation of employer demand for training is the number of apprentices and trainees. Figure 1 shows the number of commencements in recent years. We note that the number of commencing trade apprentices and trainees has been growing solidly for some years, while there has been some decline in the non-trade occupations, after remarkable growth from the end of the 1990s. In addition, many employers have other employees undertaking nationally recognised training (table 4).

We see that the proportions of employers providing unaccredited and informal training significantly exceed the proportions with apprenticeships or traineeships, or with employees undertaking a nationally recognised course. The demand by employers for unaccredited training is much larger than the demand for accredited training (table 4).

The employer demand outlined above does not include 'indirect demand'. By this we mean that employers may require a vocational qualification as a prerequisite to employing someone in a particular job. In fact, the proportion of employers with jobs in this category is quite large, as can be seen from table 5. However, outside the trades the number of jobs for which a vocational qualification is necessary is quite limited (Cully 2005a).

Factors behind the demand for training

Looking at the individual demand for training first: the factors driving demand are quite straightforward. Individuals, although sometimes implicitly, balance the benefits against the costs. The costs can be split into direct costs—such as tuition fees—and the indirect opportunity costs. The information we have on direct costs is limited to the public sector, where fees are highly subsidised. Fees vary between states (see Kronemann 2008), but are typically quite modest by comparison with university fees and those of private providers.

The Victorian policy document, *Securing jobs for your future: Skills for Victoria*, provides an insight into the latest thinking in this area. The document distinguishes between four levels of qualifications and indicates minimum and maximum fees and the average government contribution (table 6). Minimum fees range from $50 for a foundation course, to $225 for a diploma, while maximum fees range from $500 (a foundation course), to $1500 (diplomas). The average government contribution is very high—from 75% for diplomas to 90% for foundation courses.

The opportunity cost is more difficult to quantify because it depends on the individual. For example, an adult with good employment prospects studying full-time is foregoing a full-time wage. By contrast, the same adult studying part-time while being employed is foregoing leisure in the evenings or on the weekend. An early school leaver studying full-time may be foregoing very little if the alternative prospect is remaining at school (heaven forbid) or being on the youth allowance.

The benefits from training are usually taken to be improved employment prospects and higher wages. These benefits depend very much on the level of the qualification, but they also depend on the field. On the whole, a diploma/degree is worth more than a certificate III/IV, which is worth

more than a certificate I/II. Virtually no certificates I/II are worth more than the completion of Year 12, and only one certificate III/IV (architecture and building) is worth appreciably more than the completion of Year 12. Most diplomas and degrees are worth more than a certificate III/IV, although there is some crossover. For example, a certificate III/IV in architecture or building (trade fields) leads to higher wages on average than diplomas/degrees in architecture and building, agriculture, and creative arts. Table 7 gives a recent set of estimates.

Taking costs and benefits together, Long and Shah (2008) conclude that VET is a good investment for males undertaking diplomas or certificates III or IV, and females undertaking diplomas, with rates of return generally exceeding 20% for those studying full-time. Rates of return increase greatly for part-time students because foregone earnings are lower. They also note that an increase in tuition fees would reduce rates of return, but they remain healthy even under high-fee scenarios.

The point is that the demand for training from an individual depends on the premium attached to skill, as well as the costs of the training. If the premium is low, then the demand for training will be low. A point to note here is that there has been much rhetoric about the need to encourage individuals to consider a trade rather than automatically aspire to a university degree. But the available evidence suggests that *on average* people with degrees are more highly paid than those in the trades.

We can also get indirect evidence of the demand for training from the completion rates we observe. We know that, while there is some variation across occupations, on average less than 50% of apprentices and trainees complete their contract of training (table 8). This suggests that there is a very large number of apprentices and trainees for whom the benefits are insufficient to induce them to complete their training or, alternatively, the benefits can be realised without having to obtain the qualification.

We now turn to demand by employers. The large numbers of apprentices and trainees shows that there is considerable demand for this type of training.[3] In the trades, Nechvoglod, Karmel and Saunders (forthcoming) show that the costs to an employer of an apprenticeship are very substantial, mostly because of high costs of supervision in the early years. Therefore, the demand is driven by the need to acquire skilled labour (Stevens 1994), and this idea is supported by the relationship between the economy and the number of apprentices; the growth in apprentice numbers in recent years can be attributed to the buoyant labour market (Karmel & Mlotkowski 2008, for example). Trainees are a different story and Cully (forthcoming) points to the implicit wage subsidies provided by government incentives. So perhaps traineeships are more about employment than training.

The remainder of employer demand for training is presumably driven by business needs, and there is a great deal of literature on the return on investment (in training). Smith, Oczkowski and Selby Smith (2008) argue that training, or a culture of workforce development, is beneficial in terms of attracting and retaining skilled employees, over and above any direct impact on productivity. Recent surveys of business (for example, the Allen Consulting Group 2006) indicate that skilled labour constraints are high among business concerns.

Concluding comments

We wish to make the point that our discussion of the demand for training is couched in terms of individuals and employers. This is a neoclassical economic framework in which the focus is on the actors in the economy. We do not think of the demand for training as being driven by 'the needs' of the labour market in some deterministic sense. That is, we do not talk of there needing to be a particular number of training places for a specific occupation, which is often the language of

[3] Anecdotal evidence suggests that there are plenty of applicants for apprenticeships from which we conclude that the number of apprentices is measuring demand. The quality of applicants is another matter.

industry and government. Rather, we focus on signals being provided by the labour market, on which individuals in particular base their decisions to undertake training. These signals are simply the number of vacancies, differential unemployment and wage rates, and expectations of these variables in future years.

In making this comment we point to three stylised facts. First, apart from the licensed occupations (particularly the professions and some of the trades), employers rarely require job applicants to hold a non-school qualification (Cully 2005b). They are much more likely to specify a set of skills and personal attributes they expect an individual to have. Another way of putting this is that, while all jobs can be assigned into an occupation, the extent of pure occupational labour markets—those characterised by a required qualification—is limited. Table 9, which shows the extent of formal post-school VET qualifications by occupation, adds detail to these comments. Even in the trades the proportion with a VET certificate is nowhere near a pure occupational labour market (automotive tradespersons is the highest at 71.0% in 2006).

A related observation is that informal on-the-job training is a very important path for skills acquisition. Richardson (2004) estimates that the value of skills acquired through on-the-job training is of the order of $30 billion per annum, which is way in excess of the level of government funding for formal VET, at around $5 billion per annum.

The second point is that the match between training and the labour market is very loose. While someone may train in a particular area, there is no guarantee that in a narrow sense they will then work in an occupation that matches. Where they work will depend on the nature of the training (in particular, the extent to which the training is narrowly vocational) and the availability of work (for example, the most common occupation for VET graduates in the arts and media is sales assistant [Karmel, Mlotkowski & Awodeyi 2008]).

The third point is that governments have played a very important role in determining the demand for training. There is no doubt that the provision of heavily subsidised places in VET has underpinned the high level of demand we have seen. Similarly, our view is that incentives for trainees have been a very important factor in their growth. Implicit wage subsides can be over 20% (Cully forthcoming). These subsidies may, in fact, have led to the substitution of work-related courses. Between 1997 and 2005, the number of hours of employer-provided training per working hour fell by 22%, at the same time as existing worker traineeships came to account for around a third of trainee commencements. This suggests that some government incentives do not actually increase the level of training to a large degree. Toner, Cully and Ong (2007) find small effects on training of apprenticeship incentive payments, and this is supported by Nechvoglod, Karmel and Saunders's (forthcoming) observation that the incentives are not material relative to overall costs. In these cases a high dead weight cost is implied.

In thinking about the optimal allocation of government funds for training we make a number of observations. First, government intervention in the market can be easily justified with reference to capital market imperfections (the difficulties faced by individuals in borrowing for investment in education), externalities (the positive effect that skilled individuals have on others), and inadequate information available to individuals and firms. However, much government intervention needs to be considered in other terms, such as a desire to ensure that all individuals have a firm educational foundation (that is, an extension of compulsory schooling), and a push to minimise the numbers of individuals on various forms of social support. Finally, while we have some faith in the value of market signals and the ability of individuals to respond sensibly to them, the distortion to the prices that individuals pay caused by government intervention means that governments do have to steer the provision of places. Here, they should be guided by labour market signals, in particular, vacancies, unemployment and wage rates.

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Tables and figures

Table 1 Reasons for undertaking VET, 2007

	Graduates	Module completers
	%	%
Employment-related outcome	77.7	66.6
Further study outcome	4.7	3.0
Personal development outcome	17.7	30.4

Notes: Graduates have completed a qualification, while module completers have left the VET sector having completed at least one module, but not a full qualification.

Source: NCVER Australian vocational education and training statistics: Student outcomes 2007—Summary.

Table 2 VET students by selected characteristics, 2007

	'000	%
Sex		
Males	868.0	52.1
Females	794.2	47.7
Not known	2.8	0.2
Age		
14 years and under	11.0	0.7
15–19 years	433.2	26.0
20–24 years	275.6	16.6
25–44 years	586.1	35.2
45–64 years	310.4	18.6
65 years and over	26.5	1.6
Not known	22.1	1.3
Study mode		
Part-time students	1 466.8	88.1
Full-time students	198.2	11.9
AQF qualifications		
Diploma or higher	166.0	10.0
Certificate IV	188.7	11.3
Certificate III	476.8	28.6
Certificate II	281.6	16.9
Certificate I	100.1	6.0
AQF sub-total	1 213.1	72.9
Non-AQF qualifications		
Other recognised courses	251.1	15.1
Non-award courses	87.4	5.2
Subject only—no qualification	113.4	6.8
Non-AQF sub-total	451.9	27.1
Field of education		
Natural and physical sciences	5.9	0.4
Information technology	36.6	2.2
Engineering and related technologies	278.8	16.7
Architecture and building	111.9	6.7
Agriculture, environmental and related studies	70.6	4.2
Health	85.2	5.1
Education	51.5	3.1
Management and commerce	337.9	20.3
Society and culture	161.9	9.7
Creative arts	44.1	2.6
Food, hospitality and personal services	169.2	10.2
Mixed field programs	198.0	11.9
Subject only—no field of education	113.4	6.8
Total students	**1 665.0**	**100.0**

Source: NCVER Australian vocational education and training statistics: Students and courses, 2007.

Table 3 Employer-provided training by industry, 2001–02

	Provided unstructured training in 2001–02	Provided structured training in 2001–02	Expenditure on structured training 2001–02
	%	%	Net $ per employee
Agriculture, forestry and fishing	n/a	n/a	n/a
Mining	74.3	45.2	1 643.0
Manufacturing	83.2	33.6	434.3
Electricity, gas and water supply	90.7	86.7	1 279.1
Construction	73.4	42.0	207.7
Wholesale trade	71.1	36.5	422.3
Retail trade	84.5	34.1	127.0
Accommodation, cafes and restaurants	86.3	41.3	146.8
Transport and storage	50.4	17.0*	426.3
Communication services	52.3	37.1*	1 279.3
Finance and insurance	77.5	64.0	1 323.4
Property and business services	79.0	42.2	536.7
Government administration and defence	98.2	87.5	718.8
Education	92.1	72.9	478.8
Health and community services	85.2	57.9	382.9
Cultural and recreational services	79.7	39.7	225.0
Personal and other services	94.5	47.5	859.4
All industries	**79.2**	**41.0**	**458.4**

Notes: * Indicates the estimate has a relative standard error of between 25% and 50% and should be used with caution.
Source: Cully (2005b).

Table 4 Employers' demand for training: Employers engaging with training in the last 12 months, by employer size, 2005

	Apprenticeships and traineeships	Nationally recognised training	Unaccredited training	Informal training	No training
	%	%	%	%	%
Small	24	19	46	67	16
Medium	40	39	74	89	2
Large	54	70	91	97	0

Source: NCVER Australian vocational education and training statistics: Employers' use and views of the VET system, 2005.

Table 5 Employers' indirect demand for training: Employers who have vocational qualifications as a job requirement, by employer size, 2005

	Vocational qualifications as job requirement
	%
Small	30
Medium	49
Large	75

Source: NCVER Australian vocational education and training statistics: Employers' use and views of the VET system, 2005.

Table 6 Tuition fees structure and government funding rates, Victoria, 2009

Level of qualification	Award	Minimum fee	Maximum fee	Average government contribution
		$	$	%
Foundation	Foundation level and pre-accredited courses	50	500	90
Skills creation	Certificates I & II	105	875	87
Apprenticeships and traineeships	Various (mostly certificate III)	57	903	87
Skills building	Certificates III & IV	120	1 000	87
Skills deepening	Diploma and advanced diploma	225	1 500	75

Source: Victorian Government (2008).

Table 7 Weekly wages for full-time wage and salary earners by level and field of qualification, 2005

	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: Karmel (forthcoming).

Table 8 Apprentice and trainee completion rates by occupation (sub-major groups) for contracts and individuals, 2002 commencements

Occupation (ASCO) group	Contract completion rates	Number of contracts	Individual completion rates	Number of individuals
	%	'000	%	'000
Managers and administrators	**50.0**	**1.4**	**50.5**	**1.4**
11 Generalist managers	44.0	0.7	44.1	0.7
12 Specialist managers	60.0	0.1	62.2	0.1
13 Farmers and farm managers	55.2	0.6	56.0	0.6
Professionals	**56.3**	**2.1**	**58.5**	**2.0**
21 Science, building and engineering professionals	65.3	0.3	67.4	0.3
22 Business and information professionals	63.5	0.2	64.8	0.2
23 Health professionals	47.7	0.9	50.0	0.8
24 Education professionals	77.3	0.2	78.3	0.2
25 Social, arts and miscellaneous professionals	53.7	0.5	56.0	0.5
Associate professionals	**42.9**	**20.5**	**43.7**	**20.1**
31 Science, engineering and related associate professionals	56.8	1.1	58.4	1.1
32 Business and administration associate professionals	39.7	14.2	40.4	13.9
33 Managing supervisors (sales and service)	46.6	4.0	47.1	4.0
34 Health and welfare associate professionals	51.4	0.5	53.9	0.4
39 Other associate professionals	59.0	0.7	61.6	0.7
Tradespersons and related workers	**46.5**	**67.2**	**47.4**	**59.8**
41 Mechanical and fabrication engineering tradespersons	59.0	6.8	60.0	6.3
42 Automotive tradespersons	51.3	9.9	51.8	8.7
43 Electrical and electronics tradespersons	55.6	7.2	56.7	6.5
44 Construction tradespersons	46.4	15.6	47.0	13.9
45 Food tradespersons	30.7	12.9	31.1	11.1
46 Skilled agricultural and horticultural workers	51.7	3.6	53.0	3.4
49 Other tradespersons and related workers	45.2	11.1	45.8	9.6
491 Printing tradespersons	59.9	0.6	63.0	0.6
492 Wood tradespersons	48.8	2.5	50.1	2.2
493 Hairdressers	39.9	6.0	39.2	4.9
494 Textile, clothing and related tradespersons	52.7	0.5	53.1	0.5
498 Miscellaneous tradespersons and related workers	52.8	1.1	54.1	1.0
Advanced clerical, sales and service workers	**49.7**	**6.4**	**50.9**	**6.3**
51 Secretaries and personal assistants	61.2	1.5	64.2	1.4
59 Other advanced clerical and service workers	45.1	4.6	45.7	4.6
Intermediate clerical, sales and service workers	**48.7**	**101.2**	**49.9**	**98.4**
61 Intermediate clerical workers	56.6	29.8	57.9	29.1
62 Intermediate sales and related workers	39.9	37.4	40.8	36.3
63 Intermediate service workers	51.5	34.0	52.9	33.0
Intermediate production and transport workers	**55.5**	**34.1**	**56.7**	**33.3**
71 Intermediate plant operators	60.1	3.4	62.1	3.3
72 Intermediate machine operators	52.5	3.6	52.8	3.6
73 Road and rail transport drivers	56.4	13.0	57.8	12.6
79 Other intermediate production and transport workers	54.4	14.1	55.3	13.8

Occupation (ASCO) group	Contract completion rates	Number of contracts	Individual completion rates	Number of individuals
	%	'000	%	'000
Elementary clerical, sales and service workers	**46.6**	**22.5**	**47.9**	**21.9**
81 Elementary clerks	61.5	1.4	62.3	1.4
82 Elementary sales workers	46.2	15.1	47.0	14.8
83 Elementary service workers	44.0	6.0	46.5	5.7
Labourers and related workers	**47.7**	**29.3**	**48.8**	**28.6**
91 Cleaners	51.1	7.0	51.8	6.8
92 Factory labourers	43.0	12.7	43.9	12.4
99 Other labourers and related workers	51.4	9.7	52.9	9.4
All occupations	**48.4**	**284.8**	**49.5**	**271.7**

Notes: Completion rates are derived for both contracts of training and individual apprentices and trainees. The individual completion rate disregards contract changes to employer and occupation details.

ASCO = Australian Standard Classification of Occupations

Source: Australian vocational education and training statistics: Apprentices and trainees, 2007—Annual.

Table 9 Proportion of persons with a certificate I–IV qualification by occupation, 1996 and 2006

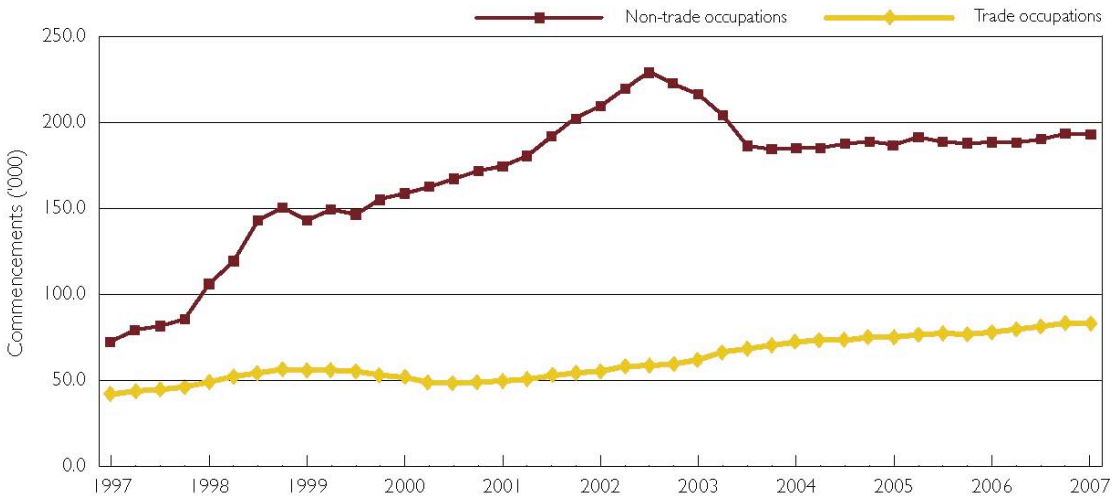
	1996	2006	Change
	%	%	% points
1 Managers and administrators	16.8	18.6	1.8
2 Professionals	5.9	6.8	0.9
3 Associate professionals	21.4	23.5	2.1
40 Tradespersons and related workers, nfd	53.6	50.7	-2.9
41 Mechanical and fabrication engineering tradespersons	65.3	68.7	3.4
42 Automotive tradespersons	66.8	71.0	4.2
43 Electrical and electronics tradespersons	61.4	63.8	2.5
44 Construction tradespersons	58.2	59.7	1.5
45 Food tradespersons	31.0	35.3	4.2
46 Skilled agricultural and horticultural workers	25.3	35.6	10.3
49 Other tradespersons and related workers	46.2	52.0	5.8
5 Advanced clerical and service workers	12.3	16.1	3.9
61+81 Clerical workers	10.3	17.5	7.2
62+82 Sales workers	9.6	13.7	4.0
63+83 Service workers	12.4	24.5	12.0
71+72 Machine and plant operators	15.8	22.5	6.7
73+79 Transport workers	16.6	20.9	4.4
60+70+80 All other clerical, sales, service, production and transport workers	15.7	26.1	10.4
9 Labourers and related workers	10.4	16.5	6.1
Not stated	8.8	13.3	4.4
Inadequately described	20.6	19.8	-0.8
Total employed	**17.9**	**21.5**	**3.6**
Not applicable[(a)]	8.2	10.3	2.1
Total persons	**13.5**	**16.7**	**3.2**

Notes: (a) Occupation not applicable comprises unemployed persons, persons not in the labour force, and persons with labour force status not stated.

nfd = not further defined

Source: Karmel (forthcoming).

Figure 1 Apprentice and trainee commencements by occupation (trades and non-trades), 12 months ending series, 1997–2007



Notes: Trade occupations are defined as all 'tradespersons and related workers' (ASCO 2nd edition).
Non-trade occupations are defined as all ASCO (2nd edition) occupations with the exception of 'tradespersons and related workers' (i.e. major groups 1–3 and 5–9).

Source: NCVER Australian vocational education and training statistics: Apprentices and trainees, 2007—Annual.