NCVER

Private returns to vocational education and training qualifications

Michael Long

Chandra Shah

Centre for the Economics of Education and Training
Monash University

Australian Government
Department of Education, Employment and Workplace Relations

A National Vocational Education and Training **Research** and **Evaluation** Program **Report**

NCVER

Private returns to vocational education and training qualifications

Michael Long

Chandra Shah

Centre for the Economics of Education and Training, Monash University

Publisher's note

To find other material of interest, search VOCED (the UNESCO/NCVER international database <http://www.voced.edu.au>) using the following keywords: investment in training; qualifications; return on investment; training; training course.

The author/project team was funded to undertake this research via a grant under the National Vocational Education and Training Research and Evaluation (NVETRE) Program. These grants are awarded to organisations through a competitive process, in which NCVER does not participate.

The NVETRE program is coordinated and managed by NCVER on behalf of the Australian Government and state and territory governments, with funding provided through Department of Education, Employment and Workplace Relations. This program is based upon priorities approved by ministers with responsibility for vocational education and training (VET). This research aims to improve policy and practice in the VET sector. For further information about the program go to the NCVER website <http://www.ncver.edu.au>.

ISBN 978 1 921412 36 3 print edition
ISBN 978 1 921412 37 0 web edition

TD/TNC 92.40

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/2011.html>

About the research

Private returns to vocational education and training qualifications

Michael Long and Chandra Shah

Much attention has been given to thinking about how to respond to the current skills shortage in Australia. One response has been to encourage people to enrol in vocational education and training (VET). But why enrol in a VET course? An essential part of the story is the financial benefit from doing a course. This study provides estimates of the rates of return to students enrolling in VET courses.

An estimate of the rate of return from enrolling in a VET course considers the study as an investment by the student in his or her future income. It treats the costs of study as an investment and expresses future increases in income resulting from undertaking the course as a rate of return on that investment—akin to an interest rate. In other words, the higher the interest rate, the better the investment for the student.

The rate of return framework provides a very useful way of looking at the private benefits of various qualifications. However, it is important to understand how it is constructed because the structure plays an important role in determining the answers. Distinctive features of the model used in this paper include the following:

- The cost of education includes forgone income. This means that the rate of return is lower for full-time students than for part-time students because their forgone earnings are included as a cost. This values leisure as having no value, and doesn't include any personal satisfaction that might come from the 'full-time student experience'.
- Income is used rather than, as is more common, earnings. The advantage of this is that the calculations include the effects of qualifications in securing employment.
- Finally, the model excludes those with university qualifications, and so it cannot be used to compare the value of VET and university qualifications.

Key messages

- VET is a good investment for males undertaking diplomas or certificates III or IV and females undertaking diplomas, with rates generally exceeding 20% for those studying full-time.
- For males, the rates of return are similar for full-time students doing diplomas and those completing higher-level certificates. While incomes are higher for those undertaking diplomas, the period of study is longer.
- Rates of return increase greatly for part-time students because forgone earnings are lower.
- An increase in tuition fees would reduce rates of return, but they remain healthy even under high-fee scenarios.

This study provides valuable insights into the private returns from undertaking VET. However, many interesting questions remain, including whether these rates have changed in recent years, how they compare to the return from university level study and the exact nature of the interrelationship between the year left school and the level of VET qualifications.

Tom Karmel
Managing Director, NCVER

Contents

Tables and figures

Tables

Figures

Executive summary

This report presents estimates of the private rates of return for students studying for vocational education and training (VET) qualifications in Australia. Estimates of rates of return are commonly used by governments, businesses and others to compare the merits of different forms of investment where costs or benefits or both are distributed over time. The approach results in a single number that can be interpreted as an interest rate: the higher the interest rate, the higher the rate of return and the better the investment.

Education and training are grist to the mill of this type of analysis—students pay for their education and training qualification while they are studying and then (hopefully) receive higher income further down the track. As with any calculations involving investment and expected future earnings, there is considerable uncertainty for individual students—they may not pass their course; they may not be able to use their knowledge and skills because of unemployment, illness or death; they may decide on a change in direction in life and not want to use their knowledge and skills; and so on. The uncertainty in the estimates and the risks in the undertaking, however, are not necessarily greater for education and training than for other investments.

Students make similar kinds of calculations about courses, but often only in the vaguest of ways—how long does the course take? how much does it cost? will I find a job when it's over? and how much will it pay? They are also motivated by intangibles—will I like the course? and will I like the kind of job I might get at the end of the course?

More rigorous calculations of the rates of return to VET courses are required to determine whether VET courses provide potential students with sufficient financial incentives to enrol. Analyses of data from the Australian Bureau of Statistics (ABS) 2005 Survey of Education and Training were used to identify the additional income people with different levels of educational attainment (advanced diplomas and diplomas; certificates III and IV; and certificates I and II) received at different ages. This additional income was compared with the costs of enrolling in VET courses to provide estimates of rates of return separately for males and females of different ages and with different levels of schooling enrolled full- or part-time in different level courses.

The major findings and their implications are highlighted in the points below:

- *The rates of return to study in higher-level VET courses mostly provide students with a better-than-adequate incentive to enrol.* Certificates I and II may be an exception. Although the estimated rates of return for certificates I and II are also sometimes high, they are based on small income effects. This combination of small income effects and small costs leads to unstable estimates. However, even if returns to these lower-level qualifications are low, they may still be valuable to students as stepping stones to higher-level qualifications.
- *The rates of return to study in VET courses differ from those reported in some earlier studies.*
  - The rates of return for advanced diplomas and diplomas are higher than corresponding results reported in earlier studies.
  - The rates of return for certificates III and IV are higher or similar to corresponding results reported in some earlier studies.
  - The rates of return for certificates I and II are variable, and earlier studies suggested higher rates of return for lower-level VET courses.

The variability between this and previous studies can be attributed to differences in:

- how qualifications were classified in the analyses—the Australian Qualifications Framework (AQF) categories used in this analysis do not fully correspond with classifications used in previous studies
- comparison groups used—this study used people whose highest level of schooling was Year 12, Year 10 or Year 9; whereas other studies have used people without post-school qualifications who completed or did not complete school, or those who left school before age 16
- how the income equations were formulated—this study used income rather than the wages and salaries often used in other studies. It also accounted for employment effects by including incomes of employers and the self-employed as well as those who are not employed. Furthermore, the income equations used in this study deliberately include only a more limited set of control variables than those sometimes used in other studies.

✧ *Increased tuition charges to students reduce, but mostly do not remove, the economic incentives for students to enrol in higher-level VET courses.* The effect of higher tuition fees on lower-level VET courses is less certain. This result is consistent with findings that have led other researchers to advocate an increased contribution by students to the costs of their study.

✧ *The rates of return for advanced diplomas and diplomas and for certificates III and IV are similar,* with some variation across other categories. The similar rates of return suggest that the value of the *additional* investment in obtaining an advanced diploma or diploma is commensurate with that made to obtain a certificate III or IV.

✧ *Age makes only a small difference to the rates of return*, which suggests that older students have almost the same economic incentives to enrol in VET courses as younger students. Policies designed to encourage lifelong learning and to upgrade the skills of older workers need to consider non-financial aspects of the motivation to study.

✧ *Rates of return are higher for part-time study than for full-time study.* Full-time students face additional costs because they forgo the opportunity of full-time work while studying and the income they could have received. About three in every four VET students are enrolled part-time.

✧ *Rates of return are mostly slightly higher for those whose highest level of schooling is Year 10 rather than Year 12,* especially for females, which points to the value of VET as a pathway for persons who do not complete their schooling.

Introduction

This report presents estimates of the private rates of return for vocational education and training (VET) qualifications in Australia. The underlying approach views education and training as an investment by the student that has the potential to yield future economic benefits.

A rate of return is typically a single number—such as 10%—that can be interpreted as an interest rate that summarises the costs and benefits, over time, associated with undertaking some investment—generally, the higher the rate of return, the better the investment.

A single number summarising the costs and benefits of an investment over time allows governments and businesses to compare the financial merits of different projects and to decide which, if any, projects to fund. Rates of return can be estimated for a wide variety of investments, including major infrastructure such as freeways (ConnectEast Management 2004) and railways (Booz, Allen & Hamilton 1999) and funding programs to reduce early school leaving (Allen Consulting Group 2003).

In the context of education, estimates of private rates of return measure the economic value of the qualification to the individual student. They can inform answers to questions about whether:

- students have a financial incentive to enrol
- some students (males or females; younger or older; early school leavers or Year 12 completers) have greater financial incentives to enrol than others
- some courses provide better financial outcomes than others
- the balance between the contributions of government, students and employers to the costs of the course is appropriate
- financial incentives for study have changed over time
- financial incentives for study vary among countries.

Answers to these questions form part of any discussion of broader issues about access to post-school education and skills shortages.

The next chapter briefly considers rates of return by examining an example of the way in which estimates are calculated. Subsequent chapters review previous research and then examine the distribution of VET qualifications and provide separate estimates of the benefits from, and costs of, VET qualifications. These are then combined into estimates of rates of return for types of VET qualifications, for male and female students, for full- and part-time students, for students with different ages and for different tuition costs. A final chapter considers the implications of the findings.

The concept of rates of return

This chapter provides a brief overview of the concept of rates of return. There are different ways of calculating rates of return. Consistent with much of the broader literature on the rates of return to educational qualifications, this report is concerned with the private *internal* rate of return. The term *private* is used because the focus is on the returns to the student him- or herself rather than to the government, the employer, or society as a whole.

Formulas can be used to calculate the internal rate of return from an educational qualification given information about the distribution of costs and benefits over time (see, for instance, Borland 2002). Conceptually, these formulas can be interpreted as saying that the rate of return is the interest rate that equates costs and benefits discounted by that interest rate over time.

The practical meaning of rates of return can be illustrated by a simple example. If, for instance, a course costs a student $3000 per year for two years and produces an increase in earnings of $2500 for the student in each of the first three years after completing the course and nothing thereafter, the rate of return is 0.0941 or 9.41% because when these costs and benefits are discounted by 9.41% the costs and benefits are equal (table 1).

Table 1 Calculation of rates of return for hypothetical costs and benefits

	Year	Discount	Costs		Benefits	
	t	r=0.0941	Nominal	Discounted	Nominal	Discounted
		1/(1+r)t	*$*	*$*	*$*	*$*
Study	0	1.00	3000	3000		
Study	1	0.91	3000	2742		
Work	2	0.84			2500	2088
Work	3	0.76			2500	1909
Work	4	0.70			2500	1745
Total				**5742**		**5742**

Notes: Rate of return of 9.41% equates the sum of discounted costs and benefits, rounding errors excepted. Calculations assume that annual costs and benefits are at the start of each year and are in constant dollars.

Equating costs and benefits over *time* is central to the concept of rates of return—$100 received today has more value than $100 received in ten years time. This observation is not based on the value-eroding effect of inflation, but on the ability to invest $100 today at a fixed interest rate and for it to be worth more in ten years time. The benefit of $2500 in year 2 in table 1 is discounted to $2088 because if $2088 had received 9.41% compounding for two years it would be worth $2500. The discounting converts future costs and benefits into their present-day equivalent value, and the discounting factor is the rate of return chosen because it equates all the costs and benefits distributed over time.

Discounting means that benefits obtained after several decades influence estimates of rates of return only slightly. Consequently, rates of return for older persons enrolling in a course often differ little from those of younger people because the 'extra' discounted benefits obtained by younger people, owing to their longer working life, are negligible.

Previous research

This chapter discusses some of the main components of rates of return—costs, benefits and time—in the context of previous empirical research that has estimated the rates of return to VET qualifications in Australia.

The costs

The costs of obtaining an educational qualification fall into three broad categories:

- *Course costs* include course fees, student amenity levies, text books, library fines, transport, computing equipment, other study-related materials and possibly accommodation (if a student has to live away from home in order to study). Fees can vary between courses, providers, states and, with concessions, among students in the same course offered by the same provider (Watson 2005). Rates of return, however, may not be very sensitive to assumptions about course costs (Ryan 2002a).
- *Opportunity costs* are the earnings that a student foregoes in order to study. These typically form the larger part of the costs for full-time students. For students studying or training for a VET qualification as part of their job, the opportunity costs are substantially less, although, to the extent that they are employed on training wages, they may still be a real cost.
- *Non-completion costs* are incurred when a student enrols and does not obtain a qualification and hence does not obtain the full or possibly any financial benefit from their incomplete study.

Costs can be reduced in different ways. For instance, some students receive textbook allowances, tool allowances or tax deductions that offset course costs; full-time students often work part-time during semester and full-time between semesters; and some students receive government payments through student assistance schemes—for example, Youth Allowance, Austudy and ABSTUDY. Employers can also pay for course costs or provide study leave.

The benefits

Higher levels of education are usually identified with two broad categories of economic benefit:

- increased earnings
- higher levels of employment.

Other benefits with economic consequences include improved health, lower incarceration rates, lower fertility and possibly better financial management (OECD 2001; Wolfe & Haveman 2001). Private economic effects of health, imprisonment and fertility are reflected in earnings and labour force participation. Some qualifications with no apparent positive economic benefit might still be valuable as stepping stones to qualifications that do have positive economic benefits (Gørgens & Ryan 2006).

Variation among estimates

Estimates of the benefits to students from enrolling in a VET course can vary between research studies because of differences in:

- *the nature of the data being analysing*—whether it is longitudinal or cross-sectional, sample or population
- *the population*—some studies focus on particular age (usually younger) groups while others draw on the working population; some focus on all or only full-time employees, while others include employers, the self-employed and possibly those not working
- *the measure of earnings or employment*—whether it is gross or after-tax; income or earnings, per hour or per week
- *the measure of educational qualification*—some studies use highest educational attainment while others are able to identify schooling separately and others have access to information on multiple qualifications; in some studies qualifications correspond to the Australian Qualifications Framework (AQF) while other studies use earlier qualification schemas
- *comparisons among educational attainment*—some studies compare the benefits of VET qualifications variously with early school leavers or school completers or those without any post-school qualification
- *the control variables used*—people with and without VET qualifications differ in a wide variety of ways (personal characteristics, prior educational attainment, and employment characteristics). Studies seek to ensure they are measuring the effect of educational qualifications on earnings and employment rather than these other factors by statistically controlling for varying combinations of these other characteristics
- *the statistical techniques employed*—a variety of multivariate statistical approaches are used to isolate the effect of education on labour market outcomes, from basic regression to more complex selection equations
- *the measurement of time*—some studies measure the distribution of labour market outcomes across a person's years of labour market experience, other use the age of the person.

Earnings

Ryan has conducted the most thorough analyses of returns to VET qualifications in Australia (2002a, 2002b). Table 2 summarises his estimates of the effects of VET qualifications on the pre-tax earnings of employees in full-time work. The categories of educational qualifications are based on a schema that predated the AQF and the current Australian Bureau of Statistics (ABS) classification—*Basic vocational qualifications* correspond approximately to certificate II, *Skilled vocational qualifications* to certificate III and an *associate diploma* to a certificate IV or diploma (ABS 2001). The table highlights the importance of the comparison group for the estimates.

Table 2 Wage effects of VET qualifications for full-time employees

VET qualification	Males	Females	Comparison group
Associate diploma	25.9	20.5	School non-completers
	9.4	7.6	School completers
	10.3	12.3	Basic vocational
	10.7	10.4	Skilled vocational
Skilled vocational	13.8	9.2	School non-completers
	0.0	0.0	School completers
	0.0	0.0	Basic vocational
Basic vocational	14.1	7.3	School non-completers

Source: Ryan (2002a, p.26). Estimated from regression equations that included a number of personal and labour market variables.

Table 2 suggests that for both males and females who had completed Year 12 at school, there was little financial incentive to enrol for any VET course other than an associate diploma—only persons who had not completed Year 12 received higher wages as a result of basic vocational and skilled vocational qualifications. Basic vocational and skilled vocational qualifications produced similar increments in earnings.

For persons in full-time employment, Chapman, Rodrigues and Ryan (2007) found larger wage effects of VET qualifications on earnings. They suggest that the gross full-time earnings for males with a diploma are 21% higher than for a corresponding male who completed Year 12 and had no post-school qualification and are 29% and 13% higher for a male with a certificate III or IV and a certificate I or II respectively compared with a similar male who did not complete secondary school. The corresponding values for females are 34%, 33% and 36%. These somewhat higher estimates may result from controlling for fewer employment characteristics.

Results from Miller and Mulvey (1996) indicate more modest wage effects for skilled and lesser skilled trade qualifications, especially for females. They examined hourly wages across all employees using the ABS 1993 Survey of Training and Education. Males with trade (skilled vocational) qualifications earned 8% more than males who left school aged 15 or earlier, while males with other post-secondary (basic vocational) certificates earned about 10% more. The corresponding values for comparisons with high school graduates were 4% and 6%, respectively. Females with trade qualifications earned 13% more than females who left school before age 15, while other post-secondary certificates had little effect on the earnings of females. The corresponding values for comparisons with high school graduates were 11% and minus 2%, respectively. Arguably, these estimates are biased downwards because they control for variables that are themselves consequences of the level of education.

Preston (1997) reported estimates of the effects of educational qualifications on weekly income for male full-time workers from the 1981 and 1991 censuses, controlling for an array of personal background characteristics. For the 1981 census, the income of males with a certificate (a broad category of that includes almost all non-school educational qualifications apart from degrees and diplomas) was 24% higher than that of males whose highest educational attainment was less than completion of high school and 9% more than persons who had completed secondary school. For the 1991 census males with certificates received 23% more than early school leavers and 10% more than high school graduates with no post-school qualifications.

The earnings effects of VET qualifications are almost uniformly calculated as percentages. Similar percentages do not always translate into the same number of dollars. For instance, even if a VET diploma increased the income of both males and females by 10%, the dollar increase in income for females is less than the dollar increase for males because the average income of females is lower than the average income of males.

Level of employment

An increased likelihood of working full-time rather than part-time or not at all can contribute as much or more to lifetime earnings as higher wages. The National Centre for Vocational Education Research (NCVER) Student Outcomes Survey canvasses the educational and labour force outcomes for graduates and other students in May of the year after course completion. The results suggest that VET qualifications improve employment levels. In 2005, 73% were employed before starting their course and 79% after completing it, including 13% who were not employed before the course but were employed after it (NCVER 2005a).

These values include a shift from school to work and movement from training to further education. Among those who were employed, 29% reported that their course had helped them to get a job, 8% that their course had helped them establish or expand their own business, and 15% that their course had helped them to change jobs, among other benefits (NCVER 2005b). These results suggest some saliency of VET qualifications for employment.

A comparison of results from surveys of recent higher education and VET graduates showed that the employment outcomes of VET qualifications were similar to those of the higher education sector after allowing for differences between the two groups (Ryan 2000). VET employment outcomes exceeded those of a group seeking employment over the same period from the broader population.

Several studies of the effect of educational qualifications on labour market outcomes have used analyses of various cohorts from the Longitudinal Surveys of Australian Youth (LSAY). One recent study reported that, compared with early school leavers who had no qualifications, over the period 1996–2000 when respondents were aged 20 to 25, time spent in full-time employment:

- ✧ increased by 12% with completion of an apprenticeship
- ✧ was little changed by completion of Year 12
- ✧ increased by 6% with completion of a TAFE certificate
- ✧ was 8% higher for a diploma or associate diploma (Marks, Hillman & Beavis 2003, pp.25–6).

Conversely, compared with early school leavers with no post-school qualifications, time spent looking for work (that is, unemployed) was 2% lower for those who had completed Year 12 or an apprenticeship, was 2% higher for those who had completed a TAFE certificate, and little different for those with a diploma or degree.

Analyses of two recent Longitudinal Surveys of Australian Youth cohorts by Gørgens and Ryan (2006) suggest that VET qualifications increase full-time employment rates at age 22 by ten to 13 percentage points relative to appropriate comparison groups. Benefits were similar for school completers and early leavers.

Ryan (2002a) estimated the effect of educational attainment on rates of full-time employment, controlling for a range of other personal and labour force characteristics. The results are shown in table 3. Overall they show some sizeable effects for basic vocational qualifications and associate diplomas for males, modest effects for skilled vocational qualifications, and lower effects of VET qualifications on full-time employment for females. These values may be biased downwards because the sample excludes persons not at least marginally attached to the labour force.

Table 3 Rates of full-time employment by educational attainment and sex compared with early school leavers with no post-school qualifications, 1993 and 1997

	Completed Year 12	Basic vocational	Skilled vocational	Associate diploma	University
	%	%	%	%	%
Males	0.06	0.14	0.06	0.13	0.12
Females	0.01	0.06	0.04	-0.02	0.11

Source: Adapted from Ryan (2002a, table 2, p.25) and derived from ABS 1993 Survey of Education and Training and ABS 1997 Survey of Education and Training. All values are marginal effects from probit equations predicting full-time employment from education and a vector of other variables. Results can be interpreted as percentage effects of educational attainment on full-time employment compared with early school leavers with no post-school qualifications. Values in italics are not statistically significant from zero.

Several studies highlight the variation among the extent to which the effect of VET qualifications on employment outcomes vary by level of qualification, other course characteristics and the characteristics of the individuals (Dumbrell et al. 2000; Lamb, Long & Malley 1998; Ryan 2000, 2002a).

Estimates of rates of return

Ryan (2002a) estimated the rates of return to VET qualifications using data from the 1997 ABS Survey of Education and Training. The results are summarised in table 4. The estimates are underpinned by similar wage effects, but the mode of study (full- or part-time) strongly affects

students' costs, mainly of the income forgone while studying. Additionally, while working full-time, individuals receive any benefits that may accrue to additional years of labour force experience. Consequently, the rates of return are substantially higher for individuals who are able to work full-time while studying.

The rates of return to full-time study of basic vocational and skilled vocational courses are similar to those of a university degree, which were recently estimated at 14.5% for young males studying full-time (Borland 2002). Returns to associate diploma courses, however, are lower.

Table 4 Estimated rates of return to VET qualifications

Study circumstances	VET qualification		
	Basic vocational	Skilled vocational	Associate diploma
	%	%	%
Males			
1 School leaver who undertakes his course full-time and works part-time	21.7	24.0	3.9
2 School leaver who undertakes his course full-time, does not work, but receives AUSTUDY	13.6	15.8	2.1
3 School leaver who undertakes his course part-time and works full-time	67.9	38.1	22.3
4 Thirty-five-year-old who undertakes his course part-time and works full-time	87.9	60.8	26.4
5 Unemployed 20-year-old who undertakes his course full-time	15.0	12.1	1.8
Females			
1 School leaver who undertakes her course full-time and works part-time	23.7	12.9	< 0
2 School leaver who undertakes her course full-time, does not work, but receives AUSTUDY	17.5	10.6	< 0
3 School leaver who undertakes her course part-time and works full-time	45.1	17.4	19.7
4 Thirty-five-year-old who undertakes her course part-time and works full-time	64.0	27.4	14.9
5 Unemployed 20-year-old who undertakes her course full-time	19.6	8.1	< 0

Source: Adapted from Ryan (2002b, p.32) and derived from the 1997 ABS Survey of Education and Training. *Basic vocational* and *skilled vocational* are compared with school non-completers who commence full-time work at age 16. Associate diploma is compared with Year 12 completers who commence full-time work at age 18.

Dockery and Norris (1996) compared the earnings of the trade groups with the earnings of individuals without post-school qualifications using the 1991 Census. The corresponding estimates of rates of return to VET qualifications varied widely among the different trades, but averaged 46% for males, while in two of the three trades examined for females, the negative wage effects implied negative returns. The estimates for females, in particular, are substantially lower than those for skilled vocational qualifications in table 4 although the correspondence between skilled vocational qualifications and apprenticeships in the two different classification schemes is loose.

McGuire (1994) also focused on rates of return to apprenticeship training. Comparing the weekly award earnings of apprentices and tradespersons with unapprenticed juniors and adult process workers produced an estimate of a rate of return of 15%.

Chapman, Rodrigues and Ryan (2007) report rates of return based on the earnings of full-time employees from the pooled cross sections of the Household Income and Labour Dynamics in Australia (HILDA) survey. Their estimates of rates of return are for full-time study and include an allowance for earnings forgone. The values in table 5 show estimates of rates of return across quartiles that provide a sense of the variation in rates of return.

Table 5 Estimates of internal rates of return for selected VET qualifications for different quantiles

	Males			Females		
Quartile	Q25 %	Q50 %	Q75 %	Q25 %	Q50 %	Q75 %
Diploma (2 years)						
Course cost: $500 pa	8.2	10.9	7.1	14.7	12.4	5.6
Course cost: $1000 pa	8.0	10.8	7.0	14.4	12.2	5.5
Course cost: $1500 pa	7.9	10.6	7.0	14.1	12.0	5.5
Associate diploma (1.5 years)						
Course cost: $500 pa	11.2	14.8	9.5	20.1	17.0	7.4
Course cost: $1000 pa	10.9	14.5	9.4	19.3	16.5	7.2
Course cost: $1500 pa	10.7	14.2	9.3	18.7	16.1	7.1
Certificate (1 year)						
Course cost: $500 pa	40.6	43.6	43.0	19.9	34.5	48.3
Course cost: $1000 pa	38.4	41.8	41.6	19.1	32.6	46.4
Course cost: $1500 pa	36.5	40.2	40.3	18.4	30.9	44.6

Notes: Comparison group for diploma is completed school while comparison group for certificates III or IV is did not complete school.

Source: Chapman, Rodrigues and Ryan (2007, table 6, p.34).

Summary

The literature on the labour market benefits of VET qualifications and the rates of return to those qualifications is characterised by differences in approaches to estimating the labour market benefits of VET qualifications—differences that affect the results:

- Estimates of the size of the effect of VET qualifications on earnings vary among studies. Within that variability, some generalisations can be made. The effect is:
  - generally, but not always, positive
  - higher for higher-level VET qualifications
  - possibly negligible for the lowest-level qualifications
  - larger for students who did not complete school
  - possibly, but not necessarily, lower for females.
- The effect of VET qualifications on the level of employment of graduates is less well researched than the effect on earnings, but the literature suggests that VET graduates are more likely to be employed than are similar people without VET qualifications.
- Rates of return to VET qualifications are influenced by the way in which the earnings and employment benefits from VET qualifications are estimated and, consequently, sometimes vary substantially between studies. The literature suggests that rates of return for VET qualifications:
  - are possibly negligible for some combination of students and courses
  - are larger for students who did not complete Year 12
  - decline only slightly with higher tuition costs
  - are higher for students who study part-time
  - are not necessarily lower for older students.

VET qualifications

This chapter and subsequent chapters present results leading to new estimates of rates of return for VET qualifications. Most of these results are based on analyses of the ABS 2005 Survey of Education and Training (SET)—a national survey of persons aged 15 years and over.[1] This chapter discusses aspects of educational qualifications in Australia and provides a definition of 'VET qualifications'.

The categories of educational qualifications recorded in the Survey of Education and Training are based on the ABS's Australian Standard Classification of Education (ASCED) (ABS 2001), which broadly corresponds to the AQF, although most of the categories include more than one AQF qualification. These categories are displayed in table 6.

Providers and qualifications

According to the AQF, the VET sector is responsible for accrediting certificates I, II, III and IV, while the higher education sector accredits bachelor degrees, graduate diplomas, graduate certificates and postgraduate degrees. Accreditation for advanced diplomas and diplomas is the major area of overlap between the VET and higher education sectors.

Table 6 shows that there is only a broad correspondence between provider types and qualifications. Universities and other (public) higher education institutions provide the bulk of higher education qualifications, while TAFE institutes and technical colleges provide the majority of VET-accredited qualifications.

Among the other provider types, business colleges, adult and community education (ACE) providers and industry skills centres (including members of the job network and other government training centres) might reasonably be included with TAFE institutes as providers of VET courses. Professional or industry associations, other private training organisations and other organisations, however, are more likely to straddle the sectors and can be registered with state and territory governments as private higher education providers (see Watson 2003) or as private VET providers or both.

For the purposes of this report:

- ✧ Postgraduate degrees, graduate diplomas, graduate certificates and bachelor degrees are classified as higher education qualifications, regardless of the type of provider at which they were obtained. Vocational graduate diplomas and certificates were added to the AQF only in 2005, and too few were obtained through VET providers to analyse separately.
- ✧ Certificate I to IV qualifications are classified as VET qualifications, regardless of the type of provider at which they were obtained, even though a small number are provided by universities or other higher education providers.

[1] In addition to some small categories of individuals usually excluded from ABS labour force surveys, the analyses presented here also exclude persons who were still attending school, who were 65 years and older, or who arrived in Australia when they were 15 years or older. Many of the analyses also exclude persons with higher education qualifications.

Table 6 Post-school educational qualifications by type of awarding institution: Persons aged 15 to 64, Australia 2005 (%)

Qualification	Type of institution that provided the educational qualification								
	Univ. or other higher education	TAFE or technical college	Business college or ACE	Industry skills centre	Prof'l or industry assoc'n	Other private training organis'n	Other organis'n	**Total**	All
	%	%	%	%	%	%	%	%	%
Postgraduate degree	94.4	0.2	0.0	0.0	3.5	0.6	1.3	**100.0**	3.2
Graduate dip./cert.	84.6	3.9	0.5	0.3	5.7	2.2	2.9	**100.0**	6.8
Bachelor degree	91.6	1.3	0.1	0.3	2.8	0.6	3.2	**100.0**	22.3
Adv. dip./diploma	29.6	40.2	4.5	1.2	6.6	9.7	8.2	**100.0**	14.9
Certificate III or IV	2.5	75.8	2.4	3.4	4.2	6.3	5.4	**100.0**	29.5
Certificate I or II	3.4	61.9	11.4	4.1	5.4	7.8	6.1	**100.0**	17.2
Certificate nfd	5.6	49.1	6.5	6.4	11.0	11.2	10.3	**100.0**	3.8
Level not determined	7.0	48.8	2.2	4.7	15.0	12.3	10.0	**100.0**	2.3
Total	**35.5**	**42.4**	**3.7**	**2.3**	**5.0**	**5.6**	**5.4**	**100.0**	**100.0**

Notes: Based on highest, second and third highest qualifications. *Industry skills centre* includes Job Network member and other government training centres. ACE is Adult and Community Education. The category Adv. dip./diploma includes associate degrees. Excludes persons still at school and persons who arrived in Australia aged 15 years or older.

Source: ABS, Survey of Education and Training, Australia, Basic Confidentialised Unit Record File, 2005, 6278.0.55.002.

The classification of diplomas and advanced diplomas (as well as associate degrees, which are not shown separately in table 6) into VET or higher education qualifications is more problematic. Although they are more likely to have been completed in the VET sector, many are completed at universities or other higher education institutions. Where these qualifications have been completed through professional or industry associations, other private training organisations or other organisations, they are not necessarily VET qualifications. Nevertheless, for simplicity, any diploma, advanced diploma or associate degree completed outside a university or other higher education institution will be considered to be a VET qualification.

Overseas qualifications

The analyses in this report are restricted to persons who were either born in Australia or who arrived in Australia before they were 15 years old. Nearly all the qualifications for this population were obtained in Australia. The exception is postgraduate degrees, which reflects the tendency for Australian students to obtain higher degree qualifications at overseas universities. In the subsequent analyses overseas qualifications are not separately identified because they are numerically small; would be difficult to analyse meaningfully; and may not raise the same issues of recognition as qualifications obtained prior to first arrival in Australia.

Qualification pathways

Combinations of schooling and qualifications are important considerations when estimating the costs of obtaining a qualification and the benefits derived from that qualification. For instance, it would not be appropriate to compare the income associated with having a highest qualification of a certificate III or IV with the income of those whose highest educational attainment is Year 10 if most of those who hold a certificate III or IV also completed Year 12.

The pathway to any qualification is not prescriptive and entry can be obtained through a variety of prior educational attainments, including combinations of training and work experience. Table 7 points to substantial levels of qualifications lying underneath the highest qualification. For instance, for females whose highest qualification is an advanced diploma or diploma, nearly two in every five have at least one other non-school qualification—8.2% have a second advanced diploma or

diploma, 18.6% have at least one certificate III or IV and 12.6% have at least one certificate I or II. Part of multiple qualifications reflects strong articulation of courses and qualifications as students progress from one qualification to the next, in which case the lower qualification is incorporated into the higher qualification. Some of it is not.

Table 7 Highest post-school educational qualification by highest grade of school completed and sex: Persons aged 15 to 64, Australia 2005 (%)

	Highest non-school qualification							
	Males				Females			
	Adv. dip./ Diploma	*Cert. III or IV*	*Cert. I or II*	*None*	*Adv. dip./ Diploma*	*Cert. III or IV*	*Cert. I or II*	*None*
	%	*%*	*%*	*%*	*%*	*%*	*%*	*%*
Qualifications								
Adv. dip./Dip. – VET	9.9	—	—	—	8.2	—	—	—
Certificate III or IV	31.5	12.7	—	—	18.6	12.8	—	—
Certificate I or II	11.5	10.8	14.3	—	12.6	18.1	11.0	—
Cert. nfd/Other	6.6	5.0	7.9	—	4.9	6.1	7.2	—
No other non-sch qual.	50.0	75.6	80.1	—	61.5	67.5	82.6	—
Year 12	37.3	18.2	33.5	—	40.9	26.7	24.4	—
Year 11	5.4	12.0	13.9	—	6.6	11.0	12.6	—
Year 10	6.8	35.8	25.4	—	11.4	24.2	35.2	—
Year 9 or below	0.6	9.5	7.2	—	2.5	5.6	10.4	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Schooling								
Year 12	62.9	25.9	39.3	37.2	62.2	41.0	31.0	34.0
Year 11	15.0	16.1	18.2	12.4	12.0	15.2	15.5	12.1
Year 10	19.5	46.3	32.2	30.8	20.2	36.0	41.6	35.0
Year 9 or below	2.6	11.7	10.2	19.6	5.6	7.8	11.9	18.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Distribution of quals %	7.3	31.0	7.7	51.6	9.7	15.9	14.4	57.4

Notes: Based on highest post-school qualification. Excludes persons still attending school, persons who arrived in Australia aged 15 or over and persons with higher education qualifications. Percentages may sum to more than 100 because of multiple qualifications. Distribution of qualifications does not sum to 100 because percentages for certificate nfd and post-school qualification not defined are not shown.

Source: ABS, Survey of Education and Training, Australia, Basic Confidentialised Unit Record File, 2005, 6278.0.55.002.

Table 7 shows that there is clearly no mandated level of schooling for any broad level of qualification. For instance, less than two-thirds of those whose highest qualification is a VET diploma or advanced diploma have completed Year 12. And the level of schooling does not always increase with the level of the qualification. For instance, the schooling profile of males whose highest non-school qualification was a certificate I or II (39.3% had completed Year 12) is higher than the schooling profile of males whose highest post-school qualification was a certificate III or IV (25.9% had completed Year 12).

The multiple qualification pathways shown in table 7 have implications for our estimates of the benefits and costs of VET qualifications that are described in the next two chapters.

Income and qualifications

The rates of return to VET qualifications are based on the size and timing of the financial benefits associated with those qualifications. This chapter estimates those benefits using data from the ABS (2005) Survey of Education and Training.

An income equation

Estimates of the rate of return to investments in obtaining educational qualifications usually require specifying the statistical relationship between earnings or income and educational qualifications as some form of a regression equation. The earlier review of the literature showed the variety of measures used to estimate the financial benefits from educational qualifications and noted that these influenced the size of the estimated benefits and rates of return. The ABS (2005) Survey of Education and Training provides considerable scope for different specifications of the equation because of the breadth of the information collected. The equation used here is:

Log annual after tax income plus a constant	=	intercept + highest qualification + schooling + level of schooling for those with non-school qualifications + age and age squared + current enrolment for full-time study + whether English was the first language + core restriction due to a disability or long-term health condition + residuals

Table 8 shows the estimates for this equation separately for males and females. The equations are statistically significant and explain modest amounts of the variation among individuals in their income—22.7% for males and 10.7% for females. The lower values for females reflect a less structured income distribution among the larger proportion of females who are not employed. The modest explanatory power of the equations follows from the relatively few variables in the equations and the restriction of the analyses to persons who did not have a higher education qualification. Rates of return estimates based on these equations will contain substantial individual variation.

Since the estimates of the financial benefits from VET qualifications are influenced strongly by the way in which the income equation is specified, and this, in turn, affects the estimates of rates of return, some comment on this choice is warranted:

- *Log annual after-tax income plus a constant.* There are several aspects to this choice:
  - *Income.* The alternative is to use an individual's earnings because higher salaries and wages appear to be more directly linked to skills and labour market outcomes than the broader category of income. On the other hand, most non-earnings components of income, such as welfare receipts, interest on savings and dividends from investment, are also arguably linked to educational attainment and an individual's earnings or employment. Measuring the benefits from educational qualifications by an individual's increased income also incorporates employment effects because it includes persons not currently employed. Not considering

different levels of employment can lead to substantial underestimation of the benefits of VET qualifications.

- *After tax*. Private rates of return reflect the costs and benefits to the individual, and after-tax income more closely reflects the private benefit than gross or pre-tax income. Annual income has been adjusted by the 2005–06 income tax schedule.

Table 8 Regression of log net weekly income on highest educational qualification, schooling and other variables: Males and females aged 15 to 64, Australia 2005

Variables	Males				Females			
	Estimate	Std error	t ratio	prob.	Estimate	Std error	t ratio	prob.
Intercept	*7.5212*	*0.0087*	*869.90*	*0.0000*	*8.3311*	*0.0034*	*2449.65*	*0.0000*
Highest level of education								
Advanced diploma or diploma	0.0924	0.0136	6.78	0.0000	0.0208	0.0052	4.02	0.0000
Certificate III or IV	0.0520	0.0111	4.68	0.0000	0.0095	0.0049	1.95	0.0511
Certificate I or II	0.0132	0.0129	1.02	0.3065	0.0020	0.0048	0.42	0.6715
Certificate not further defined	0.0272	0.0190	1.43	0.1523	0.0069	0.0070	0.99	0.3225
Not determined	0.0230	0.0239	0.96	0.3362	0.0064	0.0099	0.65	0.5187
Year 12	0.0752	0.0084	9.00	0.0000	0.0268	0.0032	8.38	0.0000
Year 11	0.0635	0.0103	6.17	0.0000	0.0097	0.0038	2.56	0.0105
Year 10	0.0380	0.0082	4.63	0.0000	0.0059	0.0029	2.05	0.0405
Year 9 or less	—	—	—	—	—	—	—	—
Schooling for persons with VET qualifications								
Year 12	0.0578	0.0107	5.39	0.0000	0.0253	0.0045	5.62	0.0000
Year 11	0.0409	0.0116	3.51	0.0004	0.0140	0.0051	2.78	0.0055
Year 10	0.0291	0.0102	2.86	0.0042	0.0144	0.0045	3.24	0.0012
Year 9 or less	—	—	—	—	—	—	—	—
Full-time study	-0.1550	0.0096	-16.12	0.0000	-0.0402	0.0032	-12.70	0.0000
Age (minus 18)	0.0131	0.0006	22.79	0.0000	0.0026	0.0002	11.70	0.0000
Age squared (minus 18)	-0.0003	0.0000	-20.36	0.0000	-0.0001	0.0000	-11.73	0.0000
Level of core activity restriction								
Severe or profound	-0.1450	0.0097	-14.94	0.0000	-0.0288	0.0039	-7.42	0.0000
Moderate	-0.1032	0.0115	-9.01	0.0000	-0.0184	0.0047	-3.94	0.0000
Mild/none, but problem	-0.0496	0.0049	-10.07	0.0000	-0.0114	0.0019	-6.05	0.0000
No disability or health problem	—	—	—	—	—	—	—	—
English not first language spoken	-0.0170	0.0074	-2.30	0.0215	-0.0060	0.0027	-2.20	0.0276
Adj. R-square	0.2271				0.1069			
F ratio (df1,df2)	113.48	18	6874		48.32	18	6955	
p	0.0000				0.0000			

Notes: Excludes persons: still attending school; who arrived in Australia aged 15 or over and with a higher education qualification. '—' indicates the omitted category. For males, income is modelled as log(income+1560); and for females as log(income+3900).

Source: ABS, Survey of Education and Training, Australia, Basic Confidentialised Unit Record File, 2005, 6278.0.55.002.

- *Log* and *adding a constant*. Analysing log income rather than income itself is a standard approach used in the literature. It changes the distribution of income from one that is strongly skewed towards a relatively small number of individuals with high incomes to a more normal distribution and, hence, reduces the influence on the analyses of those with very high incomes. Changing income to the log of income also provides an easier interpretation of the regression coefficients as (approximately) percentage effects on income. This interpretation, however, does not apply to the results in table 8 because a constant has

been added to income ($1560 for males and $3900 for females) to make all incomes positive—the log of negative income is undefined.

- *Annual*. It makes no difference to the meaning of the results whether annual or weekly income is analysed. On the other hand, analyses of, say, earnings per hour (as used in some of the studies reviewed earlier) are not appropriate for estimates of rates of return. Earnings per hour may be appropriate for investigations of links between productivity and education, but such a measure does not capture the full benefit of education delivered to the individual through differences in the number of hours worked.
- *Other adjustments*. The estimates incorporate the compulsory employer superannuation guarantee contribution of 9% of gross wages for employees earning more than $104 per week. Real incomes (that is, after adjusting for inflation) in Australia have grown at about 3% per annum over the last decade (ABS 2006). Growth in incomes contributes to any financial benefits associated with VET qualifications. Incomes have been adjusted by a more conservative factor of 2% because of the population being studied and concern that this growth may not be sustained.

✧ *Educational qualifications and schooling*. The previous chapter showed the variety of pathways leading to educational qualifications—a person with a VET diploma, for instance, could also have a certificate III or IV and have completed Year 10 at school, while another with a VET diploma could have no other VET qualifications but completed Year 12. The information available in the ABS (2005) Survey of Education and Training can be used to capture fully the complexity and individuality of the educational qualifications underlying a person's highest non-school qualification. It turned out, however, that using *Highest educational attainment* predicted income slightly better than separate measures of whether an individual had or did not have particular qualifications or levels of schooling.

Table 8 includes an additional three terms under the heading *Schooling for persons with VET qualifications*. These terms separately capture the effect of the level of schooling on income for persons who have VET qualifications and add significantly to the explanatory power of the income equations (as measured by partial F-ratios). It was expected, for instance, that the effect on income of completing Year 12 might be higher for those with post-school qualifications because they were likely to have had better results in Year 12 and these results (or the abilities, skills and dispositions reflected in them) would contribute to higher incomes. In the event, however, the effect of Year 12 on income is smaller for males with VET qualifications (0.0578) than for those without (0.0752) and similar for females (0.0253 compared with 0.0268), possibly because some of the effect of schooling on income is lost when it is not the highest educational attainment.

✧ *Age*. The analyses here use a person's age to measure the time over which costs and benefits are compared. Some previous studies use *years of experience* (overall or in a particular occupation or job) as a measure of time. Experience-based measures, however, are mainly used for analyses of the earnings of those who are employed and can make analyses of returns for females more difficult because of their intermittent work histories. Work experience is also likely to be a consequence of educational attainment and hence underestimates the size of any effect of education on earnings.

Table 8 also includes age-squared, which is fairly standard in the literature. The age term is usually positive and statistically significant (as it is in table 8) and the squared term is usually negative and statistically significant (as it is in table 8). Thus age and age-squared jointly describe the curved pattern of the initial increase of earnings and income with age or experience and then their decline (evident in figures 1 to 4). Sometimes higher-order terms are included (age cubed for instance) to reflect more complex relationships between age and income. Testing for these higher-order terms suggested that they had no effect.

The rate of return to an investment should be calculated from when the investment was made. Income equations should therefore measure time as the years since first enrolment, which can vary for persons of the same age. For instance, two males who were 50 years old at the time of the survey may have both had a VET diploma as their highest qualification; however, one may

have completed that qualification at age 20 and the other at age 40. The ABS (2005) Survey of Education and Training includes some information on the time since the qualification was completed. This proved a poor predictor of income and was not statistically significant or consistent when included in the model. Hence we use the more conventional measure of time based on age.

- *Other control variables*. The literature on the labour market outcomes of education emphasises the need to isolate statistically the effect of educational qualifications on earnings or income. People with educational qualifications differ from those without qualifications in ways that may influence earnings or income. Table 8 includes only three *other* control variables:
  - whether an individual was studying full-time or not
  - whether English was the respondent's first language or not
  - the extent of a respondent's disability or long-term health condition, if any.

  This is a small number of variables compared with most other studies. Typically, other studies include an array of employment characteristics such as the occupation and industry of the individual. It is, of course, not possible to include these variables when the population for which income benefits are being estimated includes persons who are not employed.

  A second equally important consideration, however, is the concern that the inclusion of these variables is 'stealing part of the effect of education on earnings that comes from occupational mobility' (Psacharopoulos & Patrinos 2002, p.3) because they are consequences of education. From the perspective of estimating private rates of return, it does not matter whether a plumber obtains higher earnings because he works in the housing industry or because he is a plumber. These are part and parcel of completing an apprenticeship in plumbing.

  The ABS (2005) Survey of Education and Training contains relatively few variables that are prior to, or not the result of, educational qualifications. English as a first language is both prior to education and related to income as strongly as any of the others measures of ethnic background and migrant status. The extent of a respondent's disability or long-term health condition is also likely to be mainly prior to, or not a consequence of, educational attainments. Participation in full-time study is not prior to educational attainments, but it seems inappropriate to penalise the estimate for an individual's current educational attainment when their income is reduced by study for a future qualification.

  Studies of returns to education often note that some of any observed difference in earnings or income between persons with different levels of educational qualifications is due to selection processes—those who complete qualifications differ from others in intelligence, other skills, attitudes or other attributes in ways that are likely to result in higher incomes, regardless of obtaining particular educational qualifications.

  We have not corrected our estimates for these possible effects for several reasons. First, we note Card's (1999) conclusion following a review of various approaches to estimating the size of any required correction 'that the average return to education is not much below the estimate that emerges from a standard human capital earnings function fit by OLS [ordinary least squares]'. Second, our analyses exclude persons with higher education qualifications, which results in a more homogenous population in terms of schooling achievement. Third, our equation allows the effect of schooling (and the abilities and aptitudes captured by it) to vary between those with and without VET qualifications.

The results

Table 9 shows the increase in income associated with obtaining each of three categories of VET qualification—an advanced diploma or diploma; a certificate III or IV; and a certificate I or II—compared with not having a VET qualification and having left school after completing Year 12 or Year 10.

Table 9 Percentage effects of highest VET qualification on income by age, sex and level of schooling

Age	Males			Females		
	Advanced diploma or diploma	Certificate III or IV	Certificate I or II	Advanced diploma or diploma	Certificate III or IV	Certificate I or II
	%	%	%	%	%	%
Compared with Year 12*						
20 years old	—	24.0	5.9	—	10.7	2.3
25 years old	36.8	20.3	5.0	21.5	9.7	2.1
30 years old	33.1	18.2	4.5	20.1	9.1	1.9
35 years old	31.0	17.1	4.2	19.3	8.7	1.9
40 years old	30.0	16.5	4.1	19.0	8.6	1.8
45 years old	29.9	16.5	4.1	19.1	8.6	1.8
50 years old	30.6	16.8	4.2	19.7	8.9	1.9
55 years old	32.2	17.8	4.4	20.8	9.4	2.0
60 years old	35.3	19.4	4.8	22.7	10.3	2.2
Compared with Year 10*						
20 years old	—	26.7	6.6	—	12.1	2.6
25 years old	40.1	22.1	5.5	23.9	10.8	2.3
30 years old	35.6	19.6	4.9	22.1	10.0	2.1
35 years old	33.1	18.3	4.5	21.2	9.6	
40 years old	32.0	17.6	4.4	20.8		
45 years old	31.8	17.5	4.3	20.9		
50 years old	32.6	18.0	4.5	21.7		
55 years old	34.6	19.1	4.7	23.1		
60 years old	38.2	21.1	5.2	25.4		

Notes: Derived from table 8. Estimates are for persons whose first language was English, with no disability or health problem and who were not studying full-time. Shaded estimates based on non-significant coefficients for the VET qualification.
* and no non-school qualifications.

Most studies in the literature report a single percentage effect of educational qualifications or attainment on earnings that does not vary with other individual characteristics such as a person's age—a consequence of analysing the log of earnings. The equation presented in this chapter, however, does not produce a single percentage effect because of the addition of a constant to income to allow negative incomes to be included in the analysis. The results in table 9 show that the income effects are:

- ✧ generally smaller for 30 to 50-year-olds than for older or younger persons, although the smaller percentage effects need to be interpreted in the context of higher absolute incomes for 30 to 50-year-olds; however, the size of the income effect is reasonably stable across the core working years
- ✧ progressively higher for higher-level VET qualifications.
- ✧ slightly stronger for persons whose highest level of schooling was Year 10 than for persons whose highest level of schooling was Year 12
- ✧ substantially stronger for males than for females, partly due to the lower level of employment of females
- ✧ not statistically significant for certificates I and II for males, and the income effects for certificates I and II and certificates III and IV are not statistically significant for females. When these qualifications are the highest levels of educational attainment, we cannot be sure they contribute to higher income over and above a person's initial level of schooling. With this caveat, we use these coefficients in the calculations of some rates of return.

Figure 1 Estimated after-tax annual income by age and highest VET qualification: Males who have completed Year 12

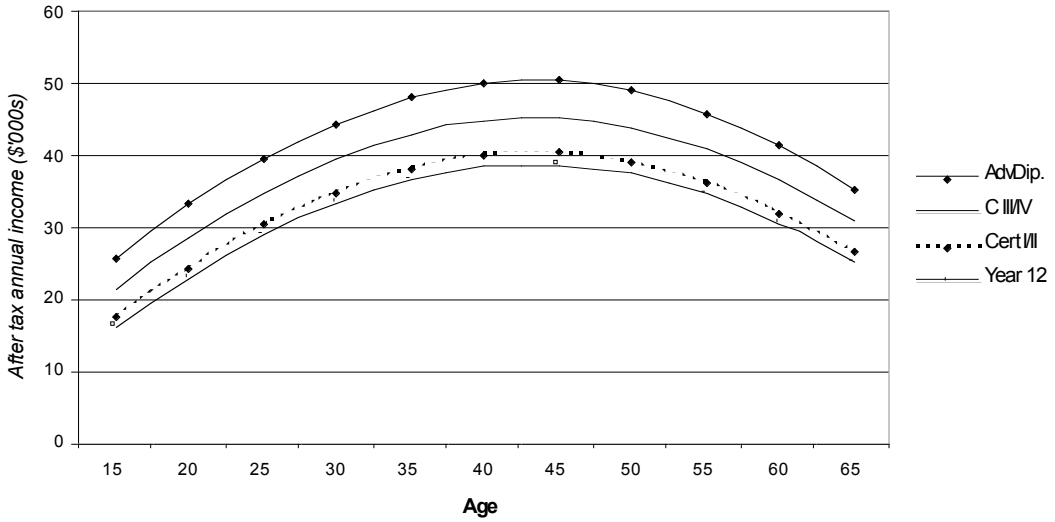
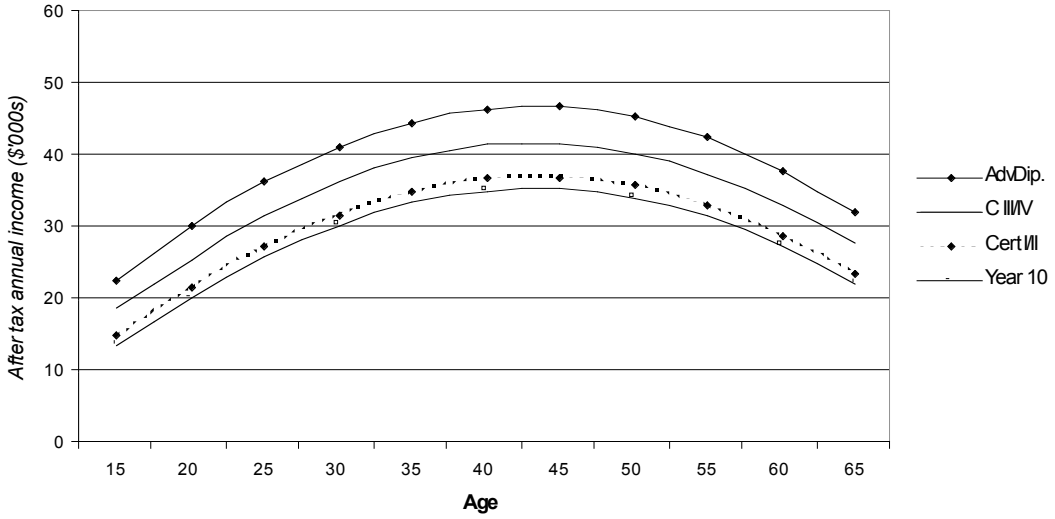


Figure 2 Estimated after-tax annual income by age and highest VET qualification: Males who have completed Year 10



Notes: Derived from values in table 8, for males with no disabilities or long-term health problems, for whom English was their first language and who were not studying full-time.

The effects in table 9 are often larger than those reported in earlier studies, although it is rarely a comparison of like with like and there is considerable variation among other studies. Ryan (2002a, see table 2 in this report), for example, reports effects of completion of an associate diploma on male earnings of 9.4% compared with Year 12 completion only, while the results in table 9 suggest effects on income for advanced diplomas and diplomas of about 30% for 30 to 50-year-old males. Similarly, the same study reports no effect of skilled vocational qualifications on male earnings for Year 12 completers, whereas table 9 shows an effect of certificates III or IV on income of about 17%. On the other hand, the male income effects of certificates I and II are more modest than the earnings effects reported by Ryan for basic vocational qualifications.

Figure 3 Estimated after-tax annual income by age and highest VET qualification: Females who have completed Year 12

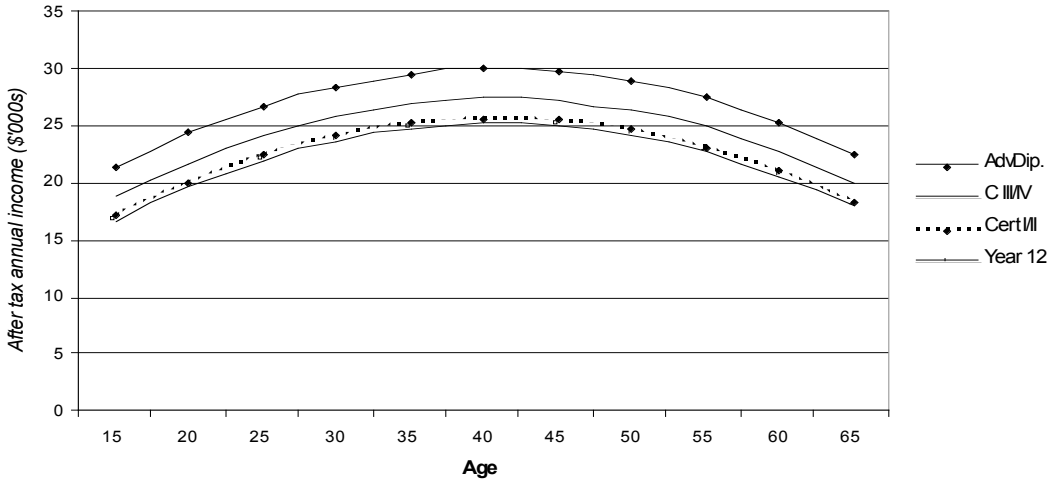
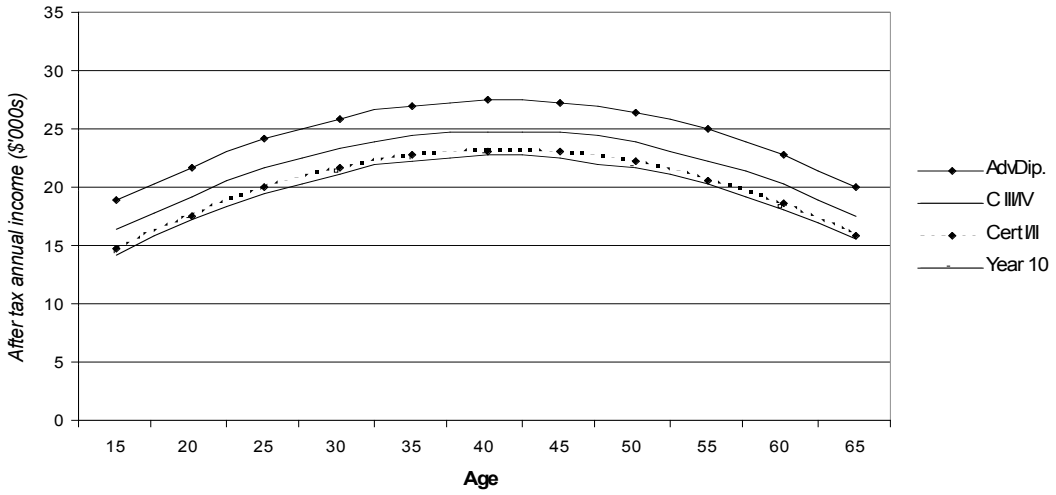


Figure 4 Estimated after-tax annual income by age and highest VET qualification: Females who have completed Year 10



Notes: Derived from values in table 8, for females with no disabilities or long-term health problems, for whom English was their first language and who were not studying full-time.

The results for females are also generally higher in table 9 than corresponding results reported by Ryan (2002a). Table 9 suggests that the effect on income for females of advanced diplomas and diplomas is about 19% for 30 to 50-year-olds, compared with an earnings effect of 7.6% reported by Ryan for associate diplomas. Similarly, the same study reports no effect of skilled vocational qualifications on female earnings for Year 12 completers, whereas table 9 shows an income effect of certificates III or IV of about 9%. Again the income effects of certificates I and II are negligible and more modest than the earnings effects reported for basic vocational qualifications.

The stronger income effects reported here reflect several features of the income equation used in this report, namely:

- ✧ fewer control variables than are used in other studies
- ✧ the use of income rather than earnings
- ✧ the inclusion of outcomes for those not employed.

Age–income profiles are a standard approach to visually displaying the relationship between educational qualifications and income. Figures 1 and 2 show the age–income profiles by highest VET qualification for males whose highest level of schooling was Year 12 and Year 10, respectively. Figures 3 and 4 show the corresponding values for females.

The graphs for males show that, regardless of the level of schooling completed, a diploma or advanced diploma contributes to higher incomes, while having a highest non-school qualification of a certificate III or IV also increases income, but not by as much as an advanced diploma or diploma. Although for markedly lower incomes, the graphs for females show similar patterns.

This chapter has presented and reviewed a model that describes the differences in income between males and females with different levels of VET qualifications and schooling and with different ages. This forms the basis for estimating the increase in income associated with completing VET qualifications. The inclusion of full-time study as an influence on income also allows us to estimate the income forgone by people who study full-time for VET qualifications. This forms part of the next chapter, which addresses the other side of estimates of rates of return—the costs.

What do VET students pay?

Calculating rates of return to educational qualifications requires estimates of both benefits and costs. This section summarises the costs a student needs to consider when enrolling for a VET qualification. The costs of education fall under three broad headings:

- course costs
- income forgone while studying
- non-completion of the course.

These costs can vary widely among courses and between students and may be offset by various subsidies. Estimates are often not precise and, frequently, all that can be done is to establish a range within which costs may fall and later examine the consequences of these varying values for the estimates of rates of return to VET qualifications.

Course costs

Course costs can be divided into tuition and non-tuition costs:

- *Tuition costs.* The complexity and diversity of the VET sector make it difficult to provide any simple summary of tuition costs of VET courses. The core of VET provision is through government-supported places at TAFE institutes or private registered training organisations. In 2005, 85% of subject enrolments and 88% of annual hours were in government-supported courses (excluding international students) for those training providers offering at least some government-supported places (NCVER 2006). Additionally, there is an unknown but possibly substantial training provision leading to VET qualifications through private registered training organisations fully reliant on fee-for service (Harris 2006).

  Watson (2003) documents the variation between states, namely within states for different courses, between providers for the same state and course, between students because of concessional arrangements and, importantly, between fee-for-service and government-supported places. Table 10 reports only the maximum values for fees. Concessions for holders of Commonwealth Health Cards, Indigenous Australians and recipients of Youth Allowance and AUSTUDY provide substantial discounts that vary across the states and territories.

Table 10 Maximum annual fees for government-supported places by state and territory, 2003

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
Maximum	$710	$500	$715	$1200	$883	$900	na	na

Notes: The value for NSW is for diploma and advanced diploma courses, other courses were $260. The South Australian fee includes some non-tuition costs.

Source: Watson (2003. Extracted from table 1, p.10).

Fees for government-supported VET places have increased, sometimes substantially, since 2003. For instance, in 2007 in New South Wales the annual tuition fee was $384 for a certificate I or II course (including all apprenticeship and traineeship courses regardless of qualification level), $600

for a certificate III course, $816 for a certificate IV course, $1086 for a diploma course and $1302 for an advanced diploma course. In Victoria, the maximum annual tuition fee was $860.

Chapman, Rodrigues and Ryan (2007) point to several examples of TAFE fee-for-service courses where the tuition fees are substantially higher than for government-supported courses—a one-year Diploma of Multimedia at Brisbane's Southbank Institute, for instance, has fees of $6060 ($5362 concessional) and the fees for Adelaide Institute of TAFE's Certificate III in Hospitality (commercial cookery) are $3167 for six months. Fees of this order are mainly for courses for which there is high demand and which are expensive to deliver.

Despite these examples, it seems unlikely that average maximum tuition fees for most courses are much above $1000 per year nationally, with some variation with the level of course. Actual fees are likely to be lower because of concessional arrangements. Borthwick (1999) suggested that between 20% and 30% of students pay concessional rates.

Students who enrol in VET courses with private training providers pay more for their tuition than students in government-supported places at TAFE. Summary information on the level of VET tuition fees charged by private training providers is scarce, but a website of the former Department of Education, Science and Training[2] for school leavers suggests that the tuition fees are usually around $6000 to $7000 a year full-time but vary widely and may be substantially higher for some courses.

The uncertainty of the actual level of tuition fees is reflected in the estimates of rates of return in the next chapter by considering several levels of fees. Rates of return are estimated for scenarios where annual tuition fees are $1000, $5000 and $10 000 for diploma or advanced diploma courses and $700, $3500 and $7000 per annum for any certificate-level course. These three fee levels are intended to correspond broadly to fees for a government-supported place, a standard fee-for-service place and a high-end course, respectively.

- *Non-tuition costs.* Students face other costs in undertaking their courses. These include the costs of texts, tools, consumable materials, computers, protective clothing, membership of the student association, licence fees and car parking fees. Consumable materials range from the trivial to the very expensive, such as precious metals and stones for jewellery courses or printing costs for graphics courses.

  Information on current non-tuition course costs for VET students is scarce. Estimates from other educational sectors are suggestive. Annual non-tuition costs are $1720 for full-time and $1590 for part-time undergraduate university students (Australian Vice Chancellors Committee 2007) and $200 for senior secondary students attending government schools (excluding voluntary levies and uniforms) plus $800 for voluntary levies and other contributions (Borthwick 1999). Average annual non-tuition course costs of VET students in 2005 were probably around $1000. In some courses these costs may be substantially higher and in others somewhat lower.

Table 11 Percentage of students currently enrolled for a qualification who received recognition for prior learning, Australia 2005

	Males			Females		
	Certificate I or II	Certificate III or Iv	Adv. dip Diploma	Certificate I or II	Certificate III or IV	Adv. dip Diploma
Enrolled full-time	37.6	19.6	24.1	14.1	16.5	17.3
Enrolled part-time	14.2	19.1	23.0	2.8	27.3	28.9

Notes: Excludes persons still at school and persons who arrived in Australia aged 15 years or older.
Source: ABS, Survey of Education and Training, Australia, Basic Confidentialised Unit Record File, 2005, 6278.0.55.002.

[2] The Department of Education, Science and Training was abolished in December 2007 and its functions taken over by the Department of Education, Employment and Workplace Relations.

Some students have completed or part-completed VET qualifications apart from their highest non-school qualification or completed multiple qualifications at the level of their highest qualification. To the extent that these studies are pathways to their highest qualification, their cost should be included when calculating estimates of rates of return. These costs can be absorbed into qualifications if they provide credit towards those qualifications. Table 11 shows the proportions of students studying for a VET qualification who receive credit for prior studies or other learning experiences. Although the values vary for males and females and between qualifications, overall about one in five students studying in 2005 was granted recognition for prior learning towards their current qualification.

The extent to which recognition for prior learning absorbs the cost of prior studies that are pathways towards the highest qualification is difficult to estimate. In our estimates we simply assume that these costs are fully absorbed into the highest qualification and that all students take the full standard time to complete their course. In addition to explicit recognition for prior learning, articulated structures of a full-time six month certificate II as a prerequisite to entry to a full-time six month certificate III may effectively create a full-time one year certificate III.

'Standard times' to course completion within the VET sector are far from standardised and may vary between courses for the same qualification level and even, with flexible learning, between students within the same course. Since many costs are based on the number of years required to complete a course, we can do little more than to explore the consequences for estimates of return for courses with differing durations.

Income forgone while studying

Full-time students generally sacrifice income from full-time work while they complete their course. They can and do, however, receive income from other sources such as part-time work, government benefits and family transfers.

The income equations discussed in the previous chapter include a parameter that reflects the effect of full-time study on the income of males and females. This can be used to estimate the difference in mean earnings between full-time students and similar individuals who are not studying full-time. Estimates differ for males and females, across age levels and with level of schooling. Table 12 shows the annual income lost by full-time students for selected ages.

For males, the cost of full-time study in terms of income forgone is between $14 000 and $17 600 for each year of study and increases with higher levels of schooling and with age (although the cost declines beyond the mid-40s as income levels decline). The corresponding costs for females are substantially less than for males—between $8500 and $9000 per annum—because of the lower average incomes of females. The influence of schooling and age on these costs is also smaller for females.

There is no effect of part-time study on income under any of several variants of the income equations reported in table 8. Students studying part-time for a qualification or engaged in a training contract (some of whom did not report study for a qualification) did not have lower incomes because of that study or training. This latter result in particular may be surprising given previous studies of returns to apprenticeships and traineeships that report costs to apprenticeships and traineeships associated with working for a training wage (for example, Miller & Mulvey 1996). These studies, however, examined earnings differences and ignored the employment effect of apprenticeships and traineeships—apprentices and trainees may not be employed full-time or in any employment at all if they were not apprentices or trainees.

Table 12 Annual net income forgone while studying full-time by sex, age and level of schooling: Persons aged 15 to 64, Australia 2005

Schooling		Males			Females		
	Age	19 years *$'000s*	29 years *$'000s*	44 years *$'000s*	19 years *$'000s*	29 years *$'000s*	44 years *$'000s*
Year 12		15.1	16.7	17.6	8.8	9.0	9.0
Year 10		14.5	17.0	17.0	8.6	8.8	8.8
Year 9		14.0	15.5	16.3	8.5	8.7	8.8

Notes: Values are derived from the equations presented in table 8 and are calculated for individuals whose first language was English and who had no disability or long-term health problem. The values are the differences, for instance, between the incomes of persons who have completed Year 12 and are not studying full-time for a qualification and persons who have completed Year 12 and are studying full-time for a qualification. The values in table 12 may over-estimate the true costs of income forgone because they result from projecting weekly income estimates measured during the year onto the entire year. Full-time students may be able to work full-time between semesters and hence the income forgone may be reduced.

The majority of VET students are enrolled part-time—at least four-fifths of students enrolled for a certificate III or IV and somewhat smaller proportions of those enrolled for other qualifications (table 13). Hence the costs of forgone earnings reported in table 12 are incurred by only a minority of VET students.

Table 13 Percentage enrolled part-time by sex: Persons currently enrolled for a qualification, Australia 2005

	Males			Females		
	Certificate I or II	Certificate III or IV	Adv. dip Diploma	Certificate I or II	Certificate III or IV	Adv. dip Diploma
Enrolled part-time (%)	64.2	86.7	56.6	70.8	82.0	61.1

Notes: Excludes persons still at school and persons who arrived in Australia aged 15 years or older.
Source: ABS, Survey of Education and Training, Australia, Basic Confidentialised Unit Record File, 2005, 6278.0.55.002.

There is a sense in which part-time students forego income compared with full-time students. If part-time study is strictly half-time, part-time students take twice as long as full-time students to complete their course. For a course of two years full-time equivalent duration, part-time students receive any income benefits two years later than full-time students. Income forgone in this sense is dealt with in the estimates of rates of return by altering the years for which any income benefits are calculated and hence the extent to which they are discounted.

Non-completion

Few studies of rates of return to education consider the risk of non-completion of a course as part of the cost—estimates are typically calculated *given* completion. This is not the case for estimates of returns to physical capital, where the risks of possible failure to commission plant and equipment are included in estimates. If private rates of return to education provide an indication of the financial incentive for students to enrol in a course, then *on enrolment* students need to consider the possible costs of non-completion.

Estimates of course completion rates in VET are dogged by often inadequate data, complexities of movement of students in and out of study and between courses and the considerable variation of course and student type in the VET sector—problems that generally lead to underestimates of completion.

Foyster, Hon and Shah (2000) estimated completion rates of 34%, 10% and 16% for courses of one, two and three years' duration, respectively, for TAFE courses in 1994. Various studies suggest completion rates for apprenticeships in the mid-1990s and later of 70% to 75% and just under 60% for traineeships. Stanwick (2005) suggests that the completion rates of persons 24 years and under

are about a third for certificate I courses and 43% for certificate II courses. Corresponding completion rates for diploma-level courses are probably somewhat higher (Karmel 2007). It is likely, however, that, as in higher education, completion rates for full-time students are higher than for part-time students (apart from apprenticeships and traineeships), although good estimates are not available.

There is uncertainty about the cost of discontinued study due to possible non-refund of tuition fees, failure to recover other non-tuition course costs and lost income through disrupted employment. Low completion rates do not necessarily translate into substantially higher costs.

Students who do not complete their course may still complete some units. Benefits from partial completion may offset costs. Many students who complete part of a course report positive labour market outcomes from that partial completion, while others may seek credit for their partially completed studies in other courses.

The net effect of these various costs and benefits is impossible to estimate accurately. On the basis of this discussion, we simply assert that the effect of non-completion is to uniformly increase tuition, other non-tuition course costs and income forgone by about 10%.

Subsidies

Students do not necessarily pay their course costs themselves—they receive support from their family, the government and their employer (paid leave, course fees and other support). Table 14 shows the percentage of students studying for qualifications who received financial support from these sources. Nearly a half of students studying for a VET qualification received some financial support for their study.

Table 14 Percentage of students currently enrolled for a qualification who receive financial support, Australia 2005

	Males			Females		
	Certificate I or II	Certificate III or IV	Adv. dip Diploma	Certificate I or II	Certificate III or IV	Adv. dip Diploma
Enrolled full-time	38.9	43.9	41.7	55.9	51.1	35.5
Enrolled part-time	48.6	62.7	46.6	27.8	51.3	24.2

Notes: Excludes persons still at school and persons who arrived in Australia aged 15 years or older.
Source: ABS, Survey of Education and Training, Australia, Basic Confidentialised Unit Record File, 2005, 6278.0.55.002.

Income support from their family and government income support schemes for students such as Youth Allowance, Austudy and ABSTUDY are already captured because they reduce estimates of income forgone. Support for non-tuition course costs is available to some VET students. For instance, Australian Government and employer support is provided to apprentices to assist with the purchase of, or access to, the tools required for the trade. State governments provide transport subsidies for full-time students. It is difficult to generalise and quantify the frequent course, student and state-specific support provided to students to cover aspects of tuition, non-tuition course costs and living costs. To the extent that subsidies reduce tuition, non-tuition or general living costs, they will increase the estimates of rates of return.

Summary

This section provided an overview of the costs of VET courses. The variation of costs by course level and within course level and by the student's age and schooling results in a substantial number of possible estimates of the costs of completing a VET course. Tables 15 and 16 display a selection of the possible combinations and their corresponding estimates for males and females, respectively.

Table 15 Estimated costs for VET courses, Australia 2005: Males

		Full-time equivalent duration (years)	Income forgone]	Tuition costs	Non-tuition course costs	Non-completion	Total
			$	$	$	%	$
Adv. dip./diploma							
Full-time			*(Year 12)*				
Age 18–19	Low cost	2	30 009	2 000	2 000	10	**37 210**
	Middle cost	2	30 009	10 000	2 000	10	**46 210**
	High cost	2	30 009	20 000	2 000	10	**57 210**
Age 28–29	Low cost	2	33 245	2 000	2 000	10	**40 970**
	Middle cost	2	33 245	10 000	2 000	10	**49 770**
	High cost	2	33 245	20 000	2 000	10	**59 770**
Part-time							
Any age	Low cost	2	nil	2 000	2 000	10	**4 400**
	Middle cost	2	nil	10 000	2 000	10	**13 200**
	High cost	2	nil	20 000	2 000	10	**24 200**
Certificate III or IV							
Full-time			*(Year 12)*				
Age 19	Low cost	1	15 101	700	1 000	10	**18 481**
	Middle cost	1	15 101	3 500	1 000	10	**21 561**
	High cost	1	15 101	7 000	1 000	10	**25 411**
Age 29	Low cost	1	16 686	700	1 000	10	**20 225**
	Middle cost	1	16 686	3 500	1 000	10	**23 305**
	High cost	1	16 686	7 000	1 000	10	**27 155**
Part-time							
Any age	Low cost	1	nil	700	1 000	10	**1 870**
	Middle cost	1	nil	3 500	1 000	10	**4 950**
	High cost	1	nil	7 000	1 000	10	**8 800**
Certificate III or IV							
Full-time			*(Year 10)*				
Age 19	Low cost	1	14 548	700	1 000	10	**17 873**
	Middle cost	1	14 548	3 500	1 000	10	**20 953**
	High cost	1	14 548	7 000	1 000	10	**24 803**
Age 29	Low cost	1	16 075	700	1 000	10	**19 553**
	Middle cost	1	16 075	3 500	1 000	10	**22 633**
	High cost	1	16 075	7 000	1 000	10	**26 483**
Certificate I or II							
Full-time			*(Year 9)*				
Age 19	Low cost	0.5	7 003	350	500	10	**8 638**
	Middle cost	0.5	7 003	1 750	500	10	**10 178**
Age 29	Low cost	0.5	7 735	350	500	10	**9 444**
	Middle cost	0.5	7 735	1 750	500	10	**10 984**
Part-time							
Any age	Low cost	0.5	nil	350	500	10	**935**
	Middle cost	0.5	nil	1 750	500	10	**2 475**

Notes: Income forgone estimated from values in table 8. (Year 12), (Year 10) and (Year 9) indicate the year of schooling for which comparisons are being made.

Table 16 Estimated costs for VET courses, Australia 2005: Females

		Full-time equivalent duration (years)	Income forgone]	Tuition costs	Non-tuition course costs	Non-completion	Total
			$	$	$	%	$
Adv. dip./diploma							
Full-time			*(Year 12)*				
Age 18–19	Low cost	2	17 458	2 000	2 000	10	**23 604**
	Middle cost	2	17 458	10 000	2 000	10	**32 404**
	High cost	2	17 458	20 000	2 000	10	**43 404**
Age 28–29	Low cost	2	17 889	2 000	2 000	10	**24 078**
	Middle cost	2	17 889	10 000	2 000	10	**32 878**
	High cost	2	17 889	20 000	2 000	10	**43 404**
Part-time							
Any age	Low cost	2	nil	2 000	2 000	10	**4 400**
	Middle cost	2	nil	10 000	2 000	10	**13 200**
	High cost	2	nil	20 000	2 000	10	**24 200**
Certificate III or IV							
Full-time			*(Year 12)*				
Age 19	Low cost	1	8 700	700	1 000	10	**11 440**
	Middle cost	1	8 700	3 500	1 000	10	**14 520**
	High cost	1	8 700	7 000	1 000	10	**18 370**
Age 29	Low cost	1	8 951	700	1 000	10	**11 716**
	Middle cost	1	8 951	3 500	1 000	10	**14 796**
	High cost	1	8 951	7 000	1 000	10	**18 646**
Part-time							
Any age	Low cost	1	nil	700	1 000	10	**1 870**
	Middle cost	1	nil	3 500	1 000	10	**4 950**
	High cost	1	nil	7 000	1 000	10	**8 800**
Certificate III or IV							
Full-time			*(Year 10)*				
Age 19	Low cost	1	8 599	700	1 000	10	**11 329**
	Middle cost	1	8 599	3 500	1 000	10	**14 409**
	High cost	1	8 599	7 000	1 000	10	**18 259**
Age 29	Low cost	1	8 766	700	1 000	10	**11 513**
	Middle cost	1	8 766	3 500	1 000	10	**14 593**
	High cost	1	8 766	7 000	1 000	10	**18 443**
Certificate I or II							
Full-time			*(Year 9)*				
Age 19	Low cost	0.5	4 274	350	500	10	**5 636**
	Middle cost	0.5	4 274	1 750	500	10	**7 176**
Age 29	Low cost	0.5	4 357	350	500	10	**5 728**
	Middle cost	0.5	4 357	1 750	500	10	**7 268**
Part-time							
Any age	Low cost	0.5	nil	350	500	10	**935**
	Middle cost	0.5	nil	1 750	500	10	**2 475**

Notes: Income forgone estimated from values in table 8. (Year 12), (Year 10) and (Year 9) indicate the year of schooling for which comparisons are being made.

There are several features of these estimates:

- ✧ Costs for full-time study are dominated by the income students forego while studying. These costs vary with age, are lower for females than for males and are less for persons with lower levels of schooling.
- ✧ Part-time study costs less than full-time study because there is no income forgone while studying part-time.
- ✧ Tuition costs are allowed to vary widely both within and between qualifications, but for full-time study are often the smaller part of total costs.

The majority of entries in tables 15 and 16 are for qualifications obtained by full-time study. This is because income forgone is a cost for full-time study only and varies markedly with the sex, age and schooling of the student. The costs for part-time study have fewer permutations and therefore fewer entries. Most VET qualifications, however, were obtained by part-time study and therefore it is the costs for part-time study that reflect the costs of the majority of holders of VET qualifications.

Tables 15 and 16 include assumptions about the duration of the course. An examination of VET provider websites indicate that there is little standardisation of duration of courses at any qualification level. As discussed above, these estimates of duration include prior studies that may have been used to gain entry to the course or that may have provided the basis for recognition for prior learning within the course. Since all costs are multiplied by the number of years of duration of the course, estimates of costs are sensitive to assumptions about course duration.

These estimates of costs are unlikely to adequately reflect the detail of the variety of VET courses, students and study circumstances. Nevertheless, the values in tables 15 and 16 are based on reasonable if not perfect information about likely costs to the student. When combined with estimates of income benefits, these provide the basis for estimates of rates of return. These estimates are provided in the next chapter.

Rates of return

The estimates of the rates of return to VET qualifications presented in this chapter bring together the results of the preceding two chapters, which discussed the income benefits from enrolling for a VET qualification and the costs of obtaining a VET qualification, respectively.

An example of the calculations

There is no single rate of return to VET qualifications because there are several different levels of VET qualifications, the costs and benefits differ for males and females for people who studied at different ages with different levels of schooling and the costs differ for students who study full or part-time and in government-supported or other courses.

Table 17 presents an example that shows the steps in the calculation of the rates of return. The example is for the returns to enrolling in a diploma or advanced diploma course for a male who had completed Year 12 and had no other post-school qualification and who started his full-time course at age 18. It shows the pattern of the initial costs of study and the subsequent benefits through the increased income from that qualification over the individual's lifespan.

There are several steps to the calculations in table 17. The first is estimating the additional income from a VET diploma or advanced diploma by comparing the income of males whose highest non-school qualification is a diploma or an advanced diploma and who have completed Year 12 with the estimated incomes of those males if they had completed Year 12 but had obtained no post-school qualifications. The additional income in table 17 initially increases and then declines, which is consistent with the age–income profile shown in figure 1. Growth of real income by 2% per year, however, results in increasing additional income with age.

Income must be discounted over time because income received in the future is not worth as much dollar for dollar as income received today—not because of inflation (all calculations are in current prices), but because income received today could be invested and worth more in the future. The interest (or discount) rate for that investment is the internal rate of return that equates costs and benefits as if they were all paid or received today. Discounting converts costs and benefits to their 'present value'. The internal rate of return in table 17 is 23.6% because this is the discount rate that makes costs and benefits equal.

The discounting of income over time means that most of the benefits from education and training qualifications occur in the first ten years or so after study. For instance, the discounted benefit of income at age 39 ($169) is less than 3% of the discounted benefit at age 20 ($5648) and continues to decline more rapidly thereafter. The discounted financial benefits from study generally do not have a long tail, a result that is important when considering the value of the educational participation of older students.

The returns to education for older students are not markedly reduced by having fewer years of income benefits from their education qualifications than younger students. Older graduates usually miss out on only a highly discounted tail of income benefits that approaches zero fairly quickly. The first years of income benefits for students aged around 45 occur when the observed income

benefits are greatest and any loss to discounting is minimised. On the debit side, however, income forgone through full-time study is generally higher for older students.

Table 17 Example of calculation of rates of return: VET advanced diploma or diploma, young males with Year 12, full-time study in a government-supported place

Age	Costs	Estimate income				Discounted	
		Diploma and Year 12	Year 12 no post-school qualification	Difference	Adjusted for 2% income growth	Costs	Income
	$	$	$	$	$	$	%
18	18 599					18 599	
19	18 811					15 221	
20		33 408	25 116	8 291	8 626		5 648
21		34 768	26 379	8 390	8 903		4 717
22		36 085	27 600	8 485	9 184		3 937
23		37 355	28 778	8 577	9 469		3 285
24		38 577	29 912	8 665	9 758		2 739
25		39 749	30 999	8 750	10 051		2 283
26		40 869	32 038	8 831	10 346		1 901
27		41 936	33 028	8 908	10 646		1 583
28		42 948	33 967	8 981	10 948		1 317
29		43 904	34 854	9 050	11 252		1 096
39		50 090	40 593	9 497	14 394		169
49		49 644	40 179	9 465	17 487		25
59		42 632	33 674	8 958	20 175		3
64		36 956	28 408	8 548	21 255		1
Total						**33 820**	**33 820**

Notes: Values for some ages omitted for brevity. Age 18 is taken as Year 0, the start of the investment process. Costs are forgone income of $14 908 at age 18 and $15 101 at age 19; tuition costs of $1000 pa; non-tuition costs of $1000 pa; plus 10% for non-completion. Estimated income and income forgone derived from the income equation in table 8 and calculated for persons without a disability, whose first language was English and (for income) not studying full-time. This discount rate (or internal rate of return) is 23.6% because this equates costs and benefits. Benefits are calculated only to age 64.

The results

Table 18 provides estimates of the rates of return to VET study for a number of scenarios. It shows rates of return separately for males and females for different qualifications, different underlying levels of schooling, selected ages, different types (full- or part-time) of study, courses of different durations and low, middle and high tuition costs.

The main results are listed below:

- *The rates of return for advanced diplomas and diplomas and for certificates III and IV are similar, with some variation across other categories.* For instance, the rates of return for males who completed Year 12 studying a shorter (1.5 years) advanced diploma or diploma full-time (33.7%) are higher than for corresponding values for a certificate III or IV (16.6%). But the rates of return for a certificate III or IV studied part-time are generally higher than the corresponding rates of return for advanced diplomas and diplomas, and, similarly, the rates of return for persons whose highest schooling was Year 10 are generally higher for a certificate III and IV than for an advanced diploma or diploma.

Estimates of the rates of return for certificates I and II are based on small income effects that are not statistically significant (table 8). In combination with low costs, these values are sensitive to small changes in either benefits or costs and, hence, are unstable. Table 18 shows the rates of return for persons who have completed Year 10 and Year 9. The rates of return are highly variable but comparable with values for advanced diplomas and diplomas and for certificates III and IV for males who completed only Year 9 (or below) and for females who completed Year 10, but are more modest for males who completed Year 10 and for females who completed only Year 9 (or below).

- *Rates of return are not consistently higher for males or females.* They are higher for males than females for:
  - advanced diplomas or diplomas for persons whose highest schooling was Year 12
  - certificates III or IV for persons whose highest schooling was Year 12
  - certificates I and II for persons whose highest schooling was Year 9

  and higher for females than males for:
  - advanced diplomas or diplomas studied full-time for persons whose highest schooling was Year 10
  - certificates III or IV studied full-time for persons whose highest schooling was Year 10
  - certificates I and II for persons whose highest schooling was Year 10.
- *Rates of return are higher for part-time study than full-time study.* Part-time study has lower costs than full-time study because there is no loss of income while studying. For instance, the rate of return to a one-year low-cost certificate III or IV for a 19-year-old male who has completed his schooling and studies part-time is 130.5% compared with 23.6% for the same student studying full-time. About three in every four VET students study part-time (table 13).
- *Higher tuition fees reduce the private rates of return to a VET qualification.* The annual tuition fees underlying the estimates in the table are $1000 pa (low cost), $5000 (medium cost) and $10 000 (high cost) for advanced diplomas and diplomas and $700, $3500 and $5000, respectively, for certificates. These tuition fees broadly reflect the costs to students of government-supported places, full-fee courses and high-end fee-paying courses, respectively.

  For instance, the rate of return to a two-year advanced diploma or diploma for an 18-year-old female who has completed her schooling and studies full-time declines from 19.7% for a low-cost course to 15.1% for a medium-cost course to 11.8% for a high-cost course. The effect of higher tuition costs on rates of return is greater for part-time study, where tuition costs are a greater proportion of total costs, but the decline is from a higher base.

  The size of the effect of higher tuition fees may be overstated if, as seems likely, high tuition fees are charged for courses leading to higher benefits. Increasing fees on lower-cost and lower-benefit courses, perversely, may therefore have larger effects than those shown in table 18.
- *Age makes only a small difference to the rates of return.* For most scenarios, rates of return are only slightly lower for older students (aged about 44) than younger students (aged about 19). For instance, for males who have completed Year 12 and are studying full-time for a certificate III or IV, the rate of return for a 44-year-old student is 21.8% and 23.6% for a 19-year-old. The relatively small differences associated with age follow from the stronger contribution to benefits of income effects shortly after graduation rather than in the longer term.
- *Rates of return for higher-level VET courses are mostly slightly higher for those whose highest level of schooling is Year 10 than Year 12, especially for females.*

Table 18 Estimates of rates of return to VET qualification by sex, Australia 2005

Characteristics of course and study			Rates of return					
Qualification	Years of full-time equivalent study	Age when studying full-time	Male: Low cost %	Male: Medium cost %	Male: High cost %	Female: Low cost %	Female: Medium cost %	Female: High cost %
Advanced diploma or diploma (compared with Year 12)	2	18–19	23.6	19.9	16.7	19.7	15.1	11.8
	2	28–29	23.1	19.7	16.6	19.5	14.9	11.5
	2	43–44	21.9	18.3	15.1	18.6	13.6	9.6
	2	18–22 pt	52.6	26.5	17.4	34.8	16.2	10.2
	1.5	19	33.7	27.8	23.0	33.0	24.6	18.9
(compared with Year 10)	2	18–19	25.7	21.6	18.1	27.7	21.2	16.6
	2	28–29	25.3	21.4	18.0	27.6	21.2	16.6
	2	43–44	20.1	16.7	13.5	25.0	18.5	13.6
	2	18–22 pt	54.9	27.9	18.4	44.7	21.6	13.9
	1.5	19	37.2	30.5	25.1	27.1	22.2	18.2
Certificate III or IV (compared with Year 12)	1	19	23.6	20.6	17.9	18.1	14.6	11.9
	1	29	23.1	20.3	17.7	17.8	14.4	11.6
	1	44	21.8	18.9	16.2	16.7	12.8	9.5
	1	19–20 pt	130.5	63.5	40.3	74.8	34.3	21.3
	1.5	19	16.6	14.5	12.6	12.6	10.2	8.3
	1.5	19–21 pt	76.8	40.5	26.7	46.4	22.8	14.6
(compared with Year 10)	1	19	28.8	25.0	21.5	37.9	30.2	24.3
	1	29	28.4	24.8	21.5	37.8	30.3	24.4
	1	44	27.3	23.7	20.3	37.5	29.9	23.8
	1	19–20 pt	148.9	73.4	46.8	134.3	65.2	41.1
	1.5	19	20.1	17.5	15.1	26.0	20.9	16.9
	1.5	19–21 pt	86.1	46.1	30.7	78.1	41.0	26.9
Certificate I or II (compared with Year 10)	0.5	19	6.8	5.8	4.8	43.8	34.9	28.0
	0.5	29	5.7	4.6	3.6	43.8	35.0	28.1
	0.5	44						
	0.5	19 pt						
	0.25	19						53.9
(compared with Year 9)	0.5	19	18.3	15.9	13.7	9.8	7.8	6.2
	0.5	29	17.8	15.5	13.3	9.3	7.2	5.4
	0.5	44	24.5	21.1	17.9	6.7	4.0	1.7
	0.5	19 pt	145.7	57.0	33.3	50.2	20.3	12.2
	0.25	19	33.9	29.2	25.0	18.1	14.6	11.8

Notes: Low cost tuition fees are $1000 pa for adv. dip./diploma, $700 for certificates; medium tuition fees are $5000 pa and $3500 pa, respectively; and high-cost tuition fees are $10 000 pa and $5000 pa, respectively. Non-tuition course costs are assumed to be $1000 pa for all courses. 'pt' indicates part-time study. Income forgone for full-time study and income benefits are derived from the ordinary least squares regression equations presented in table 8. Estimates in the shaded portion depend on parameters for qualifications that are not statistically significant.

Implications

This chapter draws out some of the implications of the analyses presented in this report.

- *The rates of return to study in VET courses are sufficient to provide students with an incentive to enrol.* One of the reasons for calculating rates of return for educational qualifications is to establish whether students are adequately recompensed for their investment in their education. There is no agreed criterion for what constitutes an *adequate* return. One criterion for a *good* return might be the return for listed property (the investment with the highest return among categories, including Australian and overseas shares and fixed interest investments), which averaged between 9.0% and 11.6% after tax and after inflation over the 20-year period from 1987 to 2006 (Australian Stock Exchange & Russell Investment Group 2007). By this criterion, most of the scenarios in table 18, which are also after tax and after inflation, provide very good economic returns for the investment made by students enrolling in VET courses, across categories of age, sex, full- or part-time study, tuition cost and prior level of schooling.

  The rates of return for certificates I and II are an exception. Although some of these values appear large, the estimates are based on small income effects that are not statistically significant (table 8). With the low costs, these values are sensitive to small changes in either benefits or costs and hence are unstable. It is unclear whether the rates of return for these courses are sufficient to provide a sound financial incentive to enrol. These courses may nevertheless have value as pathways to higher level VET courses.

- *The rates of return to study in VET courses differ from those reported in earlier studies.* The rates of return for advanced diplomas and diplomas in table 18 are higher than corresponding results reported in earlier studies. Ryan (2002b, see table 4) reports estimates that range from negligible for full-time study to between 15% and 26% for part-time study. For full-time workers, Chapman, Rodrigues and Ryan (2007) report returns of about 11% for males and 12% for females for diplomas studied full-time and between 14% and 17% for associate diplomas (table 5). In table 18 the rates of return closest to those considered in these earlier studies are between 20% and 24% for males and 15% and 20% for females for full-time study and for part-time study between 26% and 53% for males and between 16% and 35% for females.

  The rates of return for certificates III and IV are also sometimes higher than those reported in most other studies. In table 18 the estimates for the closest scenarios to those considered by other studies range from 25% to 29% for young males studying full-time who left school after completing Year 10 and 30% to 38% for females, and, for part-time study, 73% to 149% for males and 65% to 134% for females. Ryan (2002b) reports similar rates of return for skilled vocational courses of between 16% and 38% for young males studying full-time, but lower values for females of between 11% and 17% (see table 4). The rates for part-time study are somewhat lower for males, but substantially lower for females. Chapman, Rodrigues and Ryan (2007), however, report rates of return to full-time study for the generic category *certificates* of between 31% and 43%, which, although similar to the results reported here, are higher for males than for females. The high returns for females for certificates III and IV in table 18 contrast with the negligible or negative returns from apprenticeships for young women reported by Dockery and Norris (1996), although the income effects for certificates III and IV in table 8 fall just short of statistical significance.

  Some of the rates of return to certificates I and II in table 18 are possibly not too dissimilar to those reported in Ryan (2002b) for basic vocational qualifications, but they are underpinned by

small and statistically not significant income effects. While the estimates of the rates of return are unstable, the small income effects suggest that there may be little or no real financial incentive to enrol in these courses.

None of the comparisons of the values in table 18 with results from previous studies is of like with like. The broad Australian Standard Classification of Education and AQF-based qualification categories used in the ABS (2005) Survey of Education and Training do not correspond to classifications or categories such as apprenticeships used in previous studies. The comparison groups vary—other studies use persons without post-school qualifications who completed or did not complete school or who left school before age 16, rather than persons whose highest level of schooling was Year 12, Year 10 or Year 9, as in this report. The results in table 18 are based on income rather than the wages and salaries often used in other reports and explicitly take account of employment effects by moving beyond just employees to include the incomes of employers and the self-employed as well as those who are not employed. Importantly, the income equations used in this study do not exclude the effects of education-related characteristics such as occupation, hours of work and years of labour force experience. This different approach has contributed directly to the generally higher rates of return reported in table 18.

- The size and variation in the rates of return have several policy implications:
  - *The private rates of return for higher-level VET courses—advanced diploma, diploma and certificates III and IV—mainly provide good to excellent financial incentives for students to enrol.* Labour market returns are sufficient to provide students with more than adequate incentives to enrol, particularly in part-time courses. Any shortfall in demand by students for VET courses overall does not reflect issues of relative costs and benefits.
  - *The adequacy of private rates of return for lower-level VET courses—certificates I and II—are uncertain, although they may be valuable as stepping stones to higher-level VET courses.*
  - *Higher tuition fees reduce the private rates of return to a VET qualification.* The relatively high rates of return to enrolment in higher-level VET courses are reduced by the sometimes much higher tuition fees considered in this report. Often even these lower rates of return still provide students with the economic incentive to enrol. In some cases, however, especially for females who have completed Year 12, returns fall to a level where they might be characterised as only adequate.
  - *There is scope for some students in some courses to contribute more to the cost of their VET course through higher tuition fees*, possibly in association with income contingent loans (Chapman, Rodrigues & Ryan 2007). Increased tuition costs would reduce, but not remove, the economic incentive for students to enrol in higher-level VET courses. The effect of higher tuition fees on lower-level VET courses is less certain.
  - *The rates of return for advanced diplomas and diplomas and for certificates III and IV are similar, with some variation across other categories.* Similar rates of return do not support the conclusion that the two sets of qualifications have the same value. The investment (or cost) for an advanced diploma or diploma is larger than for certificates III and IV. The similar rates of return suggest that the value of the additional investment in obtaining an advanced diploma or diploma is commensurate with that made to obtain a certificate III or IV.
  - *Age makes only a small difference to the rates of return.* This result suggests that older students have almost the same economic incentive to enrol in VET courses as younger students. Policies designed to promote lifelong learning and up-skilling of the qualifications of older persons need to focus on non-financial incentives and barriers.
  - *Rates of return are higher for part-time study than full-time study.* Traditionally much of the analysis of rates of return has been developed around the scenario of school leavers enrolling for full-time study. Although the economic returns for part-time study in VET courses are often very high, other considerations may motivate their study and the perceived value of the course.
  - *Rates of return for higher level VET courses are mostly slightly higher for those whose highest level of schooling is Year 10 than Year 12,* especially for females, which points to the value of VET as a pathway for persons who did not complete their schooling.

References

ABS (Australian Bureau of Statistics) 2001, *Australian standard classification of education (ASCED)*, cat.no.1272.0, Australian Government Publishing Service, Canberra.

——2006, *Measures of Australia's progress 2006*, cat.no.1370.0, AGPS, Canberra.

Allen Consulting Group 2003, *The economy-wide benefits of increasing the proportion of students achieving Year 12 equivalent education: Modelling results,* Allen Consulting Group, Sydney, viewed 30 April 2006, <http://www.bca.com.au/DownloadFile.aspx?FileName=Allens_-_Yr_12_Education_-_Jan_03.pdf>.

The Australian Stock Exchange & Russell Investment Group 2007, *Long-term investing report: Comparing 10 and 20 year performance of various investments to December 2006,* viewed 19 April 2007, <http://www.asx.com.au/about/pdf/asx_russell_long_term_investing_report_2006.pdf>.

Australian Vice Chancellors Committee 2007, *Australian university student finances 2006: A summary of findings from a national survey of students in public universities*, AVCC, Canberra.

Booz, Allen & Hamilton 1999, *Economic evaluation of Darwin–Alice Springs Railway: A report for the Northern Territory Department of Transport and Works,* BAH, Melbourne, viewed 19 April 2007, <http://www.nt.gov.au/aarc/news/miscel/booz-allen%20&%20hamilton%20report.pdf >.

Borland, J 2002, *New estimates of the private rate of return to university education in Australia,* Melbourne Institute working paper no. 14/02, viewed 12 October 2006, <http://www.melbourneinstitute.com/wp/wp2002n14.pdf>.

Borthwick, S 1999, *Overview of student costs and government funding in post-compulsory education and training*, REB Report 4/99, Research and Evaluation Branch, Department of Employment, Science and Training, Canberra.

Card, D 1999, 'The causal effect of education on earnings', in *Handbook of Labour Economics,* eds O Ashenfelter and D Card, vol.3, Elsevier, Amsterdam.

Chapman, B, Rodrigues, M & Ryan, C 2007, *HECS for TAFE: The case for extending income contingent loans to the vocational education and training sector,* Treasury Working Paper 2007-2, Department of Treasury, Canberra, viewed 19 April 2007, <http://www.treasury.gov.au/contentitem.asp?NavId=049&ContentID=1252>.

ConnectEast Management 2004, *Product disclosure statement. Connect East Mitcham–Frankston project*, viewed 30 April 2006, <http://www.connecteast.com.au/pdf/ConnectEastAUS_PDS.pdf>.

Dockery, A & Norris, K 1996, 'The "rewards" for apprenticeship training in Australia', *Australian Bulletin of Labour,* vol.22, pp.109–25.

Dumbrell, T, de Montfort, R, Finnegan, W & Wright, P 2000, *Still not equal: A study of the differences in male and female TAFE graduates' earnings in Australia,* NCVER, Adelaide.

Foyster, J, Hon, KF & Shah, C 2000, *Student flows through Australian TAFE courses*, NCVER, Adelaide.

Gørgens, T & Ryan, C 2006, *The impact of additional educational qualifications for early school leavers*, DEST, Canberra.

Harris, R 2006, *Private training providers in Australia: Their characteristics and training activities,* NCVER, Adelaide.

Karmel, T 2007, *Vocational education and training and young people: Last but not least,* NCVER, Adelaide.

Lamb, S, Long, M & Malley, J 1998, *Access and equity in vocational education and training: Results from longitudinal surveys of Australian youth*, ACER research monograph no.55, ACER, Melbourne.

Marks, G, Hillman, K & Beavis, A 2003, *Dynamics of the Australian youth labour market: The 1975 cohort, 1996–2000,* LSAY research report no.34, ACER, Melbourne.

McGuire, P 1994, 'Rates of return to apprenticeship in the Metal Industry, 1955–1990', *Australian Bulletin of Labour,* vol.20, pp.235–50.

Miller, P & Mulvey, C 1996, 'Unions, firm size and wages', *Economic Record,* vol.72, pp.138–53.

NCVER (National Centre for Vocational Education Research) 2005a, *Student outcomes 2005: Australian vocational education and training statistics*, NCVER, Adelaide.

——2005b, *Student outcomes survey 2005: Data tables*, NCVER, Adelaide, viewed 16 October 2006, <http://www.ncver.edu.au/statistics/surveys/sos05/sos05_counts_TAFEgrads.xls>.

——2006, *Australian vocational education and training statistics: Students and courses, 2005,* NCVER, Adelaide.

OECD (Organisation for Economic Cooperation and Development) 2001, *The well-being of nations: The role of human and social capital*, OECD, Paris.

Preston, A 1997, 'Where are we now with human capital theory in Australia', *Economic Record*, vol.73, no.220, pp.51–78.
Psacharopoulos, G & Patrinos, H 2002, *Returns to investment in education: A further update,* World Bank policy research working paper no. 2881, viewed 11 October 2006, SSRN: <http://ssrn.com/abstract=367780>.
Ryan, CA 2000, *Where to next? A comparison of the outcomes and destinations of graduates from the Australian higher education and vocational education and training sectors,* NCVER, Adelaide.
——2002a, *Individual returns to vocational education and training qualifications: Their implications for lifelong learning,* NCVER, Adelaide.
——2002b, *What are the longer-term outcomes for individuals of completing vocational education and training qualifications?,* NCVER, Adelaide.
Stanwick, J 2005, *Australian Qualifications Framework lower-level qualifications: Pathways to where for young people?*, NCVER, Adelaide.
Watson, L 2003, *What do TAFE students pay? A review of charging policies in Australian vocational education and training*, NCVER, Adelaide.
——2005, 'Student fees and charges in VET: Policies and practice', in *Funding and financing vocational education and training: Research readings,* ed. K Ball, NCVER, Adelaide.
Wolfe, B & Haveman, R 2001, *Accounting for the social and non-market benefits of education,* University of Wisconsin, Madison.

The National Vocational Education and Training Research and Evaluation (NVETRE) Program is coordinated and managed by the National Centre for Vocational Education Research, on behalf of the Australian Government and state and territory governments, with funding provided through the Department of Education, Employment and Workplace Relations.

This program is based upon priorities approved by ministers with responsibility for vocational education and training (VET). This research aims to improve policy and practice in the VET sector.

Research funding is awarded to organisations via a competitive grants process.

National Centre for Vocational Education Research Ltd

Level 11, 33 King William Street
Adelaide SA 5000

PO Box 8288 Station Arcade
South Australia 5000

Phone +61 8 8230 8400
Fax +61 8 8212 3436
Email ncver@ncver.edu.au

www.ncver.edu.au