Studying beyond age 25:
who does it and what do they gain?

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About the research

Studying beyond age 25: who does it and what do they gain?

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Why should we keep studying beyond our mid-20s? After all, education and training at a younger age provide for the longest period over which the return on the investment can be harvested. On the other hand, individuals in their 40s (or even 50s) can expect to work for another 20 years or so, allowing plenty of time to recoup the cost of the investment in education and training.

Using data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey and the Survey of Education and Training (SET), this study investigates what prompts people to participate in education and training at more mature ages, and the impact of this participation on their labour markets outcomes. The report describes the main characteristics of Australians who choose to participate in formal education at more mature ages, investigates a number of potential outcomes of such investments and explores why Australian participation rates are higher than those in other Organisation for Economic Co-operation and Development (OECD) countries. The authors find that more educated individuals are more likely to undertake further education or training.

Key messages

- For males, the desire to change their current employment situation (for example, gain a promotion or obtain a different job) was a key motivator for studying after the age of 25 years. For females, simply getting a job was a major driver, especially for women who were divorced or separated.

- Labour market outcomes differed also by gender. For women who were not employed previously, enrolling in, or completing, a vocational education and training (VET) course increased the likelihood of finding a job by around one-third. For men, completion of university qualifications resulted in higher hourly wages.

- A shared outcome for both males and females was a sustained increase in job satisfaction following the course of study, which may be related to increases in levels of skills use in the job. The increases in reported skills use during and after study are sizeable, particularly for men, and persist after training has been completed.

Overall, Coelli and his colleagues conclude that the positive effects of mature-age education are quite modest, although there are clear examples of positive payoff — women who are not employed, for example. They suggest this supports the notion of targeted, as opposed to universal, government support.

Tom Karmel
Managing Director, NCVER

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Executive summary

According to the Organisation for Economic Co-operation and Development (OECD), Australia has one of the highest rates of participation in education among OECD member countries for individuals aged 30 and above (OECD 2010). Adult education can have important social implications, as it may assist in reducing the gap between the skills required by employers and those held by workers, hence increasing economic output. It may also increase social inclusion by improving the employment opportunities of low-skilled workers.

This study investigates the determinants of mature-age participation in education in Australia and its effects on the labour markets outcomes of those individuals who choose to study. We use a broad definition of mature-age education: any study towards a formal education qualification for those aged 25 to 64 years. We also break down our estimates by age group in order to understand whether outcomes differ by when further study is undertaken. Furthermore, we investigate possible reasons for Australia having such a high proportion of adult participation in education compared with other developed countries. Specifically, we compare Australia with Great Britain, a country which shares many cultural aspects with Australia, yet has much lower adult participation rates in formal education.

Our empirical analysis has four components:

1   We provide mature-age education participation rates broken down by age group, gender, level of study, whether studying on a full- or part-time basis, mode of study (on campus or distance), type of institution, number of courses, initial education levels, and main reason for study.

2   We ascertain the specific individual and initial labour market characteristics related to the decision to study at mature ages among the following: initial education levels, work experience, income, marital and dependent status, membership of disadvantaged groups (low parental socioeconomic status, immigrant status, non-English home language, disability status), employment status, wage rates, initial job satisfaction, and use of skills in the initial job.

3   We provide estimates of the effect of mature-age education on a large number of labour market and related outcomes. The estimates are constructed using changes in the outcomes from before to after the education spell.

4   We provide estimates of the proportion of the mature-age education participation gap between Australia and Great Britain that can be attributed to differences in underlying population characteristics. A breakdown of the specific differences in characteristics that may contribute to the gap is provided.

One of the main contributions of this investigation is the breadth of the labour market outcomes investigated in the third component. Most prior research has focused on the effects of adult education on a small set of outcomes only, in particular, wage rates and employment probabilities. Taking full advantage of the rich set of variables available in the Household, Income and Labour Dynamics in Australia (HILDA) Survey dataset, we study a large set of outcomes, along with these two standard measures. We also estimate the effects of mature-age study on hours of work, levels of job and life satisfaction, the extent of skills utilisation at work, the probability of holding a permanent versus a casual/fixed-term job, and occupational status (prestige).

The empirical analyses are conducted using data from the HILDA Survey for the period 2001 to 2009. We also use data from the Survey of Education and Training (SET) for 2009 to undertake some of the

more detailed breakdowns of participation rates. Finally, the comparison between Australia and Great Britain is carried out using data from the British Household Panel Study (BHPS).

Key findings

Mature-age participation rates in formal education

As expected, current participation rates fall with age, from around 14—15% of those aged 25 to 34 years down to 2—3% for those aged 55 to 64 years. Older individuals are also more likely to be enrolled in vocational education and training (VET) rather than university-level study, particularly at the certificate III/IV level. While some individuals enrol in up to four different courses during the year, the majority only enrol in one. The main reasons provided for engaging in further education differed a little across genders, with males wanting to achieve a promotion or a different job, while females wanted to obtain a job. Both genders were likely to report that the aim of the education was to acquire extra skills for the current job or that it was a requirement of the job. Certificate-level studies attracted the highest number of participants, with many participants already holding a certificate at the same level or even a higher qualification.

The decision to enrol in education

Consistent with the reported participation rates by age group, the probability of engaging in education decreases with age. Apart from age, the individual characteristic most closely related to enrolling was initial education level, with more educated individuals much more likely to enrol than individuals with very little prior education. There are some notable differences between men and women in the characteristics related to participation. For males, participation was negatively related to the initial level of job satisfaction, wage rates and disposable income, while these characteristics were unrelated to female enrolment. Furthermore, while marital status was not related to male participation, engagement is much higher for separated and divorced females relative to married females. This may reflect attempts by women who have experienced a marital disruption to re-enter the workforce by first acquiring a higher or more recent education credential. Note that being born overseas was not related to enrolment; thus, the high enrolment rate in Australia is not driven by the high proportion of immigrants in the Australian population.

Education and labour market outcomes

Among the ten labour market and wellbeing outcomes that we investigated, only a small number were affected by mature-age study. The significant effects that were estimated also differed by gender and education level undertaken. Disposable income increased for females undertaking VET studies (certificates and diplomas) only, while wage rates increased for males undertaking university studies (bachelor and above) only. Male adults who engaged in VET study did report higher levels of job satisfaction, higher use of skills in the job and a reduction in the number of weekly hours of work. They also were more likely to retain employment if they completed their study and gained a qualification. For females, the effects of mature-age education were mostly related to employment status. VET-level studies in particular led to higher levels of satisfaction with employment opportunities and a higher probability of employment among previously non-employed (unemployed or out of the labour force) women. By enrolling in VET, women can increase their probability of finding a job by around 33 percentage points. Enrolment in a bachelor degree or higher also increased the probability of females retaining a permanent job by almost ten percentage points.

Apart from estimating the overall changes in outcomes from before to after an education spell, we also looked more closely at the yearly pattern in outcomes leading up to and after each spell of VET study. By doing so, we can observe whether any effect of mature-age VET study is immediate, or takes time to materialise. Furthermore, the approach also allows us to look for the existence of the phenomenon known as 'Ashenfelter's dip'; that is, whether outcomes dip just before an education spell. For males, there is some evidence that weekly work hours actually fall in the year prior to study and remain at that lower rate after study. Job satisfaction improves during study, with further increases in the years after study. The increased levels of job satisfaction may be related to the clear and persistent increase in the utilisation of skills in the job. For females, disposable income increases for about four years after study, before returning to lower levels. The level of satisfaction with job opportunities rises considerably, starting from the year of study. Weekly hours of work and the probability of employment show an upward trend prior to VET study, with those trends flattening after study. The use of skills in the current job appears to increase after study, although this measure shows more variability across the years for women compared with men.

An international comparison

The average characteristics of the populations of Australia and Great Britain aged 25 to 64 years differ in some important dimensions. In Australia, the average age in this group is younger, the proportion of immigrants is higher, while the proportions who are married and have dependent children are higher. The initial education levels in the populations also differ, with (among other differences) more Australians holding bachelor degrees and more British holding diplomas. We use estimates of the relationships between these characteristics and the probability of enrolling in mature-age education to calculate the proportion of the mature-age education participation rate gap between the two countries that can be attributed to these differences in population characteristics. We find that these characteristics can explain at most 1.6 percentage points of the 14 percentage point gap (or 0.11 of the gap). Thus institutional and preference differences are the more likely candidates for explaining the different enrolment rates in the two countries.

Policy implications

Overall, the positive effects of mature-age education were found to be quite modest and confined to a handful of outcomes. We also found that there are differences in labour market outcomes between men and women in the effects of studying at more mature ages. For women, VET-level study results in gains in income and particularly in the probability of finding a job for those who were previously not employed, indicating potential benefits for individual females and for Australian society more generally. Conversely, the lack of direct monetary returns from mature-age education for males suggests the need for a careful analysis of the societal benefits and costs associated with subsidising mature-age education, particularly for the large number of individuals who have already attained VET qualifications or higher. Cases may still exist where subsidisation is warranted, such as in response to mass retrenchments in declining industries, as negative outcomes may occur without retraining.

Introduction

This study investigates the individual determinants of mature-age entry into formal education and the individual outcomes associated with formal study at more mature ages. We define mature-age study in this context quite broadly to include all working-age individuals above the conventional age for completing a first post-secondary education credential directly after high school: individuals aged 25 to 64.[1] The factors affecting the decision to undertake further education at more mature ages may differ considerably from those factors affecting the decision to study at more conventional (younger) ages, as mature-age individuals already have varied work experiences and histories, and many have family responsibilities and other interests. The outcomes of mature-age study may also be more varied across individuals, given the variety of potential motivations for such study. This mature-age participation in education (sometimes referred to as 'lifelong learning' or 'adult education') may be very important in alleviating labour market skill shortages, in engaging adult Australians more fully and productively in the labour market and in building social inclusion. Thus understanding the motivations for and outcomes of education at more mature ages is of considerable importance.

Australia stands out internationally in terms of the participation of more mature-age individuals in formal education and training. According to the OECD, Australia had the highest education enrolment rate of those aged 40 and over among all OECD countries in 2008, at 5.8%, nearly four times the OECD average of 1.6% (see table 1). For those aged 30 to 39, Australia's participation rate ranked second highest overall, at 13.4%, and over twice the OECD average of 5.9% (OECD 2010).

Table 1   Percentage of individuals enrolled in formal education by age group, 2008

	15–19	20–29	30–39	40 and over
Australia	81.6	33.0	13.4	5.8
United Kingdom	72.6	17.0	5.6	1.6
United States	80.8	23.2	5.5	1.3
OECD average	81.5	24.9	5.9	1.6

Source: OECD (2010).

This report describes the main characteristics of Australians who participate in formal education at more mature ages, investigates a number of potential outcomes of such investments and explores why Australian participation rates are higher than those of other OECD countries. The focus is on formal education, that is, education that is part of enrolment in education or training for gaining a formal education qualification, such as a degree, diploma or certificate. We do not focus on training that is not intended to (cannot) lead to obtaining a formal qualification.[2] We address four main research questions.

1   What are the participation rates of Australians by age group and gender in formal education and training? These participation rates are broken down by the type of qualification for which the

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[1]   Our definition of a mature-age student is similar to the OECD definition of individuals aged 30 and over. The Australian Bureau of Statistics (ABS) generally uses a narrower definition of mature age, which only includes individuals aged 45–64 years.

[2]   Information on non-formal study is not collected in the HILDA Survey, the main dataset we rely on in this report. Informal training is quite prevalent in Australia, as it is in many countries. Approximately 30% of respondents aged 25 to 64 report having undertaken at least one informal training course in the past 12 months in the 2009 Survey of Education and Training, with over two-thirds of this training being work-related.

individual is studying, whether the individual is studying full- or part-time, and where possible, by the main reason for studying, the type of institution attended and mode of study.

2   Who undertakes education at more mature ages? We describe the individual characteristics related to participation in formal education and training at more mature ages. We investigate a large number of individual characteristics, including: initial education levels, employment status, work experience, earnings levels, marital and dependent status, membership of potentially disadvantaged groups (for example, low parental socioeconomic status, immigrant status, non-English home language, disability status), initial job satisfaction, and use of skills in initial job.

3   What are the labour market and wellbeing effects of undertaking education at more mature ages? We investigate whether undertaking education at more mature ages results in improvements in: earnings, employment status (employed, hours of work, permanent positions), occupation level, job satisfaction, use of skills in the job held, and levels of subjective wellbeing. We break down our estimates of the effects of study on these labour market and wellbeing outcomes by type of credential gained (if one is gained) and by qualification completion status.

4   Why are mature-age education participation rates so much higher in Australia than in comparable OECD countries? To what extent does this reflect differences in the composition of the adult populations across countries as opposed to other differences, for example, in institutions, in preferences and/or in the returns from education?

We address these research questions using a variety of methodological approaches and different datasets. While the first question is analysed using standard descriptive statistics and tabular analysis, the investigation of the other research questions involves the use of more advanced econometric techniques. The statistical techniques and datasets we employ in addressing each of the research questions are summarised in table 2.

Table 2   Summary matrix of empirical approaches employed

Research question	Report section	Data employed	Methodology
1 Participation rates of Australians by age group in formal education.	Data and participation rates	HILDA, SET	Descriptive statistics
2 Who undertakes education at mature ages?	Multivariate regressions results: the decision to enrol	HILDA	Descriptive statistics, multivariate probit analysis
3 Labour market and wellbeing effects of undertaking education at mature ages?	Multivariate regressions results: the outcomes of education	HILDA	Multivariate linear regression
4 Why are mature-age participation rates in formal education so much higher in Australia than in other comparable OECD countries?	Multivariate regressions results: the Australian experience in an international context	HILDA, BHPS	Probit analysis, Oaxaca-Blinder decomposition

Notes: HILDA = Household, Income and Labour Dynamics in Australia Survey dataset; SET = Survey of Education and Training in Australia, 2009; BHPS = British Household Panel Survey.

Related literature

Although the figures presented in table 1 highlight the relative importance of mature-age education in Australia, the number of Australian studies that specifically investigate this topic is quite limited. Conversely, the related international literature is rich and covers a wide range of countries.

Australian studies of the determinants of education participation at more mature ages include Roussell (2002) and Ryan and Sinning (2009). These studies investigate participation in education and training using a wider definition, one not limited to formal education, as in the present report. Both find that participation rises with previous education levels and the skill level of the occupation worked in, while it falls with age. Ryan and Sinning (2009) also find that individuals who report that their jobs are demanding relative to their skills are more likely to participate in further education and training. We expand on these earlier studies of participation, analysing the role of several additional labour market factors that precede the education and training spell.

There are just a handful of Australian studies investigating the outcomes or impacts of mature-age or adult education. Karmel and Woods (2004) investigate the effect of obtaining formal qualifications later in life on two specific labour market outcomes: employment rates and the probability of working full-time. Using cross-sectional data from the Survey of Education and Training, they find that individuals who obtained qualifications after age 40 have as good or even better employment outcomes than those obtaining their qualifications at earlier ages, particularly females. However, lower-level qualifications, such as certificates I and II for men, do not have a positive effect on employment rates. Also using cross-sectional SET data, Lee and Coelli (2010) investigate four employment-related outcomes of obtaining further education: whether employed, employed full-time, holding a permanent position and weekly earnings. The authors find positive effects from obtaining sub-diploma VET qualifications at more mature ages (aged 30 to 64) if the individual did not complete high school, but not if the individual had previously completed high school. Headey and Warren (2008) use the first five waves (years) of HILDA (the main longitudinal data source we employ) to ascertain whether individuals who undertake formal education at prime working ages (25—54 years) obtain earnings increases that are higher than for those who do not undertake further education. They find median earnings gains for men, but smaller gains for women. In addition, most gains were observed two years after the education was undertaken rather than in the immediate term. We expand considerably on these studies by investigating ten labour market and wellbeing outcomes, and over a longer period of analysis using nine waves of HILDA. As we discuss in detail below, using longitudinal data to investigate the impacts of adult education results in estimates that are much less prone to potential selection bias, that is, that are more likely to reflect the 'true' impact of adult education participation.

Recent international studies of the impacts of adult education on labour market outcomes have primarily employed longitudinal data, given its potential benefits. Many of these studies failed to find strong earnings returns from adult education overall, but several did find some returns for specific subsets of individuals, particularly younger adults (under age 40). Several studies also found that it may take several years for the returns from adult education to appear. In these respects, the international evidence is in line with the results presented in this report for the Australian context.

First consider the United Kingdom. Three studies employ the National Child Development Study (NCDS) data, a long panel of individuals born in March 1958 and surveyed at various ages since (7, 11, 16, 23, 33, 42, 46 and 50 years). Blundell et al. (2000) employed this dataset up to age 33 and found

that men who began a course after age 21 earned a return about seven percentage points lower than those who began a similar course earlier, while starting late did not appear to have any detrimental effect on women's earnings. Since the individuals were only 33 years old at the time of the earnings measures, it was not possible to observe whether these effects would persist. Jenkins et al. (2003) investigated both the reasons why individuals obtain qualifications between ages 33 and 42, and the earnings and employment benefits of such qualifications. When using first difference estimation methods to control for potential selection bias (as we do below), such qualifications did not result in higher earnings, except for men with low initial levels of education who then obtained a degree. The authors did find that mature-age qualifications increased the probability of being employed at age 42 for those not employed at age 33, but they found no impact on the probability of remaining in employment. Silles (2007) investigated the hourly earnings outcomes of full-time male workers only, applying the same time period and data as Jenkins et al. (2003) and using both first-differenced and value-added models. She first noted that those full-time males who undertook new lower-level education courses between ages 33 and 42 were found to have had higher wages at age 33 than those who did not undertake further study. In terms of outcomes, she also generally found no earnings gains from education between ages 33 and 42, except for those acquiring NVQ4 qualifications (just below bachelor degree).

Buscha, Blanden and Sturgis (2009) employ the British Household Panel Study (BHPS) panel data to investigate the effect of adult education on hourly earnings and occupational status. This is an annual panel survey similar to HILDA and is the dataset we use for our international comparison below. The authors identify positive effects on both earnings and occupational status of similar magnitude for both males and females, although the impacts may take longer to occur for men than for women. The impacts are also age-dependent, with positive earnings effects only for men aged less than 35 and women aged less than 49 and lasting occupational status effects only for middle-aged men and women.

Zhang and Palameta (2006) investigate the earnings impacts of adult education using Canadian panel data similar to HILDA. The authors observe earnings gains for adults who obtained a certificate, but not for those who studied but did not obtain a certificate. Earnings gains were found for individuals who stayed with the same employer but not those who switched. Myers and Myles (2005) use two surveys of Canadian individuals' own perceived benefits of adult education. The authors found that the least-educated were more likely to report a positive labour market outcome and were just as likely to be engaged in types of learning that are associated with high labour market potential.

Griliches (1980), Marcus (1984), Light (1995) and Leigh and Gill (1997) study the effect of delaying entry to university using US panel surveys of young adults from the late 1960s to the early 1970s and the late 1970s to the early 1980s. The first two studies, using the earlier cohort, report that delayed entry did not adversely affect returns from education. Using the later cohort, Light (1995) found that those who delay earn a lower wage gain upon completion than those who did not delay. This gap, however, closes over the next four years. Leigh and Gill (1997), also using the later US cohort, find that, after controlling for ability using test scores, returns from community college study are positive and of essentially the same size for returning adults as they are for continuing students. Note that these studies only investigated education that was delayed to when individuals were in their late 20s. The timeframe over which the returns are measured was also small, that is, until the individuals were in their early 30s.

Other contributions have focused on the educational choices and outcomes of subsamples of the adult population, particularly individuals who have experienced unemployment spells. For example, Albrecht, Van den Berg and Vroman (2005) and Stenberg and Westerlund (2008) study the effect of

comprehensive adult education (upper secondary or compulsory education) on the standard labour market outcomes for the long-term unemployed in Sweden. Both studies investigate the effects of an initiative known as the 'Adult Education Initiative' or 'Knowledge Lift' (implemented in 1997), which paid the long-term unemployed (unemployed for two years or more) the equivalent of the unemployment benefit for up to a year or two to undertake comprehensive education. Albrecht, van den Berg and Vroman only found annual income gains for younger females and only employment probability gains for younger men from participation in the initiative. Stenberg and Westerlund (2008), however, estimated sizable effects from the program on annual earnings if the individual studied for two to four semesters, but not if they studied for one semester only.

Finally, Jacobson, LaLonde and Sullivan (2005) analyse the effect of community college study on labour market outcomes, specifically of displaced workers in the United States. The authors find that the equivalent of a year of community college increases displaced workers' earnings by about 9% for men and 13% for women. Credits completed in courses that taught quantitative or more technically oriented vocational subject matter, such as health-related, science, mathematical and trade courses, generated earnings gains averaging 14% for men and 29% for women. By contrast, courses teaching non-quantitative or non-technical vocational skills, such as sales, service, social sciences or humanities courses, were associated with small or possibly zero earnings gains. The authors find that those displaced workers who undertake community college credits were more likely to have particularly depressed earnings after their job loss. The authors also find that it is important to allow for a transition period after study for earnings to increase. Depending on gender and other personal characteristics, the transition period is expected to last between two and three quarters (6—9 months) after the end of the training spell.

These international studies of the outcomes of adult or mature-age education using longitudinal data have focused on investigating the earnings and employment probability effects, and they generally found mixed results. Our research will uncover whether these outcomes are more consistently positive in Australia than in these other countries, since education at more mature ages is more prevalent in Australia. We also expand the range of outcomes under investigation to determine whether education at more mature ages also has positive effects on: job satisfaction, the perception on the degree of utilisation of individual skills within the job, weekly working hours, life satisfaction, satisfaction with employment opportunities, occupational status and the probability of permanent employment as opposed to casual or fixed-term employment.

Data and participation rates

With respect to the first three research questions investigated, we use data from the Household, Income and Labour Dynamics in Australia Survey. HILDA is a nationally representative survey of around 13 000 individuals aged 15 and older. Respondents are surveyed each year, with information currently available from 2001 to 2009. The panel aspect of HILDA enables us to track changes in outcomes at the individual level. As the third research question analyses the employment and wellbeing effects of mature-age education, this feature of the data is particularly useful. It allows us to observe the change in individual outcomes from before the education is undertaken until after it is completed (or until the individual stops studying prior to gaining a qualification).

To further explore the formal education participation of mature-age Australians, information from the 2009 Australian Bureau of Statistics' Survey of Education and Training is also employed.[3] Specifically, this dataset has been used to construct participation rates by age group and gender, broken down by the type of institution attended, mode of attendance (on-campus versus correspondence or distance), full-time versus part-time enrolment, whether the individual is an apprentice or trainee and the level of study. Participation rates for current enrolment status (at the time of interview) are provided in tables 3 and 4 for males and females respectively. We focus specifically on individual responses on current enrolment in study for a formal qualification at an education institution or organisation. As noted above, we do not investigate less formal education and training, such as training in the workplace, that does not lead to any formal qualification.

Note the change over age groups in the level of study. Older individuals enrolled in education are more likely to be in VET, particularly at the certificate III/IV level. The proportion studying full-time falls over age groups, while the proportion studying by correspondence or distance education is highest among the middle two age groups (those aged 35 to 54 years).

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[3] We employ the 2009 SET in addition to HILDA for two reasons. To begin, the 2009 SET has larger sample sizes than HILDA; therefore, we can provide potentially more precise estimates of participation in formal education broken down by age group, and thus provide a check to ensure the participation rates constructed using HILDA are reasonable. More importantly, the 2009 SET collects a number of variables that HILDA does not. The additional variables we employ are: type of institution attended, mode of attendance (on-campus versus correspondence or distance), whether the individual is an apprentice or trainee, and the main reason for studying.

Table 3   Current enrolment rates in formal education and training, males, 2009 SET, %

Age group	25–34	35–44	45–54	55–64
Total	**14.66**	**8.46**	**5.50**	**2.47**
Level				
Postgraduate degree, cert., diploma	2.48	1.96	1.26	0.30
Bachelor degree	3.96	1.05	0.75	0.23
Advanced diploma or diploma	1.92	1.01	0.84	0.42
Certificate III/IV	4.30	3.19	2.06	0.68
Certificate I/II	0.80	0.15	0.16	0.22
Certificate not further defined	0.61	0.55	0.07	0.47
Level not determined	0.60	0.53	0.37	0.15
Apprentice or trainee	2.32	1.15	0.54	0.04
Institution type				
At university or other higher educ.	5.76	2.90	1.97	0.45
At TAFE, technical, vocational	4.97	2.73	1.74	0.80
Other (secondary, business, professional)	3.93	2.83	1.79	1.22
Proportion in full-time study	0.35	0.17	0.16	0.13
Proportion in correspondence or distance	0.29	0.34	0.38	0.23
Observations	*2130*	*2444*	*2370*	*2074*

Source: SET data, 2009.

Table 4   Current enrolment rates in formal education and training, females, 2009 SET, %

Age group	25–34	35–44	45–54	55–64
Total	**14.82**	**10.70**	**7.64**	**3.07**
Level				
Postgraduate degree, cert., diploma	3.00	2.30	1.22	0.51
Bachelor degree	4.56	2.02	1.26	0.26
Advanced diploma or diploma	2.45	1.83	1.74	0.49
Certificate III/IV	3.28	3.26	2.39	1.19
Certificate I/II	0.32	0.75	0.35	0.29
Certificate not further defined	0.52	0.38	0.35	0.23
Level not determined	0.68	0.18	0.33	0.10
Apprentice or trainee	0.59	0.53	0.41	0.22
Institution type				
At university or other higher educ.	7.61	4.59	2.55	0.88
At TAFE, technical, vocational	3.39	2.57	2.67	0.94
Other (secondary, business, professional)	3.82	3.54	2.42	1.24
Proportion in full-time study	0.35	0.22	0.15	0.18
Proportion in correspondence or distance	0.40	0.44	0.40	0.33
Observations	*2313*	*2688*	*2561*	*2112*

Source: SET data, 2009.

The 2009 Survey of Education and Training also provides information on the formal education and training enrolment of individuals over the 12 months prior to interview. This particular information allows us to break down participation even further, by the number of courses enrolled in during the 12-month period. Furthermore, the 2009 SET allows us to identify the main reason for undertaking further study. We provide 12-month participation rates for these additional breakdowns in appendix A, table A1. The first thing to note is that, even within a 12-month period, a small proportion of individuals have enrolled in more than one course. Some have enrolled in up to four courses. With

regards to the main reason for undertaking study, a significant proportion report reasons unrelated to paid employment, particularly to get skills for community/voluntary work and for personal interest/enjoyment. These reasons are particularly important for individuals aged 55 to 64 years. An important employment-related reason is that the study was a requirement of the job. Thus, some study may not be aimed at improving labour market outcomes; rather, certain study may be purely related to maintaining outcomes. Certain occupations have ongoing education as part of the job description, including teachers, nurses and other health-related occupations. Notable differences across genders are the higher proportion of males stating that their study was to get a different job or promotion, while females were more likely to state that their study was to get a job.

We begin the analysis of the HILDA data by constructing participation rates in formal education and training similar to tables 3 and 4. These rates use cross-sectional information for 2009 only, in order to be as comparable as possible with the participation rates constructed using the 2009 SET. These participation rates are broken down by level of study and full-time versus part-time enrolment. HILDA does not provide information on type of institution, mode of attendance, whether the individual is an apprentice or trainee, or reason for study. Participation rates using HILDA were constructed both for current enrolment and for enrolment and receipt of qualification over the previous 12 months. A summary of the constructed participation rates is provided in table A2 in appendix A. These rates are quite consistent with those constructed from the 2009 SET, both in terms of overall participation rates and rates by qualification level. The main difference is the lower proportion of the 55 to 64 years age group in HILDA studying full-time. This difference can be due to the smaller sample size of this particular age group in the HILDA survey and to the level of attrition, which can affect a longitudinal survey.

Information from HILDA is used to answer research questions 2 and 3, taking advantage of the panel nature of the data. In order to answer question 2, panel data allow us to construct measures of the characteristics of individuals prior to enrolling in formal education. If we investigated this relationship using labour market outcomes at the same time as the education enrolment, we would potentially be confusing the direct effect of current enrolment on current labour market outcomes (individuals work less in order to study) with the labour market factors that led to the enrolment decision.

To minimise any problem related to missing information on enrolment or receipt of qualification, our sample only includes individuals who have responded in all survey waves. The sample we employ in this part of the investigation includes all individuals 'at risk' in 2001 (the first wave of HILDA) of undertaking a new enrolment in formal education and training: all individuals aged 25 to 64 years and who are not studying in 2001. This exclusion of individuals who are studying in 2001 leads to the loss of 554 observations from the 5721 who responded in all waves. This sample exclusion is not random, as individuals who already have higher levels of education and are younger are more likely to be studying. We account for this non-random selection by reweighting the data based on the observable characteristics of individuals, particularly their age, gender and initial education levels. The strategy followed for building the appropriate weights will be described in the empirical section.

We begin the investigation of 'who enrols in education' by separating our sample of survey respondents into two groups. The first group includes all individuals who reported enrolling in a formal educational qualification at any time from 2002 (wave 2) to 2009 (wave 9) of HILDA. The second group includes all individuals who never report enrolling in a formal educational qualification over this period. Table 5 provides some basic information on the patterns of engagement in education observed in our sample, by gender and age group. These participation rates in formal education are higher than those reported in table A2 as they include any study over the eight-year period from 2002

to 2009, rather than just current study status in 2009. Note that, even as we move away from the youngest age group, the percentage of individuals who enrol in formal education at mature ages is not negligible. For the 35 to 44 years age group, the percentage of males in education at some time over the period is slightly below 31%, while for females the corresponding figure is above 37%. More specifically, for both genders and all age groups, certificate-level study is the most prevalent.

Table 5   Rates of enrolment in formal education at any wave between 2002 and 2009, HILDA, %

Age group in 2001	25–34	35–44	45–54	55–64
Males				
Observations	*656*	*828*	*688*	*500*
No study	56.55	69.20	82.70	93.20
Any study	43.45	30.80	17.30	6.80
Of which:				
Certificate	44.91	48.63	53.78	47.06
Diploma	16.84	15.69	15.13	17.65
Degree and above	33.68	31.37	27.73	23.53
Level not specified	4.57	4.31	3.36	11.76
Females				
Observations	*779*	*993*	*802*	*564*
No study	52.89	62.64	77.56	90.43
Any study	47.11	37.36	22.44	9.57
Of which:				
Certificate	48.23	55.26	58.33	66.67
Diploma	13.35	10.78	10.00	7.41
Degree and above	35.15	30.19	26.11	16.67
Level not specified	3.27	3.77	5.56	9.25

Source: HILDA data, weighted statistics.

Table 6 breaks down the subset of individuals reporting enrolment in certificate-level study by previously attained education levels and prior employment status. Certificate-level studies attract the highest number of participants overall, including attendees who have already achieved a qualification level that is higher than a certificate (the corresponding figures for diploma and university degree students can be found in tables A3 and A4 in appendix A). Note that, when analysing the characteristics of individuals enrolled in formal education, we use the characteristic measured in the year prior to education enrolment. Depending on age group, between 34% and 45% of men who enrolled in certificate-level study already held a certificate III or IV. Some of these individuals may be attempting to improve their qualification level from III to IV. An alternative explanation may be the desire (or the need) to obtain a qualification that provides skills closer to those required for the development of a working career. Note that up to age 54, more than 80% of males enrolled in certificate-level study held either a full- or part-time job. Note also that, depending on the age group, 18% to 36% of men and 21% to 41% of women enrolled in certificate-level courses already hold a diploma or a university degree.[4]

For all age groups, the percentage of female education enrollees working full-time is lower than the corresponding figure for males, and this is not fully compensated by a higher rate of part-time work. This reflects the usual gender gap in rates of labour force participation. Note also the higher

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[4] Similar percentages of certificate-level students were estimated to have already obtained a diploma or higher using the 2009 Survey of Education and Training.

percentage of females studying for a certificate whose prior highest education level is less than high school or a certificate I/II.

Table 6   Initial education levels and employment status of certificate-level students, HILDA

Age group in 2001	25–34	35–44	45–54	55–64
Males				
Observations	*128*	*124*	*64*	*16*
Below year 10	2.94	6.54	3.16	9.83
Year 10–11 or cert. I/II	20.79	17.08	13.76	5.32
Completed Year 12	19.21	6.92	12.78	8.74
Certificate III/IV	38.36	44.15	34.17	45.37
Diploma	6.14	9.61	18.11	13.46
Degree and above	12.56	15.70	18.03	17.28
Full-time worker	79.41	71.94	73.83	38.56
Part-time worker	8.82	11.96	7.26	15.07
Females				
Observations	*177*	*205*	*105*	*36*
Below Year 10	2.79	8.18	6.50	9.60
Year 10–11 or cert. I/II	27.95	37.59	28.84	35.05
Completed Year 12	25.61	17.18	22.39	2.74
Certificate III/IV	17.80	15.07	20.90	10.58
Diploma	12.63	9.69	6.36	24.75
Degree and above	13.22	12.29	15.00	17.29
Full-time worker	35.35	31.98	46.51	27.38
Part-time worker	32.80	41.76	25.45	23.18

Source: HILDA data, weighted statistics.

The figures reported in table 7 offer a first insight into the differences between individuals who enrol in education at more mature ages and those who do not. A few elements of distinction between the two groups can be noted from table 7. Individuals who engage in education generally appear to be better educated to begin with, as can be observed from the proportions of diploma and university degree holders in the two subsamples, irrespective of the respondent's gender. The evidence is more mixed with respect to the prior employment status of survey participants. For men, there is a notable difference in the percentages of full-time and part-time workers across the two groups. While full-time clearly prevails among non-students in the two younger age groups, the gap tends to decrease among older individuals. These relationships are less clear for females. Note also that for both genders the proportion of unemployed individuals is higher among those who enrol in education. The extent of the relations between the enrolment choice, initial education level and employment status is investigated more completely in the context of multivariate regression analysis below.

Table 7   Education levels and employment status by study status, HILDA

Age group in 2001	Not studying				Studying			
	25–34	35–44	45–54	55–64	25–34	35–44	45–54	55–64
Males								
Observations	*371*	*573*	*569*	*466*	*285*	*255*	*119*	*34*
Education level								
Below Year 10	3.65	7.65	10.12	21.78	1.29	3.37	1.71	4.58
Year 10–11 or cert. I/II	20.01	22.96	22.39	16.38	14.85	13.27	10.74	8.73
Completed Year 12	16.47	11.47	11.39	7.85	20.50	7.61	15.18	7.11
Certificate III/IV	29.34	31.54	27.65	28.59	22.07	33.14	25.15	31.49
Diploma	8.64	10.34	9.34	11.39	9.01	14.25	13.49	16.40
Degree and above	21.89	16.04	19.11	14.01	32.28	28.37	33.73	31.68
Employment status								
Full-time	86.15	82.97	68.97	28.82	78.14	75.52	76.05	41.84
Part-time	5.00	5.53	10.05	16.92	11.42	9.89	6.97	16.00
Unemployed	1.99	1.79	1.75	1.70	4.31	6.97	5.92	10.52
Not in the labour force	6.85	9.71	19.23	52.55	6.13	7.62	11.06	31.64
Females								
Observations	*412*	*622*	*622*	*510*	*367*	*371*	*180*	*54*
Education level								
Below Year 10	3.29	7.88	16.70	26.96	2.30	5.16	4.99	9.04
Year 10–11 or cert. I/II	29.52	33.32	37.12	39.13	16.00	26.65	21.20	24.85
Completed Year 12	23.68	15.72	13.31	5.56	22.51	13.84	20.05	5.60
Certificate III/IV	9.32	8.69	10.12	8.34	10.89	14.21	15.11	8.87
Diploma	7.87	9.83	7.08	8.70	18.45	11.84	9.28	21.03
Degree and above	26.32	24.56	15.67	11.31	29.85	28.30	29.38	30.60
Employment status								
Full-time	32.77	37.68	35.14	11.92	42.36	38.54	49.42	32.47
Part-time	33.50	34.51	29.87	15.84	30.35	37.19	26.35	25.62
Unemployed	0.99	1.33	1.41	0.51	3.97	6.06	3.55	3.79
Not in the labour force	32.75	26.47	33.59	71.73	23.32	18.21	20.68	38.12

Source: HILDA data, weighted statistics.

The British data

With respect to the last research question, the comparison will be conducted using Great Britain as the reference country. Great Britain was selected for two reasons. First, the two countries have cultural and institutional similarities and yet very different enrolment rates. Second, the investigation can be based on relatively comparable data sources. The analysis will be conducted by complementing the HILDA data with data from the British Household Panel Survey (BHPS), an annual survey consisting of a nationally representative sample of about 5500 households recruited in 1991, and containing a total of approximately 10 000 interviewed individuals. As in HILDA, the same individuals are re-interviewed each year. The analysis of HILDA and the British survey will cover the same interval of time, starting from 2001, in order to maintain a degree of comparability between samples. Note that the Australian data include 2009, while the British data are only currently available until 2008.

The sample from the British dataset has been chosen in the same manner as the HILDA sample. We thus focus on individuals aged 25 to 64 years and we start following their working and educational paths in 2001. Our analysis is based on 7738 survey participants, 55.6% of whom are women.

Table 8 provides participation rates in education of British individuals, similar to table 5 for Australia. The participation rates refer to any enrolment in education during the period 2001—08 (one year shorter than for Australia). As in the tables presented using HILDA data (tables 5 to 7), each individual is only recorded once, so if a survey participant experiences more than one spell in education, we report the level of the first of these spells. In the British survey, respondents are asked to specify whether they have enrolled in any full-time education course since the previous interview. The definition of part-time education is more complicated, since respondents are asked whether they have taken part in any part-time education or training activity since the last interview. In order to separate the individuals in formal education from those in informal training, we only include those respondents who declared that the course took place in a school or in an academic institution. This choice leads to the exclusion of individuals who indicated the workplace or a training centre as the course location, and thus should result in a measure of formal education most consistent with that employed using the Australian data. In order to facilitate the comparison between the British and the Australian educational systems, table A6 links the different educational levels to the structure suggested by the International Standard Classification of Education (ISCED), as developed by the United Nations agency, UNESCO.[5] With respect to the educational levels categorised in table 8, the term 'intermediate education' identifies all the courses that lead to GCE A level or equivalent (comparable with an Australian certificate level III/IV), while 'sub-degrees' include courses that lead to a work-related qualification, such as hospitality management or non-degree nursing diploma. (This category is comparable with the Australian diploma.) Similar qualifications can be obtained through 'adult education centres'. Nonetheless, these institutions may provide different types of education, including work-related training, so their inclusion may slightly overestimate the number of individuals who enrol in formal education qualifications.

The numbers reported in table 8 suggest a higher tendency to engage in education among women and a comparatively negligible role of intermediate courses as an educational choice of more mature-age individuals. Sub-degree courses and college attendance appear to be the most attractive educational tracks, which is not surprising, given the high degree of employability that characterises the qualifications related to these types of education. Note that the British figures related to enrolment in education are considerably lower than the comparable Australian figures in table 5, except in the oldest age group. This difference may be due in part to the questions on education not being identical in the two surveys. The exclusion of all individuals enrolled in training from the British figures[6] may lead to an overestimation of the actual gap in participation rates. If we instead include all individuals who report enrolment in a training centre (either private or employment-related), it increases the share of individuals in education by around 7.5 percentage points. (The overall enrolment rate of men and women of any age shifts from 15.6% to 23.3%.) The change is larger for men than women, which may be due to the inclusion of study that is linked directly to employment. Given the higher rate of labour market participation of men, it is not surprising to observe a more considerable impact of these courses on male enrolment rates. In particular, for men, the figures reported in the third row of table 8 would double if such training courses were included, while for women the increase would be between three and seven percentage points, depending on age group. Nonetheless, even if we consider this broader definition of enrolment in education, the British rates generally are lower than the Australian ones, with the exception of rates for individuals aged 55 to 64 years. This result can

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[5] UNESCO = United Nations Educational, Scientific and Cultural Organization.

[6] As indicated earlier, only respondents who indicated the learning took place in a school or in an academic institution were included; those who undertook training in the workplace or at a training centre were excluded.

probably be linked to the lack of a homogeneous and well-structured system of vocational education in the British educational model.[7]

Table 8   Percentages of individuals enrolled in education, British survey

Age group in 2001	25–34	35–44	45–54	55–64	Australia, 25–64
Males					
Observations	*823*	*1004*	*894*	*709*	*2672*
No study	86.39	87.95	91.05	92.10	74.06
Any formal study	13.61	12.05	8.95	7.90	25.94
Of which:					
Intermediate education (full-time only)	0.89	0.83	1.25	0.00	47.91[a]
Adult education centre (part-time only)	11.61	12.40	20.00	28.57	n/a
Sub-degree/college	58.93	59.50	61.25	53.57	16.16[b]
University	28.57	27.27	17.50	17.86	31.31[c]
Females					
Observations	*1039*	*1276*	*1079*	*896*	*3138*
No study	80.37	73.04	83.41	89.73	69.00
Any study	19.63	26.96	16.59	10.27	31.00
Of which:					
Intermediate education (full-time only)	1.47	1.45	0.00	0.00	53.81[a]
Adult education centre (part-time only)	16.18	16.86	22.91	38.04	n/a
Sub-degree/college	59.31	59.88	57.54	52.17	11.41[b]
University	23.04	21.80	19.55	9.78	4.22[c]

Notes: a = certificate level I–IV; b = diploma; c = university degree and above.
Source: BHPS data, weighted statistics; Australia: HILDA data, weighted statistics.

Summary statistics for the British sample are provided in tables A7 and A8 of appendix A for males and females respectively. There are some important differences in the composition of the populations in the two countries under analysis. Examples of differences are highlighted in table 9, in which details are provided on country of origin and age group. Regarding age distributions, the share of the population in the oldest age group is lower in Australia than in Great Britain, while the opposite is the case for individuals aged 35 to 54. Larger differences emerge in relation to country of birth. The proportion of the British population born in a non-English speaking country is markedly lower than in Australia. Such differences in population composition will be explored as a potential explanation of the different participation rates in education between the two countries. The method of exploration is discussed in the next section.

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[7]   Wolf (2011) provides an extremely detailed analysis of the role and scope of vocational education in the United Kingdom.

Table 9   Population composition, Australia and the UK: age groups and country of origin

Age group in 2001	25–34	35–44	45–54	55–64
Great Britain, males				
Share of individuals in the age group	24.99	29.04	25.66	20.31
British-born	96.97	95.59	95.12	95.7
Immigrants, English speaking	2.44	2.4	3.29	3.15
Immigrants, non-English speaking	0.58	2	1.59	1.15
Great Britain, females				
Share of individuals in the age group	25.97	29.09	24.58	20.37
British-born	96.24	95.28	93.66	95.66
Immigrants, English speaking	2.15	3.12	3.78	3.31
Immigrants, non-English speaking	1.61	1.6	2.55	1.03
Australia, males				
Share of individuals in the age group	24.55	30.99	25.75	18.71
Australian-born	80.67	73.05	69.03	65.44
Immigrants, English speaking	8.23	13.10	15.66	14.61
Immigrants, non-English speaking	11.10	13.85	15.31	19.63
Australia, females				
Share of individuals in the age group	24.82	31.64	25.56	17.97
Australian-born	80.43	71.10	70.06	71.34
Immigrants, English speaking	7.99	9.92	11.78	13.84
Immigrants, non-English speaking	11.58	18.98	18.15	14.82

Source: BHPS and HILDA data, weighted statistics.

Methodology

The education participation rates by age group presented in the previous section provide a useful background on mature-age education in Australia (research question 1). A comparison of a small number of the characteristics of individuals who undertake education at more mature ages and those who do not was also given in table 7. This provided some simple information regarding question 2 on who undertakes formal education at more mature ages. In particular, individuals who already have higher levels of education are also more likely to undertake study at more mature ages. We continue the analysis of question 2 in the next section by estimating several multivariate regression models that relate the enrolment outcome to a large set of individual characteristics. Such multivariate analysis allows for the correlations inherent among the set of individual characteristics under investigation, allowing us to observe the effect of each characteristic after controlling for the effects of the other characteristics on the enrolment outcome. For example, earnings and current education levels are closely related, while both these characteristics may be related to the decision to undertake further study. The estimation results from the multivariate analysis will enable us to observe the effect of earnings on enrolment over and above the effect of initial education levels. We employ the Probit technique to estimate these equations, given the outcome (enrolment) is binary (0 or 1).

When attempting to estimate the causal effects of education (at any age) on labour market and wellbeing outcomes (research question 3), it is important to consider the potential effect of self-selection bias. Those individuals who choose to invest in education may be more able or motivated than others, thus they may have better labour market outcomes (higher earnings, employment rates etc.) due to this higher ability or motivation rather than due to the education they undertake. In the returns from education literature, researchers have tended to employ either instrumental variable techniques (using a variable that changes the education level of individuals but has no direct impact on the labour market outcomes) or have compared twins or siblings when trying to estimate the causal effect of education on labour market earnings. These methodological choices are related to the use of cross-sectional data.

Such instrumental variable or twin comparison-based techniques will not be employed here. It is not clear that a suitable instrument is available and there is insufficient sample size for a twin-based approach. Instead, the longitudinal or panel nature of HILDA is exploited to ascertain the labour market effects of undertaking education at more mature ages. To control for potential ability or self-selection bias, the initial labour market and wellbeing outcomes (prior to undertaking education at more mature ages) of individuals are used. For example, if an individual is more able and productive, that should be reflected in their initial earnings level. In other words, we investigate the effect of undertaking education at more mature ages on the change in earnings or change in other outcomes from before the education is undertaken to after. The change in outcomes will be compared with the change in outcomes experienced over the same time period by similar individuals who did not participate in education at more mature ages. Those individuals used as the relevant 'control group' will essentially be selected based on their gender, initial earnings levels, initial education level, age, work experience etc. This method of estimating the labour market effects of mature-age education using changes in earnings and controlling for initial characteristics has been employed by recent studies in Australia (Headey & Warren 2008), the United Kingdom (Jenkins et al. 2003; Silles 2007; Buscha, Blanden & Sturgis 2009), and Canada (Zhang & Palameta 2006).

Note that we investigate the effect of mature-age education on more than just earnings rates. Using the same method, we also investigate the effect of such mature-age education on employment status (employed, permanent, hours of work), occupation level, level of job satisfaction, use of skills in the job held, and subjective wellbeing.

In order to obtain a more complete picture of the patterns of these labour market outcomes leading up to and after undertaking education at more mature ages, we also report estimates based on panel regressions with individual fixed effects. The regressions include indicators of how many years the observation is prior to and after an education spell. The estimated coefficients on these indicators measure how the outcome for this individual who undertakes education differs from the outcome of similar individuals who do not undertake further education. We will thus be able to observe whether outcomes dip just before an education spell (a phenomenon known in the literature as 'Ashenfelter dip', from the contribution of Ashenfelter 1978), and if outcomes after the education is completed jump up quickly or take some years to improve.

To attempt to identify sources of differentiation between the Australian and British rates of mature-age education participation, we employ decomposition analysis (see Blinder 1973; Oaxaca 1973) to disentangle the role played by differences in the composition of the mature-age populations in the two countries (for example, gender-age profiles, proportion of immigrants, prior qualifications, prior employment outcomes etc.) and other differences (for example, in preferences, in returns from education/training and in institutional contexts), although note that this second group of factors cannot be separately identified by our analysis.

The standard Oaxaca-Blinder decomposition can be illustrated as follows. Imagine we are interested in studying the following relation:

$$Y_i = X_i \beta + u_i \tag{1}$$

where Y is the outcome we want to investigate (in our case, participation in education for individual i), X is a matrix of characteristics believed to be related to the outcome, β represents a vector of coefficients that characterise the relation under investigation and u is an error term. Assume now that we are interested in studying this relation for two different populations, A (Australia) and B (Britain). We then have:

$$Y_i^A = X_i^A \beta^A + u_i^A \tag{1.1}$$

$$Y_i^B = X_i^B \beta^B + u_i^B \tag{1.2}$$

Both Oaxaca and Blinder separately suggested the same method for disentangling the difference in the expected values of Y between the two populations (to be approximated by the difference in the average values of the dependent variable for the two groups) into a component that can be attributed to differences between the two populations in the average levels of the variables included in X (the 'explained' component) and the remainder, which cannot be explained by differences in X. In studies of racial or gender differences, this remainder is often interpreted as 'discrimination'. The formula can be expressed as:

$$\bar{Y}^A - \bar{Y}^B = \left(\bar{X}^A - \bar{X}^B \right) \hat{\beta}^A + \bar{X}^B \left(\hat{\beta}^A - \hat{\beta}^B \right) \tag{2}$$

The $\hat{\beta}$,s are the estimated coefficients that we obtain by estimating equation (1.1) for the two populations separately. The first term on the right of equation (1.2) is the 'explained' component (or 'attributable to the endowments' as defined by Blinder). The second term is the component that

cannot be explained by differences in endowments, and is often interpreted as 'discrimination' (or 'attributable to the coefficients').

Our specification differs from standard applications of the Oaxaca-Blinder decomposition, as the dependent variable under investigation (that is, our Y) is a binary variable that takes value 1 in case the individuals engage in education and 0 otherwise. We employ a modified version of equation 1.2 in order to deal with estimation in a non-linear context (see Gomulka & Stern 1989; Fairlie 2005; Bauer, Hahn & Sinning 2008).

Multivariate regressions results

The decision to enrol in education

The decision to enrol in education at mature ages may be related to a whole host of individual characteristics simultaneously. In order to uncover which particular characteristics are related to this decision, we estimate Probit models, in which the outcome (enrolment) is estimated as a function of a number of labour market, prior education level, socioeconomic and demographic characteristics of individuals (the regressors). For each respondent, the dependent variable takes the value 1 if they enrol in education at any time in waves 2 to 9 of the HILDA survey. The variable takes the value 0 if the individual never engaged in education during this period. All the regressors are measured at their wave 1 values.

Note that for these estimates, we exclude from the estimation sample those individuals who are already studying in wave 1 of HILDA. This exclusion was undertaken in order to ensure that the prior labour market factors we enter into these models are not a function of currently being a student. If we included students in wave 1 in the estimates, their wave 1 labour force status may be a direct outcome of studying, that is, they may not be working or only working in a casual job in order to study. This exclusion results in a sample that is less educated and older than the full sample, as younger and more educated individuals were more likely to be studying in wave 1. We employ a standard inverse probability reweighting technique to construct appropriate weights for our subsequent regressions. In this way we guarantee that the subsample of individuals we employ in our regression is still representative of the Australian population. To do this, we estimate Probit models of studying in wave 1 separately by gender as a function of standard demographic characteristics (age, prior education level, immigrant status, parental occupational status and residence). We then adjust the HILDA-provided longitudinal weights by dividing them by one, minus the predicted probability of studying constructed from these Probit estimates.

Tables 10 and 11 report the main estimates of our Probit regressions of the outcome of enrolment in any wave from wave 2 to 9 of HILDA for male and females respectively. The reported estimates are marginal effects constructed from the Probit estimates, that is, they are the estimated change in the probability of enrolment related to a one-unit change in each factor, keeping all other factors constant. In each table we report results for all individuals in the selected sample, for employees only (as only they have employee earnings data) and for all employed individuals (as only they have job satisfaction measures). Note that the sample here (and below) is restricted to those aged 25 to 57 in 2001, in order to only keep individuals of standard working age (64 and under) for the entire HILDA panel. The 57-year-old individuals will be 64 in 2009, the last HILDA wave employed.

Note the clear negative relation between age and the probability of enrolling in education for both men and women. The age effects get stronger as we move toward older age groups. The results for males suggest some interesting regularities regarding prior education levels. More educated individuals have a higher probability (by 20 to 30 percentage points) of enrolling in education than the base education group of those with no post-secondary credentials and having left high school before completing Year 10. For males with very low education levels (Years 10 and 11 only and those who hold a certificate not further defined); however, the probability of enrolling in education at more mature ages is only marginally higher than the lowest base education group.

Table 10 Impacts on the probability of engaging in education: males, HILDA

	All individuals		Employees only		All employed	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Reference category: age group 25–29						
Age group: 30–34	-0.0542	-1.37	-0.0072	-0.14	-0.0444	-1.05
Age group: 35–39	-0.0636	-1.72	-0.0668	-1.42	-0.0796	-2.04
Age group: 40–44	-0.073	-1.90	-0.0644	-1.30	-0.105	-2.70
Age group: 45–49	-0.136	-4.19	-0.129	-3.03	-0.137	-3.79
Age group: 50–57	-0.190	-6.12	-0.187	-4.67	-0.187	-5.58
Reference category: below Year 10*						
Postgraduate degree	0.277	2.80	0.126	1.03	0.283	2.87
Graduate certificate or diploma	0.260	2.99	0.220	2.10	0.270	2.90
Bachelor	0.335	4.80	0.224	2.56	0.262	3.36
Advanced diploma/diploma	0.260	3.57	0.161	1.76	0.222	2.66
Certificate III/IV	0.248	4.20	0.192	2.52	0.178	2.66
Certificate I/II	0.321	2.34	0.26	1.73	0.201	1.35
Certificate not defined	0.211	0.70	0.733	51.55	0.138	0.40
Year 12	0.214	2.99	0.157	1.77	0.145	1.87
Year 10 or 11	0.114	1.86	0.0798	1.02	0.0409	0.62
Reference category: non-immigrant						
Immigrant, English speaking	-0.0201	-0.58	-0.0401	-0.88	-0.0233	-0.62
Immigrant, non-English speaking	-0.00844	-0.21	0.0183	0.34	0.0585	1.22
Reference category: father job status – fourth quartile						
Father job status – first quartile	-0.0121	-0.35	-0.0352	-0.79	-0.0168	-0.45
Father job status – second quartile	-0.0174	-0.50	-0.0302	-0.66	-0.00598	-0.16
Father job status – third quartile	-0.00406	-0.12	-0.00258	-0.06	-0.0192	-0.57
Reference category: mother job status – fourth quartile						
Mother job status – first quartile	-0.0135	-0.39	-0.031	-0.70	-0.0408	-1.13
Mother job status – second quartile	0.00607	0.18	0.0165	0.38	0.0244	0.66
Mother job status – third quartile	-0.0285	-0.95	-0.0441	-1.13	-0.0288	-0.90
Reference category: married						
De facto	-0.0161	-0.45	-0.0243	-0.54	-0.0262	-0.68
Separated	-0.00063	-0.01	0.0434	0.49	0.0471	0.62
Divorced	0.0555	0.95	0.0582	0.74	0.0375	0.57
Never married	0.0322	0.80	0.0563	1.07	0.078	1.65
Number of dependent children	-0.00547	-0.49	-0.0134	-0.94	0.000733	0.06
Health limits work	0.0603	1.46	-0.0315	-0.53	-0.0235	-0.51
Health prevents work	-0.247	-22.03				
Reference category: employed full-time						
Employed part-time	0.017	0.39				
Unemployed, wants full-time	0.0257	0.43				
Unemployed, wants part-time	0.0198	0.15				
Not in labour force, marginal (looking)	-0.096	-1.49				
Not in labour force	-0.00628	-0.10				
Receive disability pension	-0.0403	-0.43				
Receive disability support	-0.137	-2.90				
Disposable income (annual in $1000s)	-0.0016	-2.82			-0.0017	-2.78
Log wage residual			-0.115	-3.27		
Working hours			0.000109	0.08	0.00156	1.52

	All individuals		Employees only		All employed	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Reference category: employee						
Employee of own business					0.00384	0.08
Employer, own account worker					-0.0459	-1.42
Reference category: skills used in job – **do not agree**						
Skills used in job – strongly agree					-0.0367	-0.86
Skills used in job – agree					-0.0665	-1.56
Reference category: job satisfaction – low						
Job satisfaction – very high					-0.156	-3.56
Job satisfaction – high					-0.177	-3.66
Job satisfaction – medium					-0.120	-2.76
Observations	*2029*		*1323*		*1673*	

Note: * Reference category for education levels also includes a few individuals with undetermined education. Regressions include state indicators and indicators of city and regional residence. Coefficients estimated using adjusted weights. The t-statistics are based on heteroskedasticity-robust White standard errors.

Source: HILDA data.

Table 11 Impacts on the probability of engaging in education: females, HILDA

	All individuals		Employees only		All employed	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Reference category: age group 25–29						
Age group: 30–34	-0.0201	-0.51	0.0111	0.20	0.0106	0.20
Age group: 35–39	-0.0603	-1.56	-0.036	-0.66	-0.033	-0.64
Age group: 40–44	-0.101	-2.71	-0.0549	-1.02	-0.0685	-1.38
Age group: 45–49	-0.117	-3.19	-0.0378	-0.70	-0.0562	-1.12
Age group: 50–57	-0.189	-5.68	-0.151	-3.14	-0.14	-3.10
Reference category: below Year 10*						
Postgraduate degree	0.200	2.21	0.177	1.61	0.207	1.89
Graduate certificate or diploma	0.077	1.06	0.0716	0.81	0.128	1.48
Bachelor	0.187	2.97	0.230	2.87	0.223	2.90
Advanced diploma / diploma	0.116	1.82	0.128	1.52	0.146	1.83
Certificate III/IV	0.140	2.23	0.153	1.76	0.119	1.49
Certificate I/II	0.331	3.31	0.320	2.26	0.288	2.16
Certificate not defined	0.0282	0.21	0.0833	0.37	0.265	1.40
Year 12	0.108	1.84	0.107	1.33	0.116	1.57
Year 10 or 11	0.0893	1.71	0.0812	1.10	0.0854	1.27
Reference category: non-immigrant						
Immigrant, English speaking	-0.00177	-0.05	-0.0504	-1.12	-0.0195	-0.45
Immigrant, non-English speaking	-0.0642	-1.87	-0.123	-2.79	-0.108	-2.55
Reference category: father job status – **fourth quartile**						
Father job status – first quartile	-0.027	-0.81	-0.0293	-0.67	-0.00011	0.00
Father job status – second quartile	-0.0238	-0.77	-0.0714	-1.84	-0.0456	-1.23
Father job status – third quartile	-0.0105	-0.35	-0.00742	-0.19	0.0218	0.59
Reference category: mother job status – **fourth quartile**						
Mother job status – first quartile	-0.0184	-0.57	-0.028	-0.66	-0.0121	-0.30
Mother job status – second quartile	-0.0127	-0.37	-0.0166	-0.36	0.00705	0.16
Mother job status – third quartile	0.00858	0.29	-0.00767	-0.20	-0.0187	-0.54

Studying beyond age 25: who does it and what do they gain?

	All individuals		Employees only		All employed	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Reference category: married						
De facto	0.0165	0.45	0.0251	0.52	0.0374	0.81
Separated	0.151	2.56	0.206	2.69	0.221	2.99
Divorced	0.212	4.34	0.174	2.93	0.209	3.62
Never married	0.0316	0.78	0.0037	0.07	0.0452	0.90
Number of dependent children	0.0201	1.90	0.00852	0.57	0.0204	1.46
Health limits work	0.0339	0.92	0.0223	0.41	0.0211	0.44
Health prevents work	0.175	0.56				
Reference category: employed full-time						
Employed part-time	-0.0305	-1.07				
Unemployed, wants full-time	0.144	1.46				
Unemployed, wants part-time	0.219	2.08				
Not in labour force, marginal (looking)	0.00722	0.16				
Not in labour force	-0.107	-3.15				
Receive disability pension	-0.309	-27.93				
Receive disability support	-0.0926	-1.48				
Disposable income (annual in $1000s)	-0.0012	-1.35			-0.00115	-1.01
Log wage residual			-0.00375	-0.11		
Working hours			1.62E-05	0.01	0.00163	1.49
Reference category: employee						
Employee of own business					-0.127	-1.90
Employer, own account worker					-0.0397	-0.87
Reference category: skills used in job – do not agree						
Skills used in job – strongly agree					-0.0284	-0.65
Skills used in job – agree					0.0278	0.59
Reference category: job satisfaction – low						
Job satisfaction – very high					-0.045	-0.79
Job satisfaction – high					-0.0451	-0.80
Job satisfaction – medium					-0.0442	-0.73
Observations	*2393*		*1372*		*1545*	

Note:　Regressions include state indicators and indicators of city and regional residence. Coefficients estimated using adjusted weights. The t-statistics are based on heteroskedasticity-robust White standard errors.* Reference category for education levels also includes a few individuals with undetermined education.

Source: HILDA data.

Most other personal characteristics included in the set of regressors do not seem to have any significant relation to the decision by mature-age males to engage in education. Note in particular that there is no statistically significant effect of being born overseas. This indicates that the high enrolment rate of Australia is not driven by the high proportion of immigrants in the Australian population. This finding may be due to the Australian system of selecting skilled migrants. Holding a work-related qualification in an 'in demand' occupation was often a necessary condition for being granted an immigrant visa, so that a significant number of migrants would not require any additional training to find a job.

Parental occupation levels[8] are not related to the probability of studying at mature ages in these estimates. Parental occupation levels have been found to be strongly positively related to university-level study in Australia for individuals just leaving high school. The lack of any relationship in these estimates may imply that mature-age study is more equally available than study just after high school, as more mature individuals may have their own resources with which to fund further study. It may also reflect the fact that the majority of mature-age study is at the certificate and diploma levels, not the university level. Parental occupational status is not strongly related to certificate and diploma study, even among recent school leavers, as they may be partially captured by the effects of current education levels.

There is a significant negative relationship between individual disposable income measured at wave 1 and further study in the first and third models reported in table 10 for males. The probability of studying is 1.6 percentage points lower for each additional $10 000 of annual disposable income, holding the other characteristics fixed.

For male employees only (second model), note the negative relationship between log wage residuals and the probability of studying. These wage residuals were constructed from an extended Mincer-type log hourly wage regression, where the log of hourly wages was regressed on a measure of work experience and its square, education levels, interactions of work experience and education levels, the proportion of time since leaving full-time education not working, immigrant status, marital status, number of children, disability status and residence. These residuals thus denote whether the individual is earning a wage that is above or below what we would expect given the characteristics for this individual. The negative relationship between this log wage residual and the probability of studying implies that it is males who have lower hourly wage rates than we expect who are more likely to study. This may be due to dissatisfaction with their current employment situation.

For employed males (third column), the level of initial job satisfaction is significantly negatively related to the probability of engaging in education. Males reporting satisfaction levels in their job at any level above low (the base category) have much lower probabilities of studying (from 12 to 18 percentage points). In all, the results in table 10 indicate that the decision to (re-)enrol in the education system is more closely related to the working status of males than to their socio-demographic characteristics, apart from initial education level.

The results for females reported in table 11 are in some cases different from those for males. Although the estimates related to initial education levels are still generally significant, their pattern in terms of magnitude varies more than for males. More notable differences between the male and female results are observed for work-related characteristics. For females, the decision to engage in education is not significantly related to the level of job satisfaction, to wage residuals or to disposable income. Labour force status, however, appears to be more relevant for females, with unemployed females being significantly more likely to enrol in education (14 to 22-percentage-point higher probability than full-time workers, the base labour force status case).

Another notable difference between males and females is the stronger relationship between studying and marital status for females. The probability of engaging in education is much higher for separated and divorced females relative to married females (the base category). This may reflect attempts by

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[8] These occupational quartiles were constructed using the AUSEI06 occupational status scale based on the occupation of the parent when the individual was aged 14. See McMillan, Beavis and Jones (2009) for further details of how the occupational status scale was constructed.

women who have experienced a marital disruption to re-enter the workforce by first acquiring a higher or more up-to-date education credential.

The outcomes of education

In this section we focus on investigating the effects of mature-age enrolment and the completion of education courses on several outcomes. We concentrate on ten variables: total disposable income, job satisfaction, the perception of the degree of utilisation of individual skills within the job, hourly wage rate, weekly working hours, life satisfaction, satisfaction with employment opportunities, occupational status,[9] probability of employment and probability of permanent employment, as opposed to casual or fixed-term.

The analysis presented here is relatively straightforward. For each of the outcomes listed above, we calculate the difference between the value observed in the last (2009) and first (2001) waves of the survey, for all individuals in the sample. Note that in this case our sample includes individuals who are not studying in either wave 1 or wave 9 and who are aged 25 to 57 at the first wave. We then regress these differences in outcomes on a set of explanatory variables that control for the socio-demographic, education and work-related characteristics of individuals in wave 1. The set of regressors is augmented by two indicator variables: one denoting whether the individual ever enrolled in education from wave 2 to wave 8 of the survey, and a second indicator, whether the individual actually completed the course by the end of the panel (received a new qualification). The coefficients on these two indicators capture the effect of mature-age education on the outcomes under investigation, once we have controlled for the set of initial wave 1 individual characteristics. Identification of the effect of education on the outcomes relies on the assumption that any intervening shocks to those outcomes over the period from 2001 to 2009 are not correlated with the decision to undertake education.[10]

The results of these estimations are summarised in table 12. In the table we report two sets of results for male and female respondents separately for each of the ten outcomes. The first set is obtained by including an indicator for any enrolment in further education, while the second corresponds to the inclusion of the indicator for completion of the course only.[11] We distinguish between individuals who have engaged in VET or in bachelor and above studies. In both cases we do not report the coefficients related to the other variables included among the regressors. For the first eight outcomes we rely on linear regressions, while the last four sets of estimates are based on relevant probit regressions for the last two outcomes, due to the binary nature of the dependent variables.

The estimates in table 12 provide some useful insights into the effects that different education choices can have on the outcomes we are focusing on. They generally indicate that mature-age education has stronger effects for men than for women. Furthermore, the outcomes that are more likely to change following study tend to differ across genders. For males, the stronger effects we estimate are mostly linked to enrolment in and completion of VET courses. Both enrolment and completion of VET courses are related to a decrease in the hours worked per week. In both cases the

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[9] The measure employed is the AUSEI06 occupational status scale, with possible values running from 0 to 100. See McMillan, Beavis and Jones (2009) for details.

[10] The analysis was repeated after controlling for any changes in marital and employment status that might have occurred between waves 1 and 9. The main estimates of the effect of education on outcomes are essentially unchanged from those presented in table 12 and therefore are not reported here.

[11] Table A5 presents some basic statistics on the number of individuals who enrol and complete VET and bachelor degree and higher courses at mature ages from HILDA.

change is in the order of around 2.5 hours per week. Given the estimated reduction in hours worked with no estimated corresponding decrease in disposable income, it is not surprising to observe that VET is related to increases in the self-reported level of job satisfaction. Note that the reported level of job satisfaction can take values from 0 to 10, and the estimates suggest that mature-age VET can raise job satisfaction by around one-half of a reported level. This change is large when compared with the standard deviation of the reported level of job satisfaction of 1.55. Completing VET (but not just enrolling in it) is also related to a 24.6-percentage-point increase in the chances that a previously not employed (unemployed or out of the labour force) man will be employed. Enrolling in education at a bachelor or above level appears to pay back (in terms of our outcomes) for those individuals who already had a job before the education spell. The chances of remaining in employment for males after university-level education are in fact higher than for other individuals, and the enrolment decision is also linked to an increase in the hourly wage.

Table 12 Effect of education on labour market outcomes by type of course, HILDA

	Males		Females	
	Enrolled	Completed	Enrolled	Completed
Change in annual disposable income (in $1000s)				
Bachelor and above	10.01	19.18	0.728	-1.415
	(1.56)	(1.56)	(0.31)	(-0.52)
VET	-1.642	-2.863	2.064*	0.99
	(-0.59)	(-1.35)	(1.92)	(0.79)
R-squared	*0.085*	*0.088*	*0.062*	*0.06*
Observations	*1982*	*1982*	*2314*	*2314*
Change in job satisfaction				
Bachelor and above	0.230	0.276	0.143	0.109
	(0.86)	(0.77)	(0.54)	(0.31)
VET	0.474***	0.627***	0.0926	0.179
	(3.07)	(3.45)	(0.54)	(0.87)
R-squared	*0.038*	*0.041*	*0.026*	*0.026*
Observations	*1544*	*1544*	*1294*	*1294*
Change in skills utilisation				
Bachelor and above	0.143	0.319	-0.133	0.153
	(0.84)	(1.32)	(-0.59)	(0.58)
VET	0.236*	0.109	0.226	0.216
	(1.73)	(0.74)	(1.53)	(1.28)
R-squared	*0.045*	*0.042*	*0.024*	*0.023*
Observations	*1338*	*1338*	*1152*	*1152*
Change in log hourly wage rate				
Bachelor and above	0.111**	0.0572	0.0864	-0.0061
	(2.19)	(0.70)	(1.47)	(-0.09)
VET	0.00748	0.00919	0.0259	0.0386
	(0.22)	(0.21)	(0.74)	(1.06)
R-squared	*0.094*	*0.095*	*0.103*	*0.101*
Observations	*978*	*978*	*967*	*967*

	Males		Females	
	Enrolled	Completed	Enrolled	Completed
Change in working hours per week				
Bachelor and above	-0.788	2.344	-0.659	0.517
	(-0.49)	(1.16)	(-0.40)	(0.22)
VET	-2.751***	-3.030**	-0.0701	-0.588
	(-2.58)	(-2.42)	(-0.07)	(-0.54)
R-squared	*0.059*	*0.059*	*0.141*	*0.141*
Observations	*1540*	*1540*	*1291*	*1291*
Change in overall life satisfaction				
Bachelor and above	0.0894	-0.123	0.0098	0.266
	(0.39)	(-0.46)	(0.04)	(1.40)
VET	0.0943	-0.0081	0.0782	0.0224
	(0.69)	(-0.05)	(0.80)	(0.20)
R-squared	*0.023*	*0.023*	*0.033*	*0.033*
Observations	*1981*	*1981*	*2310*	*2310*
Change in satisfaction with employment opportunities				
Bachelor and above	-0.0381	-0.0391	0.219	0.413
	(-0.13)	(-0.10)	(0.85)	(1.20)
VET	-0.0681	-0.196	0.407**	0.384**
	(-0.38)	(-0.93)	(2.48)	(2.02)
R-squared	*0.026*	*0.027*	*0.035*	*0.034*
Observations	*1741*	*1741*	*1831*	*1831*
Change in occupational status				
Bachelor and above	0.77	4.475	0.749	1.094
	(0.27)	(1.12)	(0.35)	(0.42)
VET	0.623	-0.729	1.23	1.638
	(0.50)	(-0.51)	(1.14)	(1.33)
R-squared	*0.036*	*0.038*	*0.035*	*0.035*
Observations	*1533*	*1533*	*1295*	*1295*
Probability of employment in wave 9 if employed in wave 1				
Bachelor and above	0.056***	0.0408	0.004	-0.0084
	(3.43)	(1.62)	(0.10)	(-0.12)
VET	0.0206	0.004	0.0141	0.0108
	(1.16)	(0.16)	(0.62)	(0.41)
Observations	*1733*	*1733*	*1593*	*1593*
Probability of employment in wave 9 if not employed in wave 1				
Bachelor and above	-0.0263	-	-0.119	-0.0632
	(-0.10)	-	(-1.33)	(-0.39)
VET	0.129	0.246**	0.329***	0.310***
	(1.34)	(2.55)	(6.39)	(5.09)
Observations	*246*	*245*	*717*	*717*
Probability of permanent employment in wave 9 if in permanent employment in wave 1				
Bachelor and above	-0.0187	0.0158	0.0915***	0.0989**
	(-0.32)	(0.25)	(2.72)	(2.28)
VET	-0.0676*	-0.0637	-0.0586	-0.0331
	(-1.78)	(-1.51)	(-1.58)	(-0.79)
Observations	*889*	*889*	*732*	*732*

		Males		Females	
		Males		**Females**	
		Enrolled	Completed	Enrolled	Completed
Probability of permanent employment in wave 9 if not in permanent employment in wave 1					
Bachelor and above		0.0522	0.138	0.0335	-0.0517
		(0.30)	(0.58)	(0.30)	(-0.40)
VET		0.0702	-0.0428	-0.0425	-0.0352
		(0.87)	(-0.45)	(-0.62)	(-0.46)
Observations		*275*	*275*	*358*	*358*

Notes: Annual individual disposable income (in thousands of dollars); job satisfaction: 0–10 scale; skills utilisation: 1–7
t-statistics into brackets; significance levels: * 10%, ** 5%, *** 1%.
Coefficients estimated using adjusted weights. t-statistics based on White standard errors.

Source: HILDA data.

For females, the effects of mature-age education on the outcomes under investigation are quite limited and appear to be mostly related to the individuals' employment status. The estimates suggest a positive link between education at VET level and a change in the level of satisfaction with employment opportunities.[12] The strongest effects can be detected with respect to the probability of employment for previously non-employed women. By enrolling in VET, women can increase their chances of finding a job by 33 percentage points, and the completion of the course leads to a very similar result. Enrolling in a bachelor degree or higher increases the probability of holding a permanent job by almost ten percentage points for those women who already worked permanently in wave 1 and the same effect can be found with respect to the completion of a bachelor degree or higher.

For both males and females, the estimated relations between mature-age education and several outcomes are small and not statistically significant. This is the case, for example, for occupational status and levels of life satisfaction. These results suggest that, at least with respect to some outcomes, and at least over the short time frame of the HILDA panel, the benefits from enrolling and completing education courses at mature age are not widespread.

The effect of mature-age education on the set of outcomes included in our analysis can also be broken down by the education qualifications already possessed by individuals prior to enrolment in further education. To construct this breakdown, we repeated the analysis of table 12 after interacting the mature-age education indicators with indicators of whether the individual already possesses a qualification of the same level of the one he or she is seeking. The results of this analysis are reported in table B1 in appendix B.

For males, most of the statistically significant results outlined in table 12 appear to be driven by the effect of education on individuals who did not already possess an equivalent qualification. The relationships between changes in job satisfaction, skill utilisation, occupational status plus the probability of maintaining employment with participation in mature-age education are particularly strong for those individuals who did not hold a previous VET or bachelor qualification. There are two exceptions: the results with respect to changes in the hourly wage and in weekly working hours appear to be mostly driven by the effects of education on those who already possessed a bachelor or above (for the wage rate) or a VET (for working hours) qualification.

The picture is quite different for females. As already noted, the overall effect of mature-age education on outcomes is modest and is mostly confined to those females who already held a

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[12] Although VET courses do not define an educational level per se, the terminology will be used here to highlight the difference between participation at university-level courses and other educational choices.

qualification at a similar level. In particular, increases in annual income and in satisfaction with employment opportunities were confined to females enrolling in VET when already holding a VET qualification. However, enrolling in and completing a VET course appears to be beneficial for women in terms of their chances of employment in wave 9 if not previously employed independently of the qualification previously possessed. This is not the case with respect to the probability of permanent employment in wave 9 if already in permanent employment in wave 1. For this outcome, in fact, the effects of VET education are positive for women who already held a VET qualification, but appear to be negative for those who did not.

Previous research on the impacts of adult education on labour market outcomes found that the impacts were often larger for younger than older adults. Table B2 in appendix B provides estimates of the effect of mature-age education on outcomes just for older individuals, that is, those aged 40 to 57 in wave 1 of HILDA. There is no positive effect of VET on male job satisfaction for this older age group, but the lower male hours of work effect remains. In addition, mature-age VET raises the probability of remaining employed for this older male age group only, but such VET is related to lower probabilities of retaining permanent employment for this group. For women, the positive effect of completing a VET qualification on satisfaction with work opportunities over all females remains for these older women, albeit the estimates are less precise. The increase in the probability of gaining employment from VET also remains for this older age group. Note that bachelor and above education is also related to a sizeable increase in the level of overall life satisfaction for older females. The effect is approximately a third of a standard deviation.

The numbers presented in table 12 are estimates of the change in each of the ten outcomes from wave 1 to wave 9 for individuals undertaking education at mature ages relative to similar individuals who did not. The education spell could have occurred at any stage in the seven years between waves 1 and 9. Thus the table 12 estimates are not able to reveal the timing of any effect of education on outcomes; that is, does it take a few years for positive outcomes to occur or is the effect immediate? Also, the estimates in table 12 do not reveal whether these outcomes were deteriorating or improving prior to the study being undertaken. Using the full nine years of data, however, we are able to provide information on the ten outcomes under investigation at each point (year) leading up to and after the education spell. The graphs presented in figure B1 in appendix B provide this information on the ten outcomes leading up to and after VET level study.[13]

The red crosses in appendix graphs are essentially measures of each outcome for those individuals who undertake education at some stage in the panel at a particular point before, during or after their education spell. The measures are constructed after controlling for the full set of individual characteristics employed in the estimation thus far (for example, age, pre-study education level, marital status, geography) plus individual fixed effects.[14] The vertical lines above and below the red crosses provide a measure of dispersion of the estimated coefficients.[15] The shorter the vertical segment, the more precise the estimate. By controlling for individual fixed effects in these measures, we are removing the effect of self-selection into education, which is important. As a result, however,

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[13] The complete set of results with respect to all the outcomes for bachelor and above level study and just for completion of qualifications is available from the authors.

[14] The estimates presented (the red crosses) are specifically the coefficients on indicator variables for the number of years before or after a particular education spell estimated using the full panel of nine years of annual data including all covariates that change over time (thus immigrant status and parental occupation are excluded) and individual fixed effects. The estimate for 'study' is the coefficient on an indicator equal to one during each year the individual is actually studying.

[15] The vertical lines represent the 95% confidence intervals on the estimated coefficients.

we are just able to observe the movement in the outcomes over time essentially 'within' those individuals who study. Thus the measures in figure B1 tell us nothing about whether these outcomes are higher or lower among those who study versus those who do not study. They just tell us how the outcomes move from before to after study among those who do study.

For males (the measures to the left of figure B1), there are no observable trends in annual disposable income or wage rates pre- and post-VET study, which is in line with the estimates of table 12. There is some evidence that weekly work hours fall in the year prior to study, and remain at that lower rate after study. It should be kept in mind, however, that the precision of the estimates in all of figure B1 is not particularly high, making it difficult to make strong statements about any of the trends observed in the point estimates. Job satisfaction rises during study, and stays at a consistently higher level after study. Overall life satisfaction also improves during study, with a trend to increasing satisfaction in those years further out from study. The increased levels of job and life satisfaction may be related to the clear change in the (self-reported) level of utilisation of skills and abilities in the job. The increases in reported skill use during and after study are sizeable and persist after the education spell. It is interesting to note, however, that there is no comparable increase in levels of satisfaction with job opportunities for males. The probability of employment actually dips during the two years prior to study, is quite low during study (but this may be due to the study itself), then bounces back up in the two years after study and stays at the higher level. The occupational status of males rises very moderately a few years after study, but the estimates are not particularly precise.

For females, there is also no trend in wage rates, but disposable income does appear to rise for about four years before returning to lower levels. Weekly hours of work and the probability of employment are on upward trends prior to VET study, with those trends flattening after study. There is a very weak positive trend in job satisfaction from pre- to post-VET study, but no trend at all in overall life satisfaction. The use of skills in the current job appears to increase after study, although this measure shows more variability across the years for women compared with that which was observed for men. The level of satisfaction with job opportunities rises considerably starting from the year of study. Occupational status — a measure that ranks jobs on the base of several socioeconomic characteristics on a range of values between 0 and 100 (see McMillan, Beavis & Jones 2009) — dips slightly just before and during study, then rises after study, but these changes are very slight.

In all, the estimates of table 12 and figure B1 highlight the existence of some positive outcomes from study at mature ages. The observed changes in weekly hours of work, in job and life satisfaction and in the probability of employment are outcomes that can justify the decision to enrol in education at mature ages, even if such study does not necessarily result in increased wages and income. The increases in the use of skills and abilities in the current job and, for females, in satisfaction with job opportunities, are also important outcomes that can motivate engagement with further education. Furthermore, overall, the obtained estimates do not indicate the existence of a clear Ashenfelter's dip in the outcomes we analysed, although there are moderate dips prior to VET study in hours worked and the probability of employment for males.

The Australian experience in an international context

We now investigate some potential reasons behind the discrepancy between the Australian rates of enrolment in mature-age education and those of other OECD countries. In particular, we draw a comparison between Australia and Great Britain. As mentioned above, the decision to choose Great Britain for our analysis is linked to the cultural and (to a lesser extent) institutional similarities that characterise the two countries.

The empirical investigation is structured in two stages. Firstly, we replicate for Great Britain the probability analysis on the likelihood of engaging in mature-age education that was conducted for Australia in the previous section. In this way we aim to investigate whether there are any differences in the determinants of the enrolment decision between the two countries. Secondly, we further scrutinise these differences by performing a Blinder-Oaxaca decomposition (described above) of the difference in participation rates across the two countries.

Tables 13 and 14 report the results of the Probit analysis on the decision to enrol in education for males and females, respectively. We include the results for Great Britain and for Australia. The coefficients are obtained using the procedure outlined in the previous section. We only include individuals who might have experienced an education spell in the period 2002—09 (2002—08 for the British data). As before, we employ inverse probability weights for controlling for the selection effect which might arise from the exclusion of those individuals who were studying in 2001. An exact comparison of these results with those reported in tables 10 and 11 is not possible, as the set of explanatory variables employed in this section is smaller than that used previously, and we can only include variables that are available in both datasets. Moreover, most of the independent variables have been recoded in order to facilitate the analysis across the two countries. The coefficients presented for Australia are, nonetheless, very similar to those already discussed in the previous section in terms of signs and significance.

The results for males do not suggest any striking difference in the relation between the probability of enrolment and the explanatory variables in the two countries under investigation. In both educational systems, holding a qualification above primary education (the reference category) is linked to a higher likelihood of enrolment, while there is a negative relation with age. In Great Britain, never married individuals show a higher propensity to engage in education compared with married ones (reference category) relative to Australia, while disposable income (which in this section is measured in PPP-corrected[16] US dollars, to guarantee the comparability of the variable across the two countries) is not related to enrolment in Great Britain but is negatively related in Australia.

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[16] PPP = purchasing power parity.

Table 13 Impacts on the probability of enrolling in mature-age education: males, British survey and HILDA

	Great Britain		Australia	
	Coeff.	t-stat.	Coeff.	t-stat.
Reference category: age group 25–30				
Age group 30–35	-0.0368	-1.73	-0.0537	-1.34
Age group 35–40	-0.0459	-2.3	-0.0572	-1.52
Age group 40–45	-0.0327	-1.49	-0.0706	-1.84
Age group 45–50	-0.0527	-2.77	-0.135	-4.15
Age group 50–57	-0.0643	-3.17	-0.181	-5.86
Reference category: primary education				
Education: low intermediate	0.0982	1.15	0.0902	1.51
Education: intermediate (secondary)	0.0988	2.46	0.208	3.42
Education: high intermediate (high vocational)	0.101	2.01	0.207	3.17
Education: sub-degree	0.132	2.92	0.224	3.13
Education: first degree	0.161	2.81	0.284	4.39
Education: higher degree	0.0931	1.31	0.251	2.56
Reference category: non-immigrant				
Immigrant, English speaking	0.0553	0.79	-0.0181	-0.52
Immigrant, non-English speaking	0.0554	0.92	-0.0158	-0.42
Reference category: employed				
Unemployed	0.0164	0.3	0.0203	0.36
Not in the labour force	0.076	1.77	-0.0687	-1.72
Reference category: married				
Separated/divorced	0.0665	1.94	0.0293	0.66
Never married	0.0849	3.21	0.0295	0.78
Number of dependent children	0.00887	0.9	-0.00309	-0.26
Disposable income (in US $1000s)	-0.00011	-0.35	-0.00223	-2.91
Observations	*1931*		*2072*	

Notes: The disposable income is expressed in PPP-corrected US dollars; regressions include state indicators.
Coefficients estimated using adjusted weights. t-statistics based on White standard errors.

Source: BHPS and HILDA data.

The estimated coefficients for females are less similar across the two countries. While holding any education level above primary is generally linked to higher probabilities of enrolment, the evidence with respect to the relation between re-engagement and age is more mixed. While for Australian women a clear negative pattern with age is estimated, this is not the case for British females. Further differences arise with respect to the labour force and marital status coefficients. Taking employed women as the reference category, unemployed or out of the labour force women in Great Britain do not show a different propensity of engaging in education. In Australia, however, unemployed women have a higher propensity to enrol in education than the employed, while those out the labour force have a lower propensity. The positive link between engagement in mature-age education and being separated or divorced for Australian women is mirrored by a similar but less strong relationship in Great Britain.

Table 14 Impacts on the probability of enrolling in mature-age education: females, British survey and HILDA

	Great Britain		Australia	
	Coeff.	t-stat.	Coeff.	t-stat.
Reference category: age group 25–30				
Age group 30–35	0.00105	0.03	-0.0245	-0.62
Age group 35–40	0.0525	1.32	-0.0607	-1.59
Age group 40–45	0.0579	1.44	-0.101	-2.75
Age group 45–50	0.0543	1.24	-0.121	-3.43
Age group 50–57	-0.0461	-1.35	-0.194	-6.01
Reference category: primary education				
Education: low intermediate	0.093	1.25	0.103	2.02
Education: intermediate (secondary)	0.0777	2.17	0.108	1.49
Education: high intermediate (high vocational)	0.128	2.41	0.147	2.62
Education: sub-degree	0.171	4.03	0.129	2.07
Education: first degree	0.264	4.61	0.17	2.94
Education: higher degree	0.241	2.91	0.23	2.61
Reference category: non-immigrant				
Immigrant, English speaking	0.0106	0.19	0.00336	0.09
Immigrant, non-English speaking	0.0235	0.42	-0.0671	-1.99
Reference category: employed				
Unemployed	-0.0177	-0.25	0.216	3.05
Not in the labour force	0.0314	1.26	-0.0553	-2.16
Reference category: married				
Separated / divorced	0.0511	1.69	0.18	4.86
Never married	0.0931	2.86	0.0194	0.49
Number of dependent children	0.0284	2.55	0.0232	2.05
Disposable income (in US $1000s)	-0.000728	-1.23	-0.00127	-1.19
Observations	2385		2458	

Notes: The disposable income is expressed in PPP-corrected US dollars; regressions include state indicators.
Coefficients estimated using adjusted weights. t-statistics based on White standard errors.

Source: BHPS and HILDA data.

Table 15 provides the estimates that decompose the difference in the prevalence of mature-age education between Great Britain and Australia into components attributable to differences in characteristics across the two countries (the explained component) and a remainder that is unexplained. The first two rows of the table indicate the predicted probabilities of engagement in education of individuals between ages 25 and 57 based on the variables included in the previous regressions.[17] Given the OECD figures discussed at the beginning of this report, it is not surprising to observe that the Australian enrolment probabilities are systematically higher than the British ones. The differences between the two countries, which are statistically significant at the 1% level, are then divided into the explained and unexplained components. For the whole sample and for males and females separately, the explained component is positive but relatively small. Given a 14-percentage-point gap in the enrolment probabilities in the two countries, the difference that can be explained by the observable characteristics included in our analysis is only equal to 0.016 (or 11% of the total gap). This implies that, if Australians were to have the same characteristics as the British, as measured by the characteristics included in our analysis, the difference in the average enrolment rates would actually be smaller, by 1.6 percentage points.

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[17] The reported mean probabilities are predictions from our probit models, but are extremely close to the actual mean probabilities of enrolment in the raw data. We report these mean predicted probabilities because the decomposition results we report in table 15 use the probit estimates and these predicted probabilities.

In all, these results indicate that the difference between Australian and British enrolment rates is mostly due to unobserved elements and not to differences in the characteristics of the populations that can be easily measured. Institutional and preference differences are more likely candidates for explaining the different enrolment rates between the two countries. Differences in the welfare systems of the two countries and in levels of social spending may be important factors. According to the OECD,[18] social spending in Australia amounted to 16.4% of the GDP in 2011, while the OECD average was around 21%. In the United Kingdom the corresponding level of spending was equal to 23.7% of GDP. Furthermore, in the last 20 years the UK level of social spending has been constantly increasing, while the level in Australia has been fairly stable. These differences in spending are likely to be related to higher numbers of welfare-dependent individuals in the UK. The ready availability of social assistance may mean that UK individuals have less need to undergo further education and training in order to achieve an acceptable level of income.

The bottom half of table 15 breaks down the explained component into the contribution of each individual variable included in the estimates. Age differences across countries explain a small positive amount of the enrolment gap, as younger individuals are more likely to enrol and Australia has a younger population within this 25 to 57 age range. Education differences across countries contribute to explaining the gap for females but not males, and the direction of the contribution varies depending on the education level. For individuals with an intermediate (secondary) education and with a professional degree (sub-degree) the contribution is actually negative. In both countries, adults with these levels of education are much more likely to undertake education than the base education group of primary only education (see tables 13 and 14), but these education levels are much more prevalent in Great Britain than in Australia (see appendix table B3). The already observed difference in the relation between employment status and probability of enrolment for women of the two countries appears to play an important role in explaining the overall difference in the enrolment rates. The number of children also appears to explain part of this gap among women. Australian women tend to have a higher number of children than British women, and the probability of enrolment is higher among women in both countries who have more children.

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[18] Adema, Fron and Ladaique (2011). See also Buckingham (2000).

Table 15 Blinder-Oaxaca decomposition: British survey and HILDA

	All		Males		Females	
Probability of enrolment: Australia	0.291***	36.81	0.262***	22.89	0.318***	29.42
Probability of enrolment: UK	0.151***	23.02	0.108***	12.81	0.185***	19.36
Difference in probability	0.140***	13.62	0.155***	10.86	0.133***	9.21
Explained difference	0.0158**	2.06	0.0144	1.31	0.0155	0.99
Unexplained difference	0.124***	10.29	0.140***	8.51	0.117***	5.65
Reference category: age group 25–30						
Age group 30–35	0.000173	0.44	-0.0000227	-0.03	0.000226	0.38
Age group 35–40	0.000633	1.09	0.000697	0.68	0.000463	0.66
Age group 40–45	0.000478	0.65	0.000779	0.71	-0.000124	-0.13
Age group 45–50	-0.00229	-1.89	-0.00102	-0.53	-0.00287	-1.92
Age group 50–57	0.00465	3.26	0.0027	1.14	0.00632	3.43
Total contribution by age groups	**0.003644**		**0.0031333**		**0.004015**	
Reference category: primary education						
Education: low intermediate	0.0175	2.71	0.0104	1.52	0.0229	2.05
Education: intermediate (secondary)	-0.021	-3.35	-0.00813	-1.94	-0.0246	-1.48
Education: high intermediate/high vocational	0.0134	3.99	0.00968	2.43	0.0157	2.69
Education: sub-degree	-0.0174	-3.52	-0.0229	-2.97	-0.0137	-2.04
Education: first degree	0.0137	4.99	0.00881	2.67	0.0145	2.95
Education: higher degree	-0.00042	-0.88	0.000673	0.65	-0.00173	-2.12
Total contribution by education levels	**0.00578**		**-0.001467**		**0.01307**	
Reference category: non-immigrant						
Immigrant, English speaking	-0.000932	-0.47	-0.00225	-0.71	0.0000472	0.02
Immigrant, non-English speaking	-0.0043	-1.6	-0.00134	-0.37	-0.0069	-1.78
Reference category: employed						
Unemployed	0.00137	2.04	0.00047	0.42	0.00178	2.79
Not in the labour force	-0.000546	-1.24	-0.000998	-1.22	-0.00134	-1.66
Reference category: married						
Separated/divorced	-0.00338	-4.53	-0.000468	-0.55	-0.00482	-4.29
Never married	-0.00109	-0.99	-0.000681	-0.61	-0.00143	-0.62
Number of dependent children	0.00316	2.19	-0.00014	-0.17	0.00726	2.10
Disposable income (in US $1000s)	0.0119	4.42	0.0184	3.08	0.00396	1.07
Total contribution by all remaining variables	**0.006182**		**0.012993**		**-0.001443**	
Observations	*8892*		*4025*		*4867*	

Note: Coefficients estimated using adjusted weights. t-statistics based on White standard errors.
Source: BHPS and HILDA data.

Concluding remarks

Mature-age education, broadly defined, is an important part of the Australian education system. Large numbers of Australian working-age adults undertake further education at non-conventional ages. This report provides a wealth of information about this phenomenon — the levels of education being attempted, who is undertaking it and its effects.

To begin, we find that a significant proportion of education at more mature ages is undertaken at the VET level. The individuals undertaking this level of education may already hold qualifications at this level or at even higher levels. The decision to enrol in further education is related to poorer labour market outcomes for males (low income and wages, low job satisfaction), while for females it was more closely related to marriage dissolution and being unemployed. This last finding is consistent with the higher proportion of females than males stating the main reason for undertaking further study was to get a job.

Regarding the outcomes of mature-age education, for males VET study is related to higher job satisfaction and fewer weekly work hours, while bachelor or above study is related to higher hourly wages. For females, VET study at mature ages resulted in improvements in the probability of being employed if not employed previously, in higher satisfaction with work opportunities, and marginally higher disposable income. These findings are consistent with males being more likely to state that the main reason for their study was to get a different job or a promotion, while females were more likely to state the main reason as getting a job. Both men and women also report a marginally higher use of skills and abilities in their jobs after an education spell. Apart from these effects, mature-age education appears to have very little effect on the remainder of the ten outcomes we investigated. Thus, mature-age education, at least over the short term we were able to investigate in this report, appears to be less beneficial than for individuals undertaking education at more conventional (younger) ages. Economic studies of the returns from education over the whole population undertaken over a long period have found significant returns from education, particularly in terms of higher wage rates, income levels and probabilities of employment.

The analysis of the wider prevalence of mature-age education in Australia by comparison with Great Britain revealed that the observable characteristics of the two populations can explain only a little of the difference in the probabilities of enrolment in education of mature-age individuals. Unobserved characteristics thus play a crucial role in the determination of these differences. These unobserved characteristics include institutional differences between the two educational systems (formal qualifications may be more important in Australia) and differences in welfare systems. Important welfare system differences may include the requirement for single parents in Australia to either be actively looking for work or to be studying in order to obtain welfare payments. Differences in support for the retraining of workers suffering retrenchment may also be important, and differences in underlying preferences for education may also contribute to the gap in the probability of enrolling in education at more mature ages between Australia and Great Britain.

The distinct differences between males and females in the labour market outcomes from mature-age VET study pose important questions for policy-makers when thinking about the funding of mature-age VET study. Females do appear to gain in direct monetary terms from undertaking VET study at more mature ages, particularly those females who were not employed initially. Thus investment in VET study pays off for the individual and potentially it can also be beneficial for Australian society more generally, in terms of higher output, higher tax revenues and potentially

lower income support expenditures. The advantages males receive from mature-age VET studies do not however appear to be directly monetary, as disposable income and employment rates did not increase overall. Gains for males were estimated in terms of higher job satisfaction and lower work hours (increased leisure). The payoff for society more generally from such study is less clear, as the costs related to the educational courses should also be taken into account. Thus the motivation for high levels of government subsidisation of such study generally are also less clear, particularly for the large number of individuals who have already attained VET qualifications or higher. That being said, there may exist cases where education at mature ages may still be beneficial for individuals and desirable for society, in particular, in response to widespread job losses in specific industries in decline. Without such re-training and upskilling, outcomes for such individuals may actually decline rather than being maintained.

References

Adema, W, Fron, P, Ladaique, M 2011, *Is the European welfare state really more expensive?* OECD Social employment and migration working paper no.124, OECD, Paris.

Albrecht, J, van den Berg, GJ & Vroman, S 2005, *The knowledge lift: the Swedish adult education program that aimed to eliminate low worker skill levels*, IZA Discussion Papers 1503, Institute for the Study of Labor (IZA), Bonn.

Ashenfelter, O 1978, 'Estimating the impact of training programs on earnings', *Review of Economics and Statistics,* vol.6, no.1, pp.47—57.

Bauer, TK, Hahn, MH & Sinning, M 2008, 'The Blinder-Oaxaca decomposition for nonlinear regression models', *Stata Journal*, vol.8, no.4, pp.480—92.

Blinder, AS 1973, 'Wage discrimination: reduced form and structural estimates', *Journal of Human Resources,* vol.8, no.4, pp.436—55.

Blundell, R, Dearden, L, Goodman, A & Reed, H 2000, 'The returns to higher education in Britain: evidence from a British cohort', *The Economic Journal,* vol.110, no.461, pp.F82—F99.

Buckingham, A 2000, 'Welfare reform in Britain, Australia and the United States', in *Reforming the Australian welfare state,* ed. P Saunders, Australian Institute of Family Studies, Melbourne.

Buscha, F, Blanden, J & Sturgis, P 2009, 'Earnings and occupational status returns to lifelong learning', unpublished manuscript.

Fairlie, RW 2005, 'An extension of the Blinder-Oaxaca decomposition technique to logit and probit models', *Journal of Economic and Social Measurement*, vol.30, no.4, pp.305—16.

Gomulka, J & Stern, N 1989, 'The employment of married women in the United Kingdom 1970—1983', *Economica*, vol.57, no.226, pp.171—99.

Griliches, Z 1980, 'Schooling interruption, work while in school and the returns from schooling', *The Scandinavian Journal of Economics*, vol.82, no.2, pp.291—303.

Headey, B & Warren, D 2008, 'Adult education and job training, 2001—2005: who does it? Does it improve future earnings?' in *Families, incomes and jobs, volume 3: a statistical report on waves 1 to 5 of the HILDA Survey*, Melbourne Institute of Applied Economic and Social Research, University of Melbourne.

Jacobson, L, LaLonde, R & Sullivan, DG 2005, 'Estimating the returns to community college schooling for displaced workers', *Journal of Econometrics*, vol.125, nos1—2, pp.271—304.

Jenkins, A, Vignoles, A, Wolf, A & Galindo-Rueda, F 2003, 'The determinants and labour market effects of lifelong learning', *Applied Economics*, vol.35, no.16, pp.1711—21.

Karmel, T & Woods, D 2004, *Lifelong learning and older workers*, NCVER, Adelaide.

Lee, WS & Coelli, M 2010, *Analysis of private returns to vocational education and training*, NCVER, Adelaide.

Leigh, DE & Gill, AM 1997, 'Labor market returns to community colleges: evidence for returning adults', *Journal of Human Resources,* vol.32, no.2, pp.334—53.

Light, A 1995, 'Hazard model estimates of the decision to reenroll in school', *Labour Economics*, vol.2, no.4, pp.381—406.

Marcus, RD 1984, 'Measuring the rate of return to interrupted schooling', *Journal of Educational Statistics*, vol.9, no.4, pp.295—310.

McMillan, J, Beavis, A & Jones, FL 2009, 'The AUSEI06: a new socioeconomic index of Australia', *Journal of Sociology*, vol.45, no.2, pp.123—49.

Myers, K & Myles, J 2005, *Self-assessed returns to adult education: life-long learning and the educationally disadvantaged*, Research report no.W/35, Canadian Policy Research Networks (CPRN), Ottawa.

Oaxaca, RL 1973, 'Male—female wage differentials in urban labor markets', *International Economic Review*, vol.14, no.3, pp.693—709.

OECD (Organisation for Economic Co-operation and Development) 2010, *Education at a glance 2010: OECD indicators*, OECD Online, viewed 20 May 2011, <http://www.oecd.org/document/52/0,3343,en_2649_ 39263238_45897844_1_1_1_1,00.html>.

Roussel, S 2002, 'Factors influencing participation in post-secondary education and training in Australia: 1989— 1997, *Australian Journal of Labour Economics*, vol.5, no.1, pp.77—100.

Ryan, C & Sinning, M 2009, *Job requirements and lifelong learning for older workers*, NCVER, Adelaide.

Silles, M 2007, 'Adult education and earnings: evidence from Britain', *Bulletin of Economic Research, vol.*59, no.4, pp.313—26.

Stenberg, A & Westerlund, O 2008, 'Does comprehensive education work for the long-term unemployed?', *Labour Economics*, vol.15, no.1, pp.54—67.

Taylor, MF (ed.) with Brice, J, Buck, N & Prentice-Lane, E 2010, *British Household Panel Survey user manual volume A: introduction, technical report and appendices*, University of Essex, Colchester.

Wolf, A 2011, *Review of vocational education: the Wolf report*, Department of Education, United Kingdom, viewed 10 October 2011, <https://www.education.gov.uk/publications/eOrderingDownload/ The%20Wolf%20Report.pdf>.

Zhang, X & Palameta, B 2006, *Participation in adult schooling and its earnings impact in Canada*, Analytical Studies Branch Research paper series no.276, Statistics Canada, Ottawa.

Appendix A

Table A1 Participation in education over the previous 12 months, 2009 SET

Age group	25–34	35–44	45–54	55–64
Males				
Number of courses enrolled in				
One	18.6	11.68	7.21	3.86
Two	2.03	1.57	1.24	0.56
Three	0.4	0.29	0.04	-
Four	0.11	-	-	-
Main reason for study				
To get into another course of study	0.49	0.71	1.14	-
To get a job	14.2	9.36	5.93	3.48
To get a different job or promotion	22.28	14.96	17.14	11.6
Was a requirement of job	12.3	19.4	13.48	22.58
Wanted extra skills for job	21.59	26.33	26.66	19.35
To start own business	3.76	3.18	3.57	-
To develop existing business	1.5	3.66	5.8	0.91
To try for a different career	11.26	9.33	10.43	8.95
To improve general educational skills	7.17	8.26	6.33	5.5
To get skills for community/voluntary work	0.67	0.84	2	7.37
To increase confidence/self-esteem	0.67	1.49	2.39	1.89
For personal interest/enjoyment	8.87	7.75	9.39	23.55
Other reason	2.17	2.32	1.77	2.03
Females				
Number of courses enrolled in				
One	19.72	14.23	10.44	4.14
Two	2.44	1.85	1.35	0.44
Three	0.17	0.03	0.16	0.02
Four	0.07	-	-	-
Main reason for study				
To get into another course of study	4.31	3.4	0.79	2.62
To get a job	16.45	16.68	11.04	15.61
To get a different job or promotion	18.13	13.07	13.92	5.41
Was a requirement of job	9.13	12.28	15.09	17.54
Wanted extra skills for job	19.05	20.35	26.08	14.78
To start own business	2.33	3.79	2.88	4.92
To develop existing business	0.53	2.71	2.14	1.66
To try for a different career	14.39	13.76	10.22	6.2
To improve general educational skills	8.1	6.17	8.13	7.59
To get skills for community/voluntary work	2	1.66	2.36	5.79
To increase confidence/self-esteem	0.35	1.12	2.07	2.33
For personal interest/enjoyment	10.98	10.17	10.69	17.08
Other reason	1.48	1.84	2.42	6.37

Source: SET 2009 data.

Table A2 Current enrolment in formal education and training, 2009 HILDA

Age group	25–34	35–44	45–54	55–64
Males				
Any non-school study	12.50	6.27	5.21	1.79
Level				
Graduate and postgraduate	3.99	1.73	1.21	0.51
Bachelor degree	3.11	1.23	1.23	0.08
Diploma, associate degree	2.08	1.32	0.46	0.10
Certificate III/IV	2.63	1.38	1.80	0.47
Certificate I/II	0.61	0.69	0.24	0.62
Other or unknown level	0.20	0.08	0.26	0.00
Proportion full-time study	0.27	0.20	0.13	0.00
Observations	*1008*	*1097*	*1109*	*862*
Females				
Any non-school study	16.41	10.67	6.59	2.89
Level				
Graduate and postgraduate	4.87	2.21	1.84	0.36
Bachelor degree	4.13	2.11	1.15	0.45
Diploma, associate degree	2.67	1.13	0.54	0.49
Certificate III/IV	3.32	4.65	2.32	1.08
Certificate I/II	1.42	0.47	0.86	0.52
Other or unknown level	0.00	0.21	0.03	0.00
Proportion full-time study	0.27	0.12	0.15	0.01
Observations	*1083*	*1207*	*1250*	*923*

Source: HILDA data, weighted statistics.

Table A3 HILDA sample, education levels and employment status of diploma students

Age group	25–34	35–44	45–54	55–64
Males				
Observations	*48*	*40*	*18*	*6*
Below Year 10	0	0	0	0
Year 10–11 or cert. I–II	19.03	8.07	0	27.3
Completed Year 12	28.56	9.05	24.43	18.14
Certificate III/IV	15.25	33.48	34.91	0
Diploma	16.78	27.96	13.57	42.87
Degree and above	20.38	21.44	27.09	11.68
Full-time worker	74.08	76.34	81.23	45.41
Part-time worker	7.31	5.36	11.9	39.91
Females				
Observations	*49*	*40*	*18*	*4*
Below Year 10	2.95	0	0	0
Year 10–11 or cert. I–II	8.88	13.98	13.46	0
Completed Year 12	24.34	24.65	17.79	0
Certificate III/IV	1.99	21.2	6.2	22.54
Diploma	45.36	24.41	27.03	0
Degree and above	16.48	15.76	35.52	77.46
Full-time worker	47.71	42.44	55.03	68.1
Part-time worker	22.99	29.77	38.77	0

Source: HILDA data, weighted statistics.

Table A4 HILDA sample, education levels and employment status of degree students

Age group	25–34	35–44	45–54	55–64
Males				
Observations	*129*	*112*	*47*	*9*
Below Year 10	0.00	0.00	0.00	0.00
Year 10–11 or certificate I/II	3.20	4.82	5.40	0.00
Completed Year 12	18.03	7.74	11.88	0.00
Certificate III/IV	5.71	14.59	4.53	0.00
Diploma	9.50	17.10	5.79	0.00
Degree and above	63.57	55.75	72.40	100.00
Full-time worker	80.52	81.62	76.79	53.65
Part-time worker	16.48	7.74	4.37	0.00
Females				
Observations	*49*	*40*	*18*	*4*
Below Year 10	0.94	1.55	1.62	0.00
Year 10–11 or certificate I/II	1.66	6.72	5.43	0.00
Completed Year 12	17.77	4.86	17.29	0.00
Certificate III/IV	5.65	8.71	5.74	0.00
Diploma	14.21	11.87	7.48	11.22
Degree and above	59.77	66.28	62.44	88.78
Full-time worker	49.95	49.25	55.73	46.60
Part-time worker	30.65	32.33	20.44	21.47

Source: HILDA data, weighted statistics.

Table A5 Number of individuals who enrolled and completed VET and bachelor courses

	Enrolled in bachelor courses	Completed bachelor courses	Completion rate	Enrolled in VET courses	Completed VET courses	Completion rate
Males	266	143	0.54	686	450	0.66
Females	377	192	0.51	951	623	0.66
Total	**643**	**335**	**0.52**	**1637**	**1073**	**0.66**

Source: HILDA data. Enrolment data collected between wave 2 and wave 7. Completion data collected between wave 2 and wave 9.

Studying beyond age 25: who does it and what do they gain?

Table A6 Australian and British education levels compared with the ISCED classification

International Standard Classification of Education	Australia	United Kingdom
0 Pre-primary education	Pre-primary education	
1 Primary education or first stage of basic education	Primary education	CSE Grades 2–5, O Level grades D–E, GCSE grades D–G, Scottish SCE Ordinary Grade bands D–E or 4–5 or Scottish Standard Grade levels 4–7
2A Programs designed to prepare students for direct access to ISCED 3A or 3B which are the subcategories of Level 3 earmarked for providing access to tertiary education	Junior secondary education	
3A Programs designed to provide direct access to ISCED 5A, which is the type of tertiary education that enables the students to gain entry into advanced research or highly skilled professions	Senior secondary education	
2C Programs that are 'terminal' and are primarily meant to provide direct access to the labour market	Certificate I level	
2C Programs that are 'terminal' and are primarily meant to provide direct access to the labour market	Certificate II level	
3C Programs designed to lead directly to the labour market or entry into ISCED level 4 programs or even other ISCED level 3 programs	Certificate III level	O Levels (pre-1975), O Level grades A–C (1975 or later), O Grades (pass or bands A–C or 1–3), Scottish School Leaving, Certificate Lower Grade, School Certificate or Matric. Scottish Standard Grade Level 1–3 or City & Guilds Certificate, clerical or commercial qualifications, recognised trade apprenticeship
4B Programs that do not provide access to tertiary education (ISCED 5A or 5B), but are designed primarily for direct entry into the labour market	Certificate IV level	
5B Programs which are practical/technical/ occupationally specific	Diploma level	City & Guilds Certificate (Full Technological/Part III), HNC, HND, BEC/TEC/BTEC higher certificate/diploma, university diploma, any other technical, professional or higher qualifications
5B Programs which are practical/technical/ occupationally specific	Advanced diploma and associate degree level	Teaching qualifications, nursing qualifications
5A Programs which are largely theoretically based/research preparatory or which provide access to professions with high skills requirements	Bachelor degree level	
5A Programs which are largely theoretically based/research preparatory or which provide access to professions with high skills requirements	Graduate diploma and graduate certificate level	University or CNAA first degree
5A Programs which are largely theoretically based/research preparatory or which provide access to professions with high skills requirements	Master degree level	
6 Second stage of tertiary education (leading to an advanced research qualification)	Doctoral degree level	University or CNAA higher degree

Sources: ABS; United Kingdom: BHPS definitions.

Table A7 British survey sample, males

Age group	25–34	35–44	45–54	55–64
Observations	*859*	*998*	*882*	*698*
Marital status				
Married	51.92	67.43	76.98	80.66
Separated/divorced	3.49	12.22	12.13	9.03
Widowed	0	0.2	0.91	3.87
Never married	44.59	20.14	9.98	6.45
Number of children at home				
None	53.55	36.57	67.57	94.56
1 child	19.21	20.54	15.65	4.44
2 children	20.26	30.26	11.79	1
3 children or more	6.98	12.63	4.99	0
Education level				
Primary	10.74	13.09	24.5	31.14
Low secondary	32.93	33.09	25.55	25.44
High secondary	15.8	11.96	12.49	9.65
High vocational	20.14	21.86	22.52	22.51
Degree	20.39	20	14.94	11.26
Employment status				
Employed	89.87	91.58	86.28	60.17
Unemployed	5.47	2.51	2.49	2.01
Not in the labour force	4.66	5.91	11.22	37.82
Health work-limiting condition	8.51	12.53	16.89	27.79
On income support	3.38	3.21	4.88	6.88
Average weekly earnings	349.5	417.99	395.44	226.69
GB born	96.97	95.59	95.12	95.70

Source: BHPS data, weighted statistics.

Studying beyond age 25: who does it and what do they gain?

Table A8 British survey sample, females

Age group	25–34	35–44	45–54	55–64
Observations	*1117*	*1251*	*1057*	*876*
Marital status				
Married	52.1	67.95	73.51	69.41
Separated/divorced	10.21	18.86	17.98	14.27
Widowed	0.63	1.12	2.37	11.53
Never married	37.06	12.07	6.15	4.79
Number of children at home				
None	35.63	25.98	75.88	99.09
1 child	24.17	26.38	15.7	0.8
2 children	26.68	32.85	6.81	0
3 children or more	13.52	14.79	1.61	0.11
Education level				
Primary	9.93	16.03	29.05	42.39
Low secondary	37.43	37.09	30.87	28.46
High secondary	14.39	10.12	8.34	3.72
High vocational	20.31	21.13	18.5	18.58
Degree	17.94	15.63	13.23	6.85
Employment status				
Employed	70.1	73.38	72.75	39.95
Unemployed	2.6	1.84	2.55	0.68
Not in the labour force	27.31	24.78	24.69	59.36
Health work limiting condition	10.3	16.55	21.38	29.6
On income support	8.77	7.11	4.64	7.19
Average weekly earnings	191.72	197.37	196.55	226.69
GB born	96.24	95.28	93.66	95.66

Source: BHPS data, weighted statistics.

Appendix B

Table B1   Effect of education on labour market outcomes by type of course and prior education level, HILDA

	Males		Females	
	Enrolled	Completed	Enrolled	Completed
Change in annual disposable income (in US $1000s)				
Bachelor × previous bachelor	14.21	23.24	-2.689	-2.828
	(1.43)	(1.38)	(-0.97)	(-0.88)
Bachelor × no previous bachelor	4.027	9.225	6.675*	4.459
	(0.70)	(1.01)	(1.69)	(1.34)
VET × previous VET	-3.954	-2.704	4.055**	3.141
	(-1.63)	(-1.02)	(2.04)	(1.42)
VET × no previous VET	0.547	-2.956	1.357	0.227
	(0.12)	(-0.91)	(1.09)	(0.15)
R-squared	*0.087*	*0.088*	*0.065*	*0.061*
Observations	*1982*	*1982*	*2314*	*2314*
Change in job satisfaction				
Bachelor × previous bachelor	0.307	0.251	0.0602	0.196
	(0.87)	(0.58)	(0.20)	(0.45)
Bachelor × no previous bachelor	0.143	0.344	0.343	-0.187
	(0.35)	(0.54)	(0.62)	(-0.37)
VET × previous VET	0.339	0.537**	0.234	0.425
	(1.63)	(2.28)	(0.68)	(1.02)
VET × no previous VET	0.598***	0.711**	0.0406	0.0866
	(2.59)	(2.53)	(0.21)	(0.37)
R-squared	*0.039*	*0.042*	*0.026*	*0.027*
Observations	*1544*	*1544*	*1294*	*1294*
Change in skills utilisation				
Bachelor × previous bachelor	0.154	0.174	0.0400	0.178
	(0.63)	(0.56)	(0.18)	(0.68)
Bachelor × no previous bachelor	0.169	0.665**	-0.471	0.0616
	(0.75)	(2.11)	(-0.96)	(0.08)
VET × previous VET	0.0461	-0.104	0.412	0.412
	(0.25)	(-0.57)	(1.60)	(1.32)
VET × no previous VET	0.410**	0.322	0.161	0.147
	(2.02)	(1.39)	(0.93)	(0.74)
R-squared	*0.047*	*0.045*	*0.026*	*0.024*
Observations	*1338*	*1338*	*1152*	*1152*
Change in log hourly wage rate				
Bachelor × previous bachelor	0.188***	0.119	0.0585	-0.0411
	(2.64)	(1.14)	(0.90)	(-0.56)
Bachelor × no previous bachelor	0.00857	-0.0559	0.176	0.154
	(0.14)	(-0.47)	(1.35)	(0.88)
VET × previous VET	0.0290	0.0537	0.124	0.0786
	(0.73)	(1.21)	(1.30)	(0.92)
VET × no previous VET	-0.00972	-0.0194	-0.0101	0.0235
	(-0.18)	(-0.27)	(-0.29)	(0.58)
R-squared	*0.097*	*0.093*	*0.108*	*0.103*
Observations	*978*	*978*	*967*	*967*

	Males		Females	
	Enrolled	Completed	Enrolled	Completed
Change in working hours per week				
Bachelor × previous bachelor	0.0996	1.580	-1.892	-0.0224
	(0.05)	(0.70)	(-0.96)	(-0.01)
Bachelor × no previous bachelor	-2.069	4.237	2.080	2.318
	(-0.74)	(1.01)	(0.71)	(0.50)
VET × previous VET	-2.914**	-2.657*	0.0718	1.064
	(-2.09)	(-1.65)	(0.04)	(0.50)
VET × no previous VET	-2.579	-3.394*	-0.145	-1.205
	(-1.64)	(-1.79)	(-0.13)	(-0.94)
R-squared	*0.059*	*0.059*	*0.142*	*0.142*
Observations	*1540*	*1540*	*1291*	*1291*
Change in overall life satisfaction				
Bachelor × previous bachelor	-0.229	-0.263	0.0655	0.129
	(-1.24)	(-1.08)	(0.45)	(0.81)
Bachelor × no previous bachelor	0.558	0.222	-0.0960	0.853
	(1.22)	(0.32)	(-0.18)	(1.25)
VET × previous VET	0.158	-0.0200	-0.111	-0.313
	(1.08)	(-0.12)	(-0.59)	(-1.42)
VET × no previous VET	0.0274	0.00107	0.144	0.139
	(0.12)	(0.00)	(1.30)	(1.09)
R-squared	*0.026*	*0.023*	*0.034*	*0.036*
Observations	*1981*	*1981*	*2310*	*2310*
Change in satisfaction with employment opportunities				
Bachelor × previous bachelor	-0.335	-0.0733	0.121	0.468
	(-0.89)	(-0.14)	(0.42)	(1.16)
Bachelor × no previous bachelor	0.393	0.0542	0.393	0.168
	(0.86)	(0.12)	(0.84)	(0.30)
VET × previous VET	-0.0447	-0.325	0.731**	0.808**
	(-0.20)	(-1.33)	(2.25)	(2.22)
VET × no previous VET	-0.0974	-0.0817	0.294	0.235
	(-0.36)	(-0.25)	(1.56)	(1.06)
R-squared	*0.027*	*0.027*	*0.037*	*0.036*
Observations	*1741*	*1741*	*1831*	*1831*
Change in occupational status				
Bachelor × previous bachelor	-4.307	-2.682	0.331	-1.317
	(-1.41)	(-0.58)	(0.17)	(-0.56)
Bachelor × no previous bachelor	8.316	22.22***	1.820	9.219
	(1.43)	(4.28)	(0.36)	(1.27)
VET × previous VET	0.368	1.543	2.479	3.541
	(0.20)	(0.72)	(1.09)	(1.32)
VET × no previous VET	0.705	-3.003	0.777	0.930
	(0.40)	(-1.57)	(0.62)	(0.67)
R-squared	*0.043*	*0.052*	*0.035*	*0.039*
Observations	*1533*	*1533*	*1295*	*1295*

	Males		Females	
	Enrolled	Completed	Enrolled	Completed
Probability of employment in wave 9 if employed in wave 1				
Bachelor × previous bachelor	0.0423*	0.0495*	0.0109	-0.0376
	(1.78)	(1.80)	(0.19)	(-0.45)
Bachelor × no previous bachelor	0.0668***	0.0205	-0.00878	
	(4.42)	(0.42)	(-0.13)	
VET × previous VET	0.0178	0.0145	0.0394	0.0558
	(0.79)	(0.47)	(1.06)	(1.46)
VET × no previous VET	0.0213	-0.00431	0.00422	-0.00700
	(0.87)	(-0.12)	(0.16)	(-0.22)
Observations	*1733*	*1733*	*1593*	*1583*
Probability of employment in wave 9 if not employed in wave 1				
Bachelor × previous bachelor	-0.117	-	-0.0800	-0.0740
	(-0.46)	-	(-0.59)	(-0.45)
Bachelor × no previous bachelor	-	-	-0.155	-
	-	-	(-1.35)	-
VET × previous VET	0.160	0.331**	0.396***	0.315***
	(1.14)	(2.44)	(4.40)	(2.89)
VET × no previous VET	0.0900	0.178	0.310***	0.307***
	(0.68)	(1.26)	(5.20)	(4.37)
Observations	*245*	*245*	*717*	*716*
Probability of permanent employment in wave 9 if in permanent employment in wave 1				
Bachelor × previous bachelor	0.00561	0.0220	0.0820*	0.102**
	(0.09)	(0.31)	(1.92)	(2.13)
Bachelor × no previous bachelor	-0.107	-0.0175	0.101**	0.0527
	(-0.87)	(-0.14)	(2.27)	(0.50)
VET × previous VET	-0.0368	-0.0367	0.0593	0.106***
	(-0.67)	(-0.63)	(1.23)	(2.82)
VET × no previous VET	-0.0924*	-0.0850	-0.109**	-0.0953*
	(-1.66)	(-1.37)	(-2.34)	(-1.78)
Observations	*889*	*889*	*732*	*732*
Probability of permanent employment in wave 9 if not in permanent employment in wave 1				
Bachelor × previous bachelor	-0.230	-0.0437	-0.131	-0.226
	(-1.26)	(-0.16)	(-0.98)	(-1.63)
Bachelor × no previous bachelor	0.158	0.248	-	-
	(0.72)	(0.80)	-	-
VET × previous VET	0.134	-0.0159	-0.0817	0.0280
	(1.14)	(-0.12)	(-0.60)	(0.21)
VET × no previous VET	0.0238	-0.0643	-0.00657	-0.0470
	(0.22)	(-0.47)	(-0.08)	(-0.50)
Observations	*275*	*275*	*352*	*353*

Note: Annual individual disposable income (in thousands of dollars); job satisfaction: 0–10 scale; skills utilisation: 1–7
t-statistics into brackets; significance levels: * 10%, ** 5%, *** 1%.
Coefficients estimated using adjusted weights. t-statistics based on White standard errors.
Source: HILDA data.

Table B2 Effect of education on labour market outcomes by type of course (40 to 57-year-olds), HILDA

	Males		Females	
	Enrolled	Completed	Enrolled	Completed
Change in annual disposable income (in $1000s)				
Bachelor and above	-11.65**	-8.946	-1.699	-3.805
	(-2.10)	(-1.13)	(-0.55)	(-0.87)
VET	2.587	-0.458	2.498	1.993
	(0.50)	(-0.18)	(1.61)	(1.08)
R-squared	*0.081*	*0.079*	*0.051*	*0.051*
Observations	*1134*	*1134*	*1298*	*1298*
Change in job satisfaction				
Bachelor and above	0.136	0.713	0.0358	0.495
	(0.22)	(0.92)	(0.09)	(0.95)
VET	0.187	0.299	-0.0529	0.112
	(0.95)	(1.34)	(-0.23)	(0.41)
R-squared	*0.046*	*0.048*	*0.040*	*0.042*
Observations	*800*	*800*	*696*	*696*
Change in skills utilisation				
Bachelor and above	0.115	0.0634	-0.135	0.0149
	(0.42)	(0.16)	(-0.39)	(0.03)
VET	0.288	0.0550	0.161	0.240
	(1.41)	(0.28)	(1.06)	(1.40)
R-squared	*0.044*	*0.039*	*0.052*	*0.054*
Observations	*690*	*690*	*614*	*614*
Change in log hourly wage rate				
Bachelor and above	-0.0172	-0.0633	0.0686	-0.0596
	(-0.20)	(-0.52)	(0.96)	(-0.81)
VET	0.00633	0.0195	0.0610	0.0845
	(0.13)	(0.38)	(1.17)	(1.59)
R-squared	*0.083*	*0.098*	*0.139*	*0.139*
Observations	*465*	*465*	*512*	*512*
Change in working hours per week				
Bachelor and above	0.968	0.317	-1.413	-1.126
	(0.35)	(0.09)	(-0.59)	(-0.29)
VET	-3.229*	-4.116**	-0.328	-0.166
	(-1.89)	(-2.04)	(-0.26)	(-0.12)
R-squared	*0.090*	*0.092*	*0.149*	*0.148*
Observations	*798*	*798*	*695*	*695*
Change in overall life satisfaction				
Bachelor and above	-0.559*	-0.274	0.377*	0.413*
	(-1.80)	(-0.59)	(1.89)	(1.85)
VET	0.0794	-0.0150	0.0657	0.179
	(0.48)	(-0.08)	(0.48)	(1.10)
R-squared	*0.035*	*0.033*	*0.048*	*0.048*
Observations	*1133*	*1133*	*1295*	*1295*

	Males		Females	
	Enrolled	Completed	Enrolled	Completed
Change in satisfaction with employment opportunities				
Bachelor and above	-0.711	-0.121	0.208	0.627
	(-1.37)	(-0.24)	(0.48)	(1.52)
VET	-0.0535	-0.129	0.322	0.547*
	(-0.21)	(-0.43)	(1.26)	(1.93)
R-squared	*0.065*	*0.064*	*0.057*	*0.061*
Observations	*918*	*918*	*935*	*935*
Change in occupational status				
Bachelor and above	-4.429	-8.792	1.365	3.588
	(-0.63)	(-0.77)	(0.35)	(0.73)
VET	0.987	0.741	0.570	1.592
	(0.53)	(0.34)	(0.36)	(0.85)
R-squared	*0.065*	*0.066*	*0.059*	*0.062*
Observations	*792*	*792*	*697*	*697*
Probability of employment in wave 9 if employed in wave 1				
Bachelor and above	0.0270	-0.0151	-0.0362	-0.0489
	(0.44)	(-0.17)	(-0.43)	(-0.37)
VET	0.0760***	0.0727***	0.0288	0.0222
	(3.24)	(2.84)	(0.89)	(0.61)
Observations	*953*	*953*	*898*	*898*
Probability of employment in wave 9 if not employed in wave 1				
Bachelor and above	-	-	-0.0311	0.290
	-	-	(-0.19)	(1.04)
VET	0.203**	0.146	0.290***	0.304***
	(2.12)	(1.47)	(3.85)	(3.30)
Observations	*174*	*175*	*387*	*387*
Probability of permanent employment in wave 9 if in permanent employment in wave 1				
Bachelor and above	-0.0807	-0.0451	0.0394	0.103*
	(-0.70)	(-0.33)	(0.65)	(1.94)
VET	-0.161***	-0.139**	-0.0487	-0.0229
	(-2.76)	(-2.20)	(-0.95)	(-0.39)
Observations	*432*	*432*	*399*	*399*
Probability of permanent employment in wave 9 if not in permanent employment in wave 1				
Bachelor and above	-0.269	-0.252	0.173	0.0175
	(-1.54)	(-1.09)	(1.04)	(0.08)
VET	0.0439	0.0520	0.00869	-0.111
	(0.37)	(0.37)	(0.08)	(-0.94)
Observations	*142*	*142*	*183*	*183*

Note: Annual individual disposable income (in thousands of dollars); job satisfaction: 0–10 scale; skills utilisation: 1–7
t-statistics into brackets; significance levels: * 10%, ** 5%, *** 1%.
Coefficients estimated using adjusted weights. t-statistics based on White standard errors.
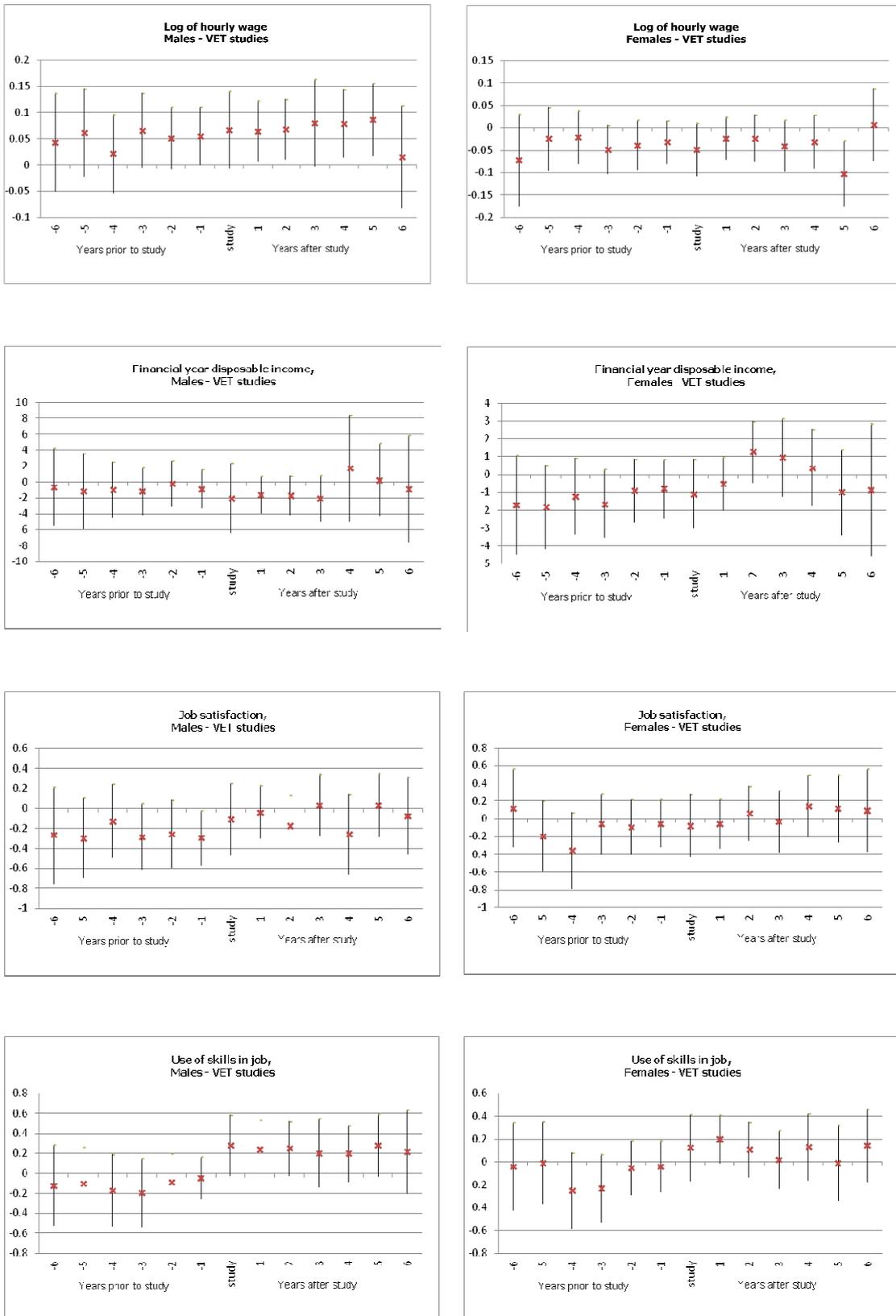
Source: HILDA data.

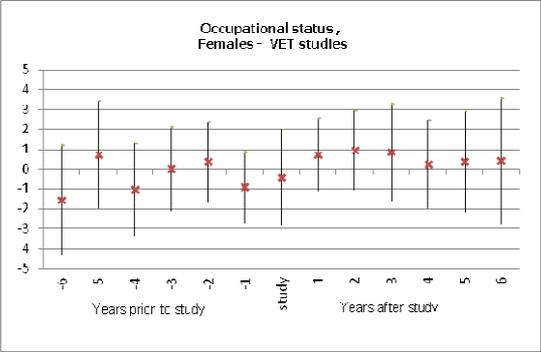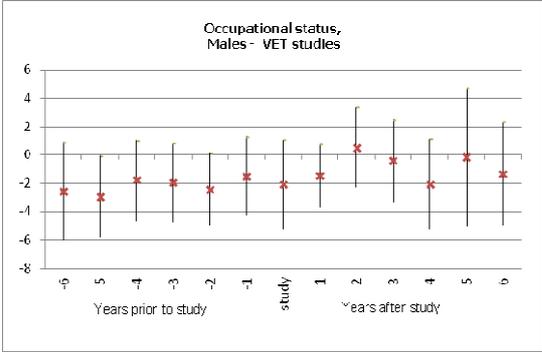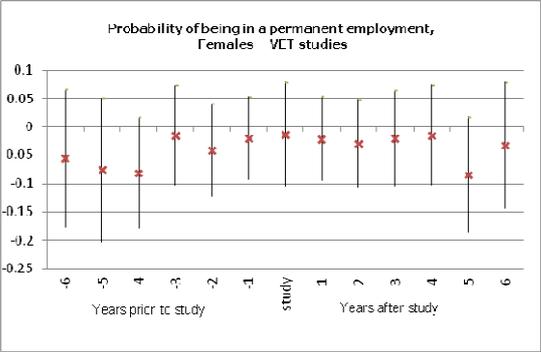**Table B3 Descriptive statistics, explanatory variables: British survey and HILDA**

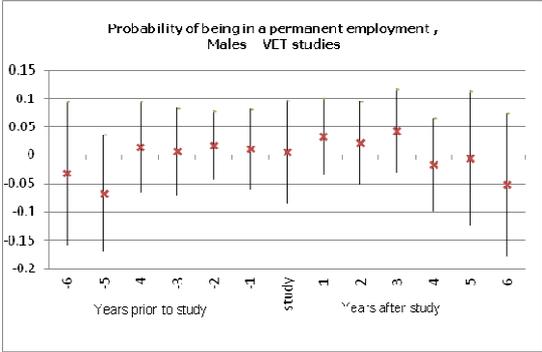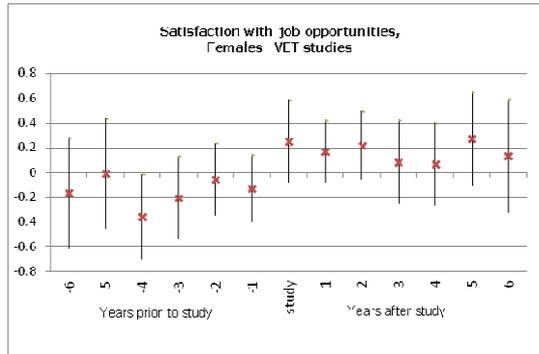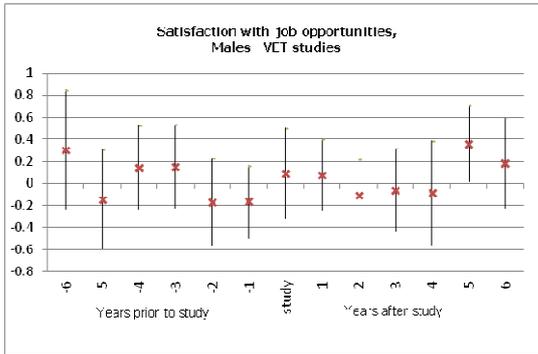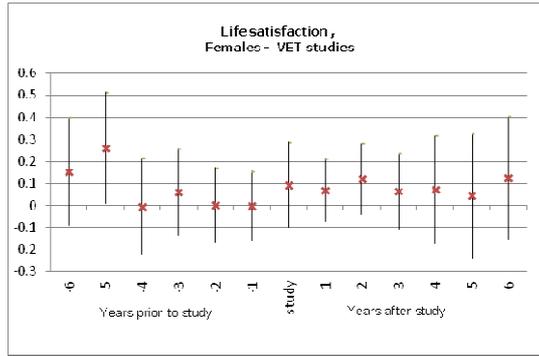|	Great Britain		Australia	
Observations	*5635*		*5248*	
Male individuals	44.77%		45.83%	
Average age	40.95	*(9.14)*	40.83	*(8.94)*
Education levels				
Education: primary	16.59%		7.80%	
Education: low intermediate	2.59%		24.54%	
Education: intermediate (secondary)	30.20%		14.19%	
Education: high intermediate/high vocational	11.85%		18.21%	
Education: sub-degree	21.93%		10.14%	
Education: first degree	13.37%		21.49%	
Education: higher degree	3.46%		3.62%	
Country of origin				
Born in the country	95.14%		77.76%	
Immigrant, English speaking	1.99%		11.13%	
Immigrant, non-English speaking	2.88%		11.11%	
Labour force status				
Employed	80.35%		77.61%	
Unemployed	2.45%		3.39%	
Not in the labour force	17.20%		19.00%	
Marital status				
Married or de facto	65.41%		75.51%	
Separated/divorced	13.42%		10.63%	
Widowed	1.14%		0.86%	
Never married	20.04%		13.01%	
Number of dependent children				
0	52.26%		42.53%	
1	19.66%		18.33%	
2	20.23%		24.60%	
3 or more	7.84%		14.54%	
Disposable income (in US $000)	27.32	*(23.77)*	21.57	*(15.40)*

Note: Standard deviations into brackets; the disposable income is expressed in PPP-corrected US dollars.
The education levels correspond to the following ISCED levels: 1, 2A and 2C, 3C and 4B, 3A, 5B, 5A, 6.

Source: HILDA and BHPS data.

Figure B1 Effects of education on labour market outcomes: longitudinal analysis, fixed effect results, HILDA data

Studying beyond age 25: who does it and what do they gain?

Weekly hours of work,
Males - VET studies

Weekly hours of work,
Females - VET studies

Probability of being employed,
Males - VET studies

Probability of being employed,
Females - VET studies

Probability of being in a permanent employment,
Males - VET studies

Probability of being in a permanent employment,
Females - VET studies

Occupational status,
Males - VET studies

Occupational status,
Females - VET studies

Life satisfaction,
Males - VET studies

Life satisfaction,
Females - VET studies

Satisfaction with job opportunities,
Males - VET studies

Satisfaction with job opportunities,
Females - VET studies

Note: Graphs obtained from panel regressions on HILDA data.

Studying beyond age 25: who does it and what do they gain?

NVETR Program funding