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Title:
Long-Term Outcomes from Australian Vocational Education

Date:
2016

Citation:
POLIDANO, C. & Ryan, C. (2016). Long-Term Outcomes from Australian Vocational Education. Melbourne Institute of Applied Economic and Social Research.

Persistent Link:
https://hdl.handle.net/11343/123432



THE UNIVERSITY OF MELBOURNE

FACULTY OF BUSINESS & ECONOMICS

Melbourne Institute Working Paper Series

Working Paper No. 35/16

Long-Term Outcomes from Australian Vocational Education

Cain Polidano and Chris Ryan



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Long-Term Outcomes from Australian Vocational Education*

Cain Polidano[†] and Chris Ryan[†‡]

[†] **Melbourne Institute of Applied Economic and Social Research, The University of Melbourne**

[‡] **ARC Centre of Excellence for Children and Families over the Life Course**

Melbourne Institute Working Paper No. 35/16

ISSN 1447-5863 (Online)

ISBN 978-0-73-405232-2

November 2016

* Disclaimer: The research in this paper was commissioned by the Victorian Department of Education and Training (DET). This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research at the University of Melbourne. The findings and views reported in this article, however, are those of the authors, and should not be attributed to DSS, the Melbourne Institute or DET. For correspondence, email <ryan.c@unimelb.edu.au>.

Melbourne Institute of Applied Economic and Social Research
The University of Melbourne
Victoria 3010 Australia
***Telephone* (03) 8344 2100**
***Fax* (03) 8344 2111**
***Email* melb-inst@unimelb.edu.au**
***WWW Address* http://www.melbourneinstitute.com**

Abstract

This study uses longitudinal data from the Household, Income and Labour Dynamics in Australia (HILDA) survey to study the long-run effects of completing vocational education and training (VET) on a set of labour market outcomes (employment, wages, earnings, hours and occupational status). It uses two novel approaches. First, it uses fixed effects regression methods to estimate effects from acquiring new qualifications. Second, it measures effects of acquiring qualifications at lower, the same and at higher levels than previously attained. This is important, since one half of the VET qualifications observed being completed in the HILDA data are at the same or lower levels. The use of fixed effects generates estimates that differ from those found previously in the literature, at least by gender. Here, the estimated improvements in outcomes for females following the completion of a VET qualification are often larger than they are for males. In the longer term, these results point to considerable stability in estimated effects – significant effects apparent in the first year after course completion tend to remain evident up to five years later. Completed qualifications that are not higher than those already held by individuals do not consistently improve the labour market outcomes studied here, but may provide other benefits.

JEL classification: I21, I26, J21

Keywords: Vocational education, qualification outcomes, all qualifications

1. Introduction and motivation

The most readily available source of information about vocational education and training (VET) student outcomes in Australia comes from the survey of recent course completers conducted each year by the National Centre for Vocational Education Research (NCVER). This survey is undertaken some six months after students complete their courses and generally shows more people are employed after completing their courses than were employed beforehand, though the contribution of the courses to this result is unclear. Further, how well the picture provided by this survey reflects the longer term outcomes of completing a VET course is not clear, although studies of other data also suggest that VET completers do well in terms of labour market outcomes compared to those who have not completed a VET qualification (Karmel and Fieger 2012, Karmel and Nguyen 2006, Lee and Coelli 2010, Leigh 2008, Ryan 2002).

Two important questions for policy are studied in this paper. First, do short-term VET outcomes translate into similar long-term patterns, or do other factors intervene? Second, do any apparent long-run outcomes vary by qualification level and by field of study? Answers to the first question should be informative for the sort of data required by government to assess properly the impact of vocational education and training. Answers to the second question can inform how much individuals might be expected to contribute to the cost of various courses.

Previous longer term studies are somewhat unsatisfactory, in that they rely on the comparison of people with VET qualifications with those and without them. Despite some attempts to make comparisons between completers and non-completers who are as alike as possible in terms of observed characteristics, it is never clear whether there might be unobserved differences between such groups (ability, motivation, perseverance and so on), whose effects get bound up with the apparent qualification effect. (Leigh 2008, Lee and Coelli 2010). Also, previous studies have tended to only examine outcomes from completing any VET qualification (Ryan 2002, Leigh 2008) or increases in the level attained (Chapman, Rodrigues and Ryan 2008). These studies shed no light on the outcomes of VET completions at levels that are no higher, or lower, than the previously highest qualification attained. This is a shortcoming of the existing literature given that around half of all completions fall into

one of these two categories.[1] An exception is a study by Stromback (2012) who used propensity score matching and the Student Outcome Survey (SOS) to examine initial labour market outcomes from completing different VET qualifications across people who held various levels of VET qualifications. However, the limited student information to match on in the SOS means that the results may be contaminated by unobserved factors.

In this study, we estimate long-run outcomes from VET using longitudinal data from the Household, Income and Labour Dynamics in Australia (HILDA) survey. The data allows us to identify individuals before and after they complete VET qualifications and follow them for a number of years after they do so. In estimating outcomes, we deal with the shortcomings of previous studies that have relied on across group comparisons, since the groups may differ in other important ways. If course completers have the same underlying ability, motivation and perseverance before as after they complete their qualifications, our before-after (or "fixed effects") comparison estimates will show how much better off actual individuals are when they complete their qualifications. As well as estimating outcomes from attaining higher qualifications levels than previously attained, which has been standard practice, we also estimated outcomes for completions at the same and at lower levels. In some analysis, we also distinguish between the effects of commencing and completing a qualification. The set of outcomes studied include having a full or part-time job, hourly wages, financial year income, hours worked and job quality via an occupational status measure.

The analysis indicates considerable stability in the benefits of VET qualification completion over time. Where benefits exist, the first year estimates provide a good indication of the longer term benefits. The focus on the actual completion of qualifications provides results that depart somewhat from those in the existing literature. The fixed effects estimates point to stronger benefits of completion of VET qualifications for females than males across a set of outcome measures. We distinguish between qualifications completed that are the individual's first post-school qualification, one that is at a lower level than an existing qualification they held according to the Australian Qualifications Framework (AQF), one that is at the same level than an existing qualification and one that is a higher level qualification. Only completion of the extreme categories of these qualifications would be captured in a traditional analysis of the outcomes from the highest qualifications held by individuals.

[1] Estimate based on observed completions from the Household Income and Labour Dynamics Australia (HILDA) survey.

Consequently, individuals who completed about half of all the VET qualifications undertaken in the HILDA data in the period studied here would be omitted from such analysis.

The remainder of the paper is organised as follows. The next section contains a review of the relevant literature on VET outcomes in Australia. Section three contains descriptions of the methodology and the data used here, while section four contains the results. Concluding comments are made in section five.

2. Outcomes from completing a VET qualification

There are many dimensions in which studies differ in their analysis of the outcomes of completing a VET qualification. They differ in terms the types of outcomes analysed, the timeframe over which they are analysed, the extent to which the general student population or specific VET populations are analysed, the types of data utilised, and the extent to which the authors aim to estimate the outcomes of completers or the consequences/effects of completion. These topics are considered in turn below. Studies of participation in and the actual completion of VET courses among those who commence them are not considered further below because the focus here is on qualification outcomes. For example, studies have examined the factors associated with VET completion (Polidano and Zakirova 2011), patterns of re-engagement in VET among early school leavers (Black, Polidano and Tseng 2012; Polidano, Tabasso and Tseng 2015) and the impacts of demand-driven VET reforms on course choice and course completion (Polidano 2013; McVicar and Polidano 2015).

2.1. Types of outcomes analysed

The literature reviewed here focuses on studies that look at the economic outcomes of completion of a VET qualification. Mostly, the focus of the studies is on remuneration (Coelli 2010a&b, Leigh 2008, Chapman, Rodrigues and Ryan 2008), employment (Ryan 2000, Gorgens and Ryan 2006, Mavromaras and Polidano 2011) and unemployment (Marks *et al*. 2003). There are obviously many other economic outcomes that could be analysed (entrepreneurship, occupational outcomes, and job satisfaction and other measures of job quality, for example) that are not addressed here.

Most studies show that VET completers do well in terms of labour market outcomes compared to those who have not completed a VET qualification (Karmel and Fieger 2012, Karmel and Nguyen 2006, Lee and Coelli 2010a&b, Leigh 2008, Ryan 2000). For example, Ryan (2000) found that completion of a VET qualification provided a two-tiered benefit to individuals: it increased the immediate likelihood that they work full-time. Then, among

those working full-time, it increased wage, occupation and long-term employment outcomes. Ryan (2000) also found that the actual fields in which VET graduates complete their qualifications had an impact on their outcomes, with some fields providing full-time employment outcomes almost 20 percentage points lower than those of the business field.

2.2. Long-term versus short-term outcomes

Many studies are not explicit about whether they study short or long-term VET outcomes. Studies that use the VET destinations data (Ryan 2002) obviously study short-term outcomes. Those that use Australian Bureau of Statistics (ABS) surveys and longitudinal data as pooled cross sections implicitly study long-term outcomes (Lee and Coelli 2010a&b, Leigh 2008, Chapman *et al*. 2008).

Others are more explicit in attempting to study 'time since completion' more directly. Ryan (2000) focuses explicitly on the long-term outcomes of completing a VET qualification, using information on how long individuals have held their qualifications. Since the ABS data he used was based on multiple cross-sectional surveys, the source of variation he exploited to estimate the longer-term effects of holding a qualification involved comparisons across individuals who have held their qualifications for different lengths of time. Ryan (2000) found that the better outcomes for those with VET qualifications were most apparent immediately after individuals complete their qualifications, but that they faded with time, though whether that reflected something about the skills developed via the qualification or the post-course experience of individuals was unclear. If we were confident nothing else had changed between qualification completions and the date of the surveys, analysis of this type might be satisfactory, but the role of the economic cycle and potential changes in qualification completer cohort quality make this approach problematic.

Studies that use ABS survey information with detailed VET course completion information to try to assess longer term outcomes are not entirely satisfactory in that they rely on the comparison of people with VET qualifications with those without them (Lee and Coelli 2010a&b, Ryan 2000).

Nevertheless, Ryan (2000) found that the full-time employment outcomes achieved by individuals who completed a VET qualification were significantly higher than their relevant comparison groups immediately after the groups entered the labour market. The VET qualifications clearly smoothed the transition to full-time employment for completers.

Over time, differences between the employment outcomes of VET graduates and the comparison groups narrowed somewhat.

Leigh (2008) and Chapman, Rodrigues and Ryan (2008) both used HILDA data to look at VET employment and wage outcomes, but both used the data as pooled cross-sections rather than by exploiting its panel structure. Leigh (2008) uses the first five waves of HILDA and finds positive hourly wage and annual earnings effects for Certificate III and IV qualifications and for Diplomas/Advanced Diplomas among those who had not completed Year 12. Among those who had completed Year 12, Leigh (2008) found no further effect from completing a Certificate III and IV qualification, but positive effects on hourly wages and annual earnings from Diplomas/Advanced Diplomas. Chapman *et al.* (2008) use four waves of HILDA data and found wage effects approaching 30 percent for Certificate III and IV qualifications for both males and females, compared with those who did not complete school or a further post-school qualification, with substantial effects for females for Certificate I and II qualifications as well.

Lee and Coelli (2010a&b) used repeated ABS surveys to estimate the impact on completing VET qualifications. Lee and Coelli (2010b) found that among Year 12 completers, there was little difference in outcomes associated with certificate level qualifications, but there were positive employment and earnings outcomes associated with obtaining Diploma level qualifications. Among persons who did not complete Year 12, however, there were improved outcomes for those with any kind of VET qualification, including the lower level Certificate I and II qualifications.

Stromback (2012) used propensity score matching to examine effects on employment, earnings and engagement in future education around six months after completing different VET qualification levels for people with a previous VET qualification. His main results is that completing higher level qualifications, especially certificates IV and above, provide greater benefits than at lower levels. His results also appear to suggest that the overall benefits are greater for students who had already attained a higher-level qualification, regardless of the level they completed in their new qualification, which is likely to be because of unobserved differences in the characteristics of students by their previous level of study. In other words, those who have already completed diploma level courses have higher payoffs from taking further study because they are more capable. Thus, results from this study do you provide a reliable gauge of the outcomes from courses at the same or lower level.

2.3. Student groups

Many studies found that the benefits from completing VET qualifications are more substantial for males than females (for example Ryan 2000, Lamb, Long and Malley 1998 and Preston 1997), though Long and Shah (2008) do not. Ryan (2000) found that male VET graduates enjoyed more substantial immediate benefits from completion of their qualifications than did female graduates, with differences in the impact of completion of apprenticeships lying at the heart of the divergence in outcomes. Further out from their courses, life-cycle factors also pushed male and female outcomes to diverge.

Marks, Hillman and Beavis (2003) examined the experiences of 20 to 25 year old Australians. They studied the determinants of time spent in full-time employment and unemployment in any year. They report positive effects on time spent in full-time employment for those with Apprenticeships/Traineeships and Diplomas. Other types of VET qualifications did not improve time spent in full-time employment but had weak effects in reducing the time spent unemployed.

Gorgens and Ryan (2006) used longitudinal data following young people into their early twenties and focused on the impact of VET qualifications among those whose pre-course experience may have been problematic, such as those who had been unemployed for six months or more. Their results suggested that the effect of VET qualifications on full-time employment rates were the same for those who did not complete Year 12 as on those who did, and were of the order of 10 to 13 percentage point improvements. Earlier spells of unemployment of six months or longer acted to lower subsequent full-time employment rates. However, those who completed a VET-level qualification following a spell of such unemployment experienced improved full-time employment rates compared with those who experienced unemployment but did not complete later post-school qualifications.

The study by Mavromaras and Polidano (2011) concentrated on the employment outcomes of VET up to three years after completion using a dynamic panel probit model and data from the HILDA, with a specific focus on people with disability. They found that for those out of work prior to study, completing a VET qualification improves the employment rate of people *without* disability by around 2 percentage points up to three years post-completion. For those *with* a disability who were out of work prior to study, completing any VET course is estimated to increase the rate of employment by around 20 percentage points up to three years post-completion. These results are estimated to be stable over time.

Other studies have examined initial labour market outcomes from participation in VET-in-schools courses in Australia. Using propensity score matching and data from the Longitudinal Survey of Australian Youth, Polidano and Tabasso (2014) found that taking an upper-secondary VET-in-schools course is associated with a 13 percentage point higher school completion rate, and among those who did not go onto further study, a 3 percentage point improvement in full-time employment and a 5 percentage point improvement in the chances of finding a career job in the first year after graduating. Importantly, these schooling and employment benefits are only found for courses that contain a workplace learning component.

2.4. Outcomes of those with qualifications versus the qualification effects

Despite some attempts in the literature to make comparisons between completers and non-completers who are as alike as possible in terms of observed characteristics, it is never clear whether there might be unobserved differences between such groups (ability, motivation, perseverance and so on), whose effects get bound up with the apparent qualification effect. Lee and Coelli (2010a&b) use a limited form of matching to make the comparison between VET completers and non-completers who are more comparable. Nevertheless, the set of variables available to match on in the study was quite limited, involving birth cohorts, gender, English-speaking birthplace or not, parents' birthplace and state of residence. Leigh (2008) made adjustments to the estimated qualification effects for ability bias. The fixed effects approach used in this study deals with ability bias and other individual factors that are constant over time.

3. Methodology and data

3.1. Methodology

The analysis pursued in this paper involves the regression of a set of individual outcome measures of a small set of individual characteristics and some categorisation of the qualifications held by individuals. The specification incorporates individual fixed affects that we expect influence outcomes in any year, whatever the qualifications held by individuals, and time period indicators that influence all individuals in a year that pick up the impact of the economic cycle.

The approach uses longitudinal data and involves estimation of multiple fixed effects regression equations of graduate outcomes. The set of graduate outcomes studies here

includes: full-time employment; part-time employment; real hourly wages; real financial year income; usual hours of work; and a measure of occupational "quality", an occupational status measure.

Our interest is in the relationship between outcomes and explanatory variables, including vocational education and training qualifications across all individuals

$$(1)\quad y_{it} = X_{it}'\beta \quad + Q_{it}'\delta_t + \lambda_t + \mu_i \; + e_{it}$$

where y_i is the outcome of individual *i* in year *t*; the ***X***s reflect individual characteristics that might differ over time, principally labour market experience in this application, $Q_{it}$is a series of indicator variables that reflect the completed education and training of qualifications of individuals that might differ over time and β and δ_t are parameter vectors.[2] Specifically, δ_t is the estimated effect of completing a VET qualification over time, the main parameter of interest in this study. The residual consists of three elements, λ_t, a time period effect that influences all individuals in a calendar year ; μ_i, an individual, time invariant component and e_{it}a random term that varies across individuals and over time.

The fixed effects regression estimation includes observations of individuals prior to them completing their qualification and at least one post-completion observation. Estimates of the effects one year out are estimated through inclusion of the individuals' outcomes from their first year after their course; the two year effects through inclusion of the individuals' outcomes from their second year after their course, and so on for further years.

Imagine that individuals complete their training qualifications at the end of some year prior to year *t*, so that $Q_{it} = 1$ and $Q_{it-j} = 0$ for the specific qualification completed. Taking the j^{th} (for example, the second or third) difference of equation (1), we can re-write it as

$$(2)\quad y_{it} - y_{it-j} = (X_{it} - X_{it-j})'\beta \quad + (Q_{it} - Q_{it-j})'\delta_t + (\lambda_t - \lambda_{t-j}) + (e_{it} - e_{it-j})$$

Equation (2) is specified so that the qualification effects are allowed to vary with *t,* or the number of years following completion of the qualification. That is, δ_τ is estimated for τ = *t–j*+1, *t–j*+2, *t–j*+3 and so on to estimate the impact of completion of the qualification over successive years.

[2] Those who are identified in HILDA as commencing study, but not completing are treated in the same way as those who did not enter study.

Individual outcomes will differ between the two years if any of the measured personal characteristics of an individual change, because they have completed a new qualification, been affected by aggregate economy-wide factors and because of unpredictable, random factors that influence them alone.

The estimated effects for the completed qualifications are shown for different level VET qualifications and by field of study, where there are sufficient observations. In the fixed effects specification, the qualification effects are estimated only over those individuals who complete a new qualification, but the other effects, such as the experience effect and the time period indicators, are estimated over all individuals. These estimates provide the counterfactual, showing how much outcomes typically change over time among those who did not complete any (or any new) qualification in the waves of HILDA, thereby removing experience effects, along with the impact of economy-wide productivity growth, for example.

We specify education and training qualifications (Q_{it}) in a number of ways:

1. By highest level of completed qualification at a broad level. Here we use six categories: postgraduate qualification; bachelor degree; Year 12 and other (VET) post-school qualification; Year 12 but no post-school qualifications; less than Year 12 but with a (VET) post-school qualification; less than Year 12 and no post-school qualifications. This approach has a fixed effect variant which identifies the impact of a new highest level qualification.
2. By highest level of completed qualification at a more detailed level for VET qualifications. Here we use ten categories: postgraduate qualification; bachelor degree; Year 12 and diplomas/advanced diplomas; Year 12 and Certificate III or IV; Year 12 and other post-school qualifications; Year 12 but no post-school qualifications; less than Year 12 but with a diploma/advanced diploma; less than Year 12 but with a Certificate III or IV; less than Year 12 but with another post-school qualification; less than Year 12 and no post-school qualifications. Again, this approach has a fixed effect variant which identifies the impact of a new highest level qualification.
3. All completed qualifications, regardless of the highest level, for either the six category or ten category specifications identified above. To be specific, the highest qualification post-graduate qualification would be split into two effects, with a post-graduate effect separated from a degree effect. This approach also has a fixed effect variant which identifies the impact of a new qualification.

4. The number of completed qualifications for either the six category or ten category specifications identified above. This approach also has a fixed effect analogue, identifying the effect of an increase in the number of specific qualifications that treats all increases of one unit, such as from 1 to 2 or 5 to 5 as the same.
5. Specifying completion of first post-school, new higher or new same or lower level qualifications – so with a focus on skill deepening – at the VET level, as well as at the university level too. This approach really only has a fixed effect interpretation, since it identifies the effect of the new qualification at whatever level it is.
6. For any of these approaches, it is also possible to look at field of study at the VET level, where it is available, to see to see if this provides further information on where returns might be high.

The first two approaches are the standard in the literature, though the incorporation of fixed effects is not so commonly used since qualifications are usually completed at the outset of the careers of individuals, and those observed completing their highest qualifications later in their careers might be unusual for the purposes of drawing inferences about the effects of completing qualifications. This concern applies less to vocational education and training than it does to university education, so here we do report fixed effects estimates along with the more standard highest qualification parameters.

The next three approaches are more unusual and were all estimated for the purposes of this report, but only the fifth type of analysis is described in any great detail. The sum of the effects from the estimated parameters from the third categorisation typically simply add to the highest qualification effect, while the highest qualification categorisation dominates the number of qualifications approach, at least in its ability to explain the variance in the outcome variables. The fifth approach gets closer to the complex set of reasons why individuals undertake VET qualifications and conveys different information to that of the highest qualification approach, since it captures about twice as many completed qualifications in the HILDA data in the effects it estimates.

Data limitations, described in the next sub-section, mean the field of study approach is not given too much emphasis in this report. Field of study is not properly identified for enough of the recently completed qualifications for their effects to be measured in any satisfactory way, so the discussion of field of study effects is limited.

3.2. The HILDA Survey

The data used in this study are taken from the Household Income and Labour Dynamics in Australia (HILDA) Survey (see Summerfield 2015). It is a household-based longitudinal survey, which aims to track members of sample households, and individuals who join those initial households, over an indefinite life. The initial sample of 7682 households was drawn in 2001 as a sample of households from 488 non-remote Census Collection Districts in Australia. The sample was intended to be nationally representative of the Australian population aged 15 years or more living in non-remote regions at that time. Some 13969 respondents from those 7682 households were interviewed in the first wave of HILDA. A top-up sample was added in 2011. Those interviewed each year are asked detailed questions about: their current living arrangements; education and labour market participation; income; and their living circumstances, including their finances and general life satisfaction. Each year, participants are asked about educational qualifications they have completed since they were last surveyed. The responses to these questions are used in this study to estimate the impact of VET qualification completion on individual outcomes.

All observations used in the HILDA sample analysed here were of individuals aged older than 15 years of age and no older than 65 years of age. Individuals who aged out of that range are included for the years when their age was no older than 65 years. In total, the data contains 160,553 person-year observations drawn from 20,765 individuals. Over 4600 individuals appear in every wave of the HILDA data. A further 6000 individuals appear in at least half the waves in HILDA.

Patterns in the data show it is broadly representative of the Australian population. The top panel of Table 1 shows the distribution of highest qualifications held by individuals aged 15 to 64 in the broader population, as measured in Australian Bureau of Statistic data for 2009 and in the HILDA data. While there are small differences in the proportion in each category between the ABS and HILDA data, they are not significantly different, with both data sets indicating approaching 30 per cent of individuals had VET-level qualifications as their highest level of education and training. There were slightly more VET Certificate Level III and IV graduates in the HILDA data than in the ABS data.

The second panel of Table 1 shows the proportion of the population who completed VET-level qualifications in the preceding twelve months in the ABS and HILDA data. The ABS proportion is based on subject recall at the time of the survey in 2009. The HILDA responses were asked about completion of qualifications by those known to have been

studying at the time they were last interviewed. The HILDA data show completion rates that are around 60 per cent of those reported to the ABS, but seem likely to be more reliably measured.

3.2.1 Outcomes

The HILDA data also seem to capture the pattern of outcomes associated with course completion in the NCVER course completion survey. Table 3 contains a comparison of the average NCVER course outcomes data for 2005 to 2014 with the outcomes of those who completed VET qualifications in the HILDA data, averaged over the fourteen waves of HILDA. The NCVER VET collection measures outcomes some six months after they complete VET qualifications. The HILDA data outcomes are measured as at the interview where course completers report that they have completed a VET qualification. Those who completed qualifications in the HILDA data have similar employment rates after completion to individuals in the NCVER data. The increase in employment in HILDA from before to after completion also broadly matches that in the NCVER data from before the course to after it. The proportion who obtains their first full-time job after the course is reported to be 5.3 per cent of completers in the NCVER data, while the increase in the proportion with a full-time job after completion is 4.5 per cent higher than in the year prior to completion in the HILDA data, suggestive of broadly comparable magnitudes in the two sources of data.

3.2.2 VET completions

Analysis of the number of available VET level qualifications recorded in the first fourteen waves of HILDA data appears in the attachment and in Table 2. It shows the total number of VET-level qualifications completed after the first wave over the course of the next 14 waves of HILDA, by qualification level and field of study. After the first wave of the data, some 5811 VET-level qualifications were completed by around 4200 individuals in the HILDA survey to wave 14. About of 20 per cent of individuals ever observed in the data completed a VET qualification by wave 14.

The table contains the breakdown of VET qualifications that were the first post-school qualifications of individuals (about one-third of the 5811 qualification completions), a qualification lower than a post-school qualification held ready (another one-third), a qualification at the same level as a post-school qualification held ready (one-sixth of completed qualifications), or a new, higher qualification than one held already (another one-

sixth). About one half of the qualifications completed that were lower than a post-school qualification held ready were completed by individuals with university degrees.

3.2.3 Field of study

In wave 12 of the HILDA data, individuals were asked about the field of study of their highest qualification (or their most recent qualification if they have more than one qualification at the highest level). In 1418 cases, the VET qualification completed was lower than a previous qualification already held by the individual. In a further 877 cases, field of study completed was not identified in wave 12, either because the description of the field was inadequate or the person who completed the qualification was not interviewed for some reason in wave 12.

The full set of 5811 observations can be used in aggregate analysis of outcomes and outcomes by qualification level. The smaller subset of just over 2300 observations is available for analysis by field of study of the new qualifications. Clearly, not all of the level by field of study cells by qualification can support separate analysis. A larger number is available for analysis of field of study when the highest qualification specification is used.

4. Results

The results are presented in three substantive sub-sections in what follows. First, the hourly wage and full-time employment outcomes are presented from a specification that follows the "standard" categorisation of qualifications – analysis of outcomes by the highest qualifications of individuals, with the longitudinal data first analysed as pooled cross-sections. These highest qualifications might have been completed before the HILDA survey commenced. We then use individual fixed effects to estimate the impact of highest qualifications. In this case, only qualifications completed during the HILDA survey contribute to the estimated effects. Second, an alternative approach is presented that looks at the impact on the outcomes of individual of the new qualifications they completed since the start of the HILDA survey. Completed qualifications that are the first post-school qualification of individuals are distinguished from others that might be lower, higher or the same level as those already held by the individual. Third, results are presented that distinguish the field of study of the completed qualifications of individuals, where this information is available.

Typically, results are only discussed for the hourly wage and full-time employment outcomes, since they are the outcomes that receive most attention elsewhere in the literature

and tend to be representative of the other outcome measures. If full-time employment rates increase, part-time employment falls, hours usually worked tend to rise and financial year earnings, which depend on hours, also tend to increase. The full set of results for all outcomes are presented in the appendix.

4.1. Highest qualification level effects on hourly wages and full-time employment

Estimated parameters from a "standard" specification of the qualification effects associated with the highest qualifications categorisation on the hourly wages and incidence of full-time of males and females using HILDA data are presented in the top and bottom panels of Table 4. The levels estimates, without the individual fixed effects specification appear in columns 1 and 3, for males and females respectively.

The qualification categories used in Table 4 are broad: post-graduate qualification, degree, VET qualification with Year 12, Year 12 only, VET qualification without Year 12, all compared against the omitted category, early school leavers with no post-school qualifications. The regression specification also includes quartic terms in experience, indicators for being overseas born and whether the individual is Indigenous or not, along with wave indicators to capture population-wide economic cycle effects. All equations reported in this section have a similar specification.

These results show the features typically found in estimates of this kind. Those with university-level qualifications holders earn around 50% more than the base category, and about 25% more than those who completed only Year 12 (Lee and Coelli 2010b). VET graduates earn around 15% to 25% more than the base category depending on whether they have also completed Year 12. Completion of a VET qualification on top of Year 12 adds little to the Year 12 effect. The results for females tend to show slightly smaller qualification effects, especially the VET qualification effects.

Fixed effects estimates of these qualification effects on hourly wages for males and females appear in columns 2 and 4 of Table 4. The fixed effects estimates are identified by the year in which the individual completes their new highest qualification. These estimates show a slightly different pattern from the pooled cross-sections. The fixed effects estimates tend to be substantially smaller than the pooled cross-section results, so the changes in wages that take place in the first year after completing the qualification typically tend to be smaller than the apparent gap between individuals with different qualification levels.

A second, striking difference is that the results for females are now stronger than the male results, especially for VET qualifications. This pattern will be repeated in many of the

results that follow in alter tables – the fixed effects specification results in larger apparent benefits for females than males. It seems likely that this reflects differences between males and females in the extent to which undertaking VET qualifications is attached to a contract of employment. With apprenticeships a larger part of the VET experience for males, a higher proportion of males than females are employed full-time in the year prior to completing their course than among females. Then, when males complete their courses, little changes with their employment or remuneration. Since females are less likely to undertake VET courses with an associated contract of employment, the act of completion of the qualification provides them with a valuable credential with which to gain such a contract and the higher wages of the skilled job market that it brings. Hence, completion has bigger effects for female wages than it does for male wages.

The lower panel of Table 4 contains comparable qualification effect estimates for full-time employment. Now, the fixed effects estimates identified when individuals complete their courses are typically larger than those from the comparison of those with the qualifications and those without them. This is because the years straight after an individual completes a qualification are critical for those wishing to establish themselves in the labour market. Like the hourly wage results, the VET fixed effects results are much more favourable for females than males. As before, this difference likely reflects differences in the types of jobs associated with male and female VET course completers: male completers are often already in full-time jobs before completion, such as apprenticeships, while this is less common among female completers. The estimated effects are large – a 23 percentage point increase in the probability of full-time employment for females completing a qualification after Year 12, and around 9 percentage points for those without Year 12. Both male and female degree effects are also very large, reflecting the fact that people tend to move into full-time employment in the year after they complete their university degrees.

Tables 5 and 6 show comparable results to those in the two panels of Table 4, except now qualification effects for a more detailed categorisation of qualifications are shown, but only for the VET-level qualifications. Table 5 presents the qualification effects on hourly wages, while Table 6 presents them for full-time employment. These show similar patterns to the broader qualifications specification for males and females, in that the fixed effects estimates for females paint a much stronger view of the qualification effects than do the pooled estimates. The female fixed effects estimates are often larger than those from the pooled cross-sectional results, though that is rarely true for males.

In general, the magnitude of the effects point to about a 10 per cent increase in hourly wages for males for completion of Certificates III and IV, as well as for Diplomas for those without Year 12. Completion of these qualifications on top of Year 12 adds little to male wages. For females, it is predominantly completion of Certificates on top of Year 12 that increases wages, again by something like a 10 per cent increase. These are substantial increases in wages.

The hourly wage qualification estimates in the top panel of Table 4 and in Table 5 are often interpreted as rates of return to investment in education and training for individuals. This interpretation works best when individuals are not employment prior to and while studying and where course fees are low, so that the main cost individuals face from studying is the cost of not working. This framework does not work so well in the VET context. Nevertheless, the wage benefits implied by the parameter estimates, in conjunction with males probably working more while studying than females and low course fees, means that these estimates imply very high rates of return for individuals from these VET qualifications.

4.2. Distinguishing qualifications commenced and completed

The previous sub-section noted the possibility that commencing and completing VET qualifications might provide different benefits to males and females. We explore this possibility in this sub-section, where we repeat the analysis for the broad specification of qualifications, but distinguish the impact of commencing a VET qualification from that of completing one. Table 7 presents the results for hourly wages and Table 8 for full-time employment, comparable to the results already presented in Table 4. Like Table 4, both levels and fixed effects estimates are presented in Tables 7 and 8.

The levels estimates for completed qualifications are not much different from those already presented, but tend to be marginally higher than those reported in Table 4. This is because the commenced qualification parameters tend to be negative. In the highest qualification specification, to commence but not complete a qualification tends to represent a bad signal for the labour market, when the comparison is against people who never commenced the qualification.

By contrast, both the completed and commenced VET qualification parameters in the fixed effects estimates are positive in the full-time employment equation, and larger for males than for females. In VET, where commencing a qualification is often linked directly to a job, the employment effects for individuals who do so are positive. Commencing a qualification, however, does not have the same positive impact on hourly wages. The completed VET

qualification parameters are not much affected by the inclusion of the qualifications commenced variables, with the completion effects for females tending to be larger than the effects for males, as before.

4.3. New qualifications specifications

As noted earlier, the highest qualification estimates only capture the impact of the highest qualification an individual has, and the fixed effects estimates only those new qualifications that change their level of educational attainment. From Table 3, such qualifications represent just one half of the all new qualifications completed by individuals during the HILDA survey data window. Hence, we now turn to measures that estimate the impact on the outcomes of individuals of all of the qualifications they completed over the course of the HILDA survey. Conceptually, the specification is like a fixed effects approach, measuring the change in the outcomes of individuals associated with the acquisition of a new qualification.

Table 9 shows fixed effects estimates for all outcome measures for the qualification categorisation that distinguishes whether the VET qualification completed was their first post-school qualification, or whether they had completed a new qualification at a lower level than a previous qualification, one at the same level or a new higher qualification level. The effects are shown for first year after the individuals completed their VET qualification. Table 10 replicates the earlier analysis where we distinguish VET qualification commencement and completion, for the new qualification specification.

Tables 11 and 12 show the evolution over time of the completed qualification effects on hourly wages and full-time employment, respectively. In Tables 9, 11 and 12 in this section, the reference is an individual who completed a new qualification, with their outcomes measures before and after its completion. In Table 10, it is an individual who commenced a qualification, with the commenced effect measured between the time studying and the time before, and the completion effect between the time completed and the time while studying.

The results in Table 9 have a number of interesting features. First, they point to more widespread positive effects for those completing their first post-school qualification or a higher level one than they previously held. Full-time employment increases by around 10 percentage points for women completing their first post-school qualification, hourly wages by 3 per cent, with increases in hours worked, earnings and occupational status. With the exception of wages, completing a new higher qualification affects these outcomes in the same

way for women. There are positive effects for males on wages and full-time employment too for first post-school qualifications and higher level ones. Positive effects for VET qualifications lower than or at the same level as one previously held are not so common. Second, there are more positive effects across all categories for females than males, a result that accords with the fixed effects results described in the previous sub-section. Third, there are positive wage, earnings and full-time employment effects for males for first and new higher level post-school qualifications, but few other consistent effects across other outcomes for other qualifications. For females, the wages effects are more muted, but other increases are large and registered against most of the outcomes, at least for completed qualifications other than new lower level qualifications.

The results in Table 10 where we distinguish VET qualification commencement and completion show how important commencement is for males and females, especially for the first post-school qualification undertaken by individuals. For both males and females, there are positive commencement effects on full-time employment, hours worked and earnings. These commencement effects tend to be larger for males than for females. However, inclusion of the commencement effects has only a small effect of the estimated VET completion effects, so these continue to be more positive for females than for males.

The results in Tables 11 and 12 show the qualification effects for hourly wages and full-time employment in each of the first five years after individuals completed their VET qualifications. The results show the outcomes for year after completion against the year prior to completion, not year on year changes. The results show considerable stability over time. In general, significant VET qualification effects apparent in the first year after course completion, such as that for male hourly wages of those completing a higher level qualification than one they held previously remain in place in subsequent years, and the magnitudes of the point estimates do not vary much. Hence, those males who completed a higher level qualification than one they held previously enjoyed an increase in real hourly wages of 9% in their first year after completion, and this benefit remained between 9.1-9.5% in the following four years compared with the year prior to completion. The wage premium for males who completed their first post-school qualification halved over time, while that for females increased marginally. The magnitude of the full-time employment effects in Table 12 were larger for females than males, and were quite stable over time.

In terms of one of the main research questions for this paper, estimates made one year out appear to be quite representative of the longer term qualification effects for VET course completers.

4.4. Effects of the Global Financial Crisis

In this sub-section, we explore briefly the impact of the Global Financial Crisis (GFC) on our estimates in two ways. First, we look at its general impact on the outcome measures, using the wave indicator parameters to assess how outcomes changed from 2009 compared to earlier years. Second, we include a post-GFC indicator interaction that allows the VET qualification effects to differ before and after the onset of the GFC.

In general, the estimates do not point to a substantial impact on VET outcomes from the GFC. The top panel of Table 13 contains estimates of how much outcomes changed in general before and after the onset of the GFC from 2009. The estimates point to small negative effects on male full-time employment and hours worked, but real earnings and wages appeared to be higher after the GFC than before for both employed male and females.

The remainder of Table 13 shows how the VET qualification parameters changed from 2009 in the broad qualification specification (comparable to Table 4), while Table 14 contains the same estimates for the new qualification specification (comparable to Table 12). The last row in each panel shows the *p-value* for the joint test of significance of the interaction terms. These indicate whether it is likely the VET qualification effects really differed before and after the GFC. The majority of these *p-values* are greater than 0.05, suggesting we would not generally conclude that the VET effects had changed following the GFC. Further, where there is evidence the effects might have changed, the parameters are often positive, rather than negative. From this, we conclude that the GFC did not have any major, detrimental, impact on VET qualification effects over this period.

4.5. Why do the highest qualification FE results differ from the "new qualification" results?

The highest qualification fixed effects estimates presented in Tables 4, 5 and 6 are estimated where individuals obtain a new, highest post-school qualification. With the broad qualification categorisation used in Table 4, they are identified where an individual obtains their first post-school VET qualification (higher level new VET qualifications are ignored, in this categorisation), and differ depending on whether the individual completed Year 12 or not. For the more detailed VET qualification specification used in Tables 7 and 8, the effects are identified from either a first post-school qualifications or where individuals complete subsequent, but higher qualifications according to the Australian Qualifications Framework. At first glance, the fixed effects estimates should be something like a kind of weighted average of the first and last categories of the "new qualification" formulation of the observed

VET qualification results contained in Table 9, that is the first and new highest qualifications. They could not capture any effect from the new lower and new same level qualifications, categories two and three of the "new qualification" categorisation. Yet the estimates in Tables 4, 5 and 6 for the fixed effects qualification estimates look higher than those for the comparable estimates in Table 9. Why does this appear to be the case?

A first response is that some of the differences are more apparent than real. In fact, the first post-school qualification effects for hourly wages and full-time employment in Table 9 are very close to the fixed effects estimates in Table 4 for the aggregate VET qualifications for those who have not completed Year 12.

There other reasons why the fixed effects estimates of the qualification effects might differ from those from "new qualification level" categorisation. For example, the base case is different in the two categorisations (by the groups who complete new qualifications that do not change their educational attainment), so the set of observations that contribute only to the experience effect is different, which can also change the resulting estimated qualifications effects.

4.6. Field of study effects on outcomes

Field of study effects are presented in Tables 15 through 18. Tables 15 and 16 show the field of study qualification effects for all outcomes in the first year after individuals completed their VET qualifications for males and females respectively. These Tables show the results where we distinguish the prior qualifications held by the individual and the relationship of the recently completed qualification to them. The results in Tables 17 and 18 show, for males and females respectively, the field of study qualification effects for all outcomes where the highest qualification categorisation is used, since these are what the recorded fields relate directly to.

Because we have missing information for about two-thirds of all individuals in Tables 15 and 16, the reference group is those without field of study information, which is sometimes missing by design (for those completing a lower level qualification than one already held), through timing (completed after wave 12) or is genuinely missing . Hence the omitted group is somewhat hard to characterise properly and may differ between males and females. The results show little stability across outcomes or between genders and we view them as of poor quality due to the data issues faced here. Hence, we do not discuss these estimates further.

The results in Tables 17 and 18 for the highest qualification categorisation show more consistency across genders and across outcomes. Now, the reference category is someone who completes a qualification whose field was missing or not reported with sufficient accuracy. As in earlier studies, the results point to substantial differences in outcomes across fields, of up to 30 per cent in wages and 20 percentage points in full-time employment outcomes for both males and females. The distributions of respondents across field of study in the data are shown for males and females in Table 19. The three largest fields for males, covering two-thirds of valid responses, were Engineering, Management and Architecture. For females, Management, Teaching (incorporating child care), Hospitality and Nursing are the four largest fields, also covering around two-thirds of valid responses. The three male fields are all associated with strong positive outcomes, in terms of wages, full-time employment, hours, earnings and occupations, in Table 17. For females, the fields are also typically associated with more positive outcomes, with the exception of wages, earnings and occupational outcomes in hospitality, where the effects are negative. Hospitality matters a bit less for males, in terms of the proportion who undertake studies in that field and the effects of completing such a qualification are all negative for them in Table 17.

5. Concluding remarks

Compared to the existing literature on the outcomes of completing VET qualifications, this paper has used two novel approaches. First, it has focused on the estimation of qualification effects using fixed effects regression methods. Rather than relying on comparisons between different individuals, the fixed effects approach shifts the focus in estimation to effects that are measured when individuals add to their education and training qualifications. We identify the effects of a qualification by comparing outcomes for individuals when they do and do not have the new qualification. Second, the approach pursued in this paper has allowed the impact of VET qualification upgrading to extend to qualifications that individuals complete that do not change their highest level of educational attainment. Such qualifications, which amount to around one half of the VET qualifications completed in the data used here, are ignored in most studies of the impact of completing VET qualifications. This approach allows us to estimate the impact of all of the qualifications individuals complete, not just those that raise their attainment. One consequence of using longitudinal data, needed to support the fixed effects approach, is that it also allows us to measure how different the short-term outcomes of competing VET qualifications are compared to the longer term outcomes.

The results presented in the study point to a number of differences with the existing literature. First, the shift in emphasis towards the qualification effects estimated via fixed effects generates estimates based on how the outcomes of individuals change after they complete their qualifications. This changes the pattern of results by gender. The estimated VET qualification effects for females are often larger than they are for males. This is partly because some of the benefits provided to males by VET occurs when they commence their training, while females get larger benefits with completion of qualifications.

From a policy perspective, it seems clear that individuals benefit from undertaking a VET qualification, especially a first post-school qualification, or a new higher one. Their economic outcomes are better after they complete their qualification than they were before them. In some cases, they may be sufficiently better to justify seeking some kind of sharing of the cost of the course.

Second, the value of qualifications that are not higher than those already held by individuals is not readily apparent. While females who complete a qualification at the same level as one already held appear to receive some benefits from doing so, there seem to be little by way of benefit from lower level qualifications and neither type of qualification provides any apparent payoffs for males, at least in terms of the outcomes studied here.

This result points to the need to study further whether there are other benefits conveyed by such qualifications to individuals. After all, these are informed consumers. They already have post-school qualifications, many have university degrees, so it seems likely that if their benefits are not captured by standard economic outcomes, the people who undertook them had other objectives in mind.

Third, the approach followed here naturally lends itself to estimation of the longer term benefits of completion of VET qualifications, again for individuals as their experience after they complete their course grows. These results point to considerable stability in estimated effects – significant effects apparent in the first year after course completion compared to the year before remain evident in later years.

The current NCVER data collection of short-term VET outcomes seems to capture the long-term benefits conveyed by course completion to VET course completers. Data collections that focus on longer term outcomes do not seem justified in these circumstances.

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Table 1: Educational Attainment, 2009: ABS & HILDA

	ABS	HILDA
Attainment	%	%
Graduate qualification	7.7	7.8
Degree	13.9	15.6
Advanced Diploma/Diploma	10.2	7.4
Certificate III/IV	17.4	19.6
Certificate I/II	1.2	1.3
Year 12	17.2	19.8
Year 11 or below	31	28.3
% completing VET level qualification in previous 12 months		
Advanced Diploma/Diploma	1.5	0.4
Certificate III/IV	3.4	1.8
Certificate I/II	1.5	0.9

(a) Source: ABS, *Education and Training Experience 2009*, Cat No. 6278.

Table 2: Completed VET qualifications by wave, gender, level and relationship to prior attainment

		Has previous qualification				
	First post-school qual	Lower qual than previous		Same level as previous qual	Higher qual than previous	Total
		VET	Uni			
HILDA Wave						
2	138	77	54	59	49	377
3	143	71	58	45	56	373
4	128	78	67	64	58	395
5	170	83	65	63	100	481
6	151	67	50	51	68	387
7	118	62	66	65	76	387
8	139	76	63	59	68	405
9	116	61	52	42	65	336
10	127	57	51	55	64	354
11	149	60	63	61	71	404
12	220	94	103	102	117	636
13	196	106	108	108	105	623
14	200	126	94	114	119	653
Male	889	522	354	438	458	2,661
Female	1,106	496	540	450	558	3,150
Certificate level not known	200	295	169	44	3	711
Certificate Level I	221	182	75	45	32	555
Certificate Level II	482	210	80	112	73	957
Certificate Level III	722	196	117	340	319	1,694
Certificate Level IV	287	170	326	222	381	1,386
Diploma	168	0	126	123	245	662
Associate Degree	6	0	8	8	6	28
Advanced Diploma	32	0	30	44	33	139
Total	1,995	1018	894	888	1,016	5,811

Table 3: Short term VET graduate outcomes, NCVER and HILDA data

	NCVER 2005-2014	HILDA 2001-2014
Employed after completing course	79.7	80.0
Not employed	20.3	20.2
Unemployed	11.1	8.6
Not in the labour force	8.9	11.3
Employed before training	73.1	75.0
Difference in proportion employed from before training to after	6.6	5.0
Employed or in further study after training	89.3	90.2

NCVER outcomes taken from Student outcomes 2014: Time series of key findings for total reported VET (2005-2014) , released on 3 December 2014 at https://www.ncver.edu.au/wps/portal/vetdataportal/restricted/collectionsContent/!ut/p/a1/lZFPb4JAEMU_jcfNjsvy70ijFGhFKk2VvRgclkoLC8pq2n76wqGXJtY6t0lmXn7vPSrohgqVn6vXXFetyutxF9YW2IwHrgMRJL4DoW_NbeYyFr8wuqaCClS603uaKTzL47bf50dZTADbupY4CvUT6PWpkEqT9qSxbWQ_vnVYFTSbFmihREkwl0B4aSLZGZyR0jUl3zGDlyUbOLKR48J48C_M4SQJ7i12xyFyggVAGKcrfzFPDVhavw_AfZpBaLM4Ch6TKTyYVxTgR-EpyGxwYV_ADGEJNL0xluia7yG36u1wEN5Ququ0_NB0c0tLXdM4xid5XwVfz2Wz9r4Bkpsi_g!!/dl5/d5/L2dBISEvZ0FBIS9nQSEh/

Table 4: Highest level, broad qualification effects: HILDA data

	Male highest	Male Fes	Female highest	Female Fes
Hourly wages				
Post-graduate qualification	0.537***	0.089**	0.487***	0.238***
	(0.009)	(0.036)	(0.008)	(0.027)
Degree	0.442***	0.036	0.415***	0.189***
	(0.008)	(0.032)	(0.007)	(0.024)
Year 12 plus VET qualification	0.215***	0.105***	0.177***	0.176***
	(0.007)	(0.030)	(0.007)	(0.023)
Year 12 only	0.184***	0.077***	0.162***	0.170***
	(0.008)	(0.024)	(0.007)	(0.019)
No Year 12 but VET qualification	0.114***	0.067***	0.067***	0.033*
	(0.007)	(0.022)	(0.007)	(0.020)
R^2	0.24	0.14	0.24	0.12
N	54,663	54,663	52,591	52,591
Full-time employment				
Post-graduate qualification	0.135***	0.412***	0.279***	0.467***
	(0.006)	(0.031)	(0.006)	(0.031)
Degree	0.126***	0.409***	0.257***	0.502***
	(0.006)	(0.025)	(0.006)	(0.023)
Year 12 plus VET qualification	0.101***	0.154***	0.182***	0.227***
	(0.005)	(0.020)	(0.005)	(0.020)
Year 12 only	0.030***	0.099***	0.083***	0.062***
	(0.005)	(0.013)	(0.005)	(0.012)
No Year 12 but VET qualification	0.093***	0.022	0.093***	0.088***
	(0.005)	(0.016)	(0.005)	(0.018)
R^2	0.22	0.13	0.09	0.06
N	76,560	76,560	83,903	83,903

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

Parameters in columns 1 and 3 estimate the qualification effects relative to the group that did not complete Year 12 and did not obtain a post-school qualification. The parameters in columns 2 and 4 measure the qualification effects from the change in outcomes between the year before the individual completed the qualification and the year they report it as completed.

Table 5: Highest level, detailed qualification effects: Hourly wages

	Male highest	Male FEs	Female highest	Female FEs
Diploma & Y12	0.285***	0.105**	0.242***	0.126***
	(0.010)	(0.046)	(0.009)	(0.030)
Diploma	0.263***	0.153***	0.144***	0.055
	(0.013)	(0.036)	(0.012)	(0.047)
Cert IV & Y12	0.231***	0.143***	0.150***	0.147***
	(0.013)	(0.042)	(0.012)	(0.030)
Cert IV	0.221***	0.108***	0.122***	0.043
	(0.012)	(0.030)	(0.012)	(0.031)
Cert III & Y12	0.193***	0.191***	0.097***	0.179***
	(0.010)	(0.034)	(0.011)	(0.027)
Cert III	0.100***	0.117***	0.015	0.053**
	(0.008)	(0.025)	(0.009)	(0.024)
Cert II & Y12	0.069***	-0.043	0.132***	0.159***
	(0.019)	(0.047)	(0.015)	(0.036)
Cert	-0.055***	-0.048	-0.024	-0.057
	(0.018)	(0.042)	(0.016)	(0.042)
Cert I & Y12	0.061***	-0.048	0.134***	0.160***
	(0.023)	(0.056)	(0.021)	(0.043)
Cert I	-0.033*	0.030	0.063***	0.048
	(0.018)	(0.060)	(0.015)	(0.034)
Cert unknown	0.064***	0.023	0.114***	0.099***
	(0.014)	(0.048)	(0.011)	(0.032)
Year 12 only	0.176***	0.080***	0.157***	0.154***
	(0.008)	(0.024)	(0.007)	(0.019)
R^2	0.25	0.15	0.25	0.12
N	54,663	54,663	52,591	52,591

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

Parameters in columns 1 and 3 estimate the qualification effects relative to the group that did not complete Year 12 and did not obtain a post-school qualification. The parameters in columns 2 and 4 measure the qualification effects from the change in outcomes between the year before the individual completed the qualification and the year they report it as completed.

Table 6: Highest level, detailed qualification effects: Full-time employment

	Male highest	Male FEs	Female highest	Female FEs
Diploma & Y12	0.095***	0.179***	0.217***	0.283***
	(0.007)	(0.033)	(0.007)	(0.031)
Diploma	0.086***	0.096**	0.173***	0.161***
	(0.009)	(0.040)	(0.010)	(0.044)
Cert IV & Y12	0.120***	0.145***	0.222***	0.227***
	(0.010)	(0.031)	(0.011)	(0.033)
Cert IV	0.107***	0.015	0.144***	0.178***
	(0.008)	(0.025)	(0.010)	(0.034)
Cert III & Y12	0.121***	0.127***	0.175***	0.225***
	(0.007)	(0.025)	(0.009)	(0.026)
Cert III	0.120***	0.009	0.077***	0.101***
	(0.005)	(0.021)	(0.007)	(0.022)
Cert II & Y12	0.107***	0.183***	0.161***	0.186***
	(0.014)	(0.033)	(0.013)	(0.032)
Cert	-0.008	0.041	0.030**	0.096***
	(0.013)	(0.027)	(0.012)	(0.030)
Cert I & Y12	-0.024	0.089*	0.034**	0.082*
	(0.016)	(0.048)	(0.016)	(0.045)
Cert I	-0.020*	0.053	0.080***	-0.035
	(0.012)	(0.040)	(0.011)	(0.037)
Cert unknown	0.057***	0.041	0.067***	0.038
	(0.010)	(0.029)	(0.008)	(0.030)
Year 12 only	0.028***	0.091***	0.081***	0.056***
	(0.005)	(0.013)	(0.006)	(0.012)
R^2	0.23	0.13	0.09	0.06
N	76,560	76,560	83,903	83,903

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

Parameters in columns 1 and 3 estimate the qualification effects relative to the group that did not complete Year 12 and did not obtain a post-school qualification. The parameters in columns 2 and 4 measure the qualification effects from the change in outcomes between the year before the individual completed the qualification and the year they report it as completed.

Table 7: Highest level, completed and commenced qualification effects on hourly wages: HILDA data

	Male highest	Male FEs	Female highest	Female FEs
Hourly wages				
Completed qualifications				
Post-graduate qualification	0.540***	0.064*	0.489***	0.221***
	(0.009)	(0.038)	(0.009)	(0.029)
Degree	0.452***	0.015	0.425***	0.183***
	(0.009)	(0.034)	(0.008)	(0.026)
Year 12 plus VET qualification	0.278***	0.091***	0.239***	0.172***
	(0.008)	(0.032)	(0.009)	(0.025)
Year 12 only	0.280***	0.050*	0.235***	0.165***
	(0.011)	(0.029)	(0.010)	(0.024)
No Year 12 but VET qualification	0.128***	0.064***	0.081***	0.040**
	(0.007)	(0.022)	(0.007)	(0.020)
Commenced qualifications				
Post-graduate qualification	0.011	0.043**	0.020**	0.041**
	(0.011)	(0.020)	(0.009)	(0.017)
Degree	-0.034***	0.062***	-0.030***	0.027*
	(0.009)	(0.022)	(0.008)	(0.017)
Year 12 plus VET qualification	-0.089***	0.000	-0.115***	-0.048**
	(0.018)	(0.022)	(0.018)	(0.023)
No Year 12 but VET qualification	-0.060***	-0.023	-0.026**	0.019
	(0.012)	(0.022)	(0.013)	(0.018)

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

Parameters in columns 1 and 3 estimate the qualification effects relative to the group that did not complete Year 12 and did not obtain a post-school qualification. The parameters in columns 2 and 4 measure the qualification effects from the change in outcomes between the year before the individual commenced (completed) the qualification and the year they commenced it (reported it as completed).

Table 8: Highest level, completed and commenced qualification effects on full-time employment: HILDA data

	Male highest	Male FEs	Female highest	Female FEs
Full-time employment				
Completed qualifications				
Post-graduate qualification	0.151***	0.416***	0.273***	0.498***
	(0.006)	(0.034)	(0.007)	(0.035)
Degree	0.156***	0.422***	0.261***	0.525***
	(0.006)	(0.028)	(0.006)	(0.027)
Year 12 plus VET qualification	0.113***	0.150***	0.178***	0.242***
	(0.006)	(0.024)	(0.007)	(0.024)
Year 12 only	0.066***	0.112***	0.105***	0.090***
	(0.009)	(0.021)	(0.008)	(0.021)
No Year 12 but VET qualification	0.098***	0.015	0.083***	0.076***
	(0.005)	(0.017)	(0.005)	(0.018)
Qualifications commenced				
Post-graduate qualification	-0.018**	-0.030*	0.034***	-0.058***
	(0.008)	(0.018)	(0.009)	(0.020)
Degree	-0.171***	-0.128***	-0.044***	-0.082***
	(0.008)	(0.018)	(0.008)	(0.019)
Year 12 plus VET qualification	-0.020	0.074***	0.029*	0.033
	(0.015)	(0.021)	(0.015)	(0.022)
No Year 12 but VET qualification	0.088***	0.069***	0.058***	0.046**
	(0.010)	(0.017)	(0.010)	(0.020)

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

Parameters in columns 1 and 3 estimate the qualification effects relative to the group that did not complete Year 12 and did not obtain a post-school qualification. The parameters in columns 2 and 4 measure the qualification effects from the change in outcomes between the year before the individual commenced (completed) the qualification and the year they commenced it (reported it as completed).

Table 9: VET qualification effects, all outcomes, first year after completion, fixed effects

	FTE	PTE	Hours	Earnings	Wages	Occ
Males						
First post-school qual	0.029**	0.008	0.223	0.109***	0.050***	-0.005
	(0.012)	(0.012)	(0.467)	(0.029)	(0.017)	(0.551)
New qual, lower level	0.015	-0.005	0.244	-0.034	-0.016	-0.911
	(0.014)	(0.011)	(0.428)	(0.027)	(0.016)	(0.565)
New qual, same level	0.022	0.003	1.235**	0.030	-0.033	1.892**
	(0.017)	(0.016)	(0.585)	(0.037)	(0.022)	(0.854)
Higher post-school level	0.026*	0.007	-0.280	0.087***	0.090***	2.880***
	(0.014)	(0.013)	(0.473)	(0.030)	(0.019)	(0.754)
R^2	0.12	0.03	0.12	0.28	0.14	0.08
N	76,580	76,580	61,666	59,599	54,679	61,733
Females						
First post-school qual	0.104***	-0.013	2.915***	0.279***	0.027**	0.908*
	(0.013)	(0.014)	(0.496)	(0.034)	(0.014)	(0.498)
New qual, lower level	-0.006	0.029*	-0.443	-0.074**	-0.027*	-1.042**
	(0.015)	(0.015)	(0.459)	(0.032)	(0.014)	(0.492)
New qual, same level	0.065***	-0.035*	1.469**	0.151***	0.004	0.536
	(0.020)	(0.021)	(0.622)	(0.044)	(0.018)	(0.813)
Higher post-school level	0.097***	-0.003	1.599***	0.104***	0.002	2.622***
	(0.018)	(0.020)	(0.579)	(0.040)	(0.017)	(0.698)
R^2	0.06	0.02	0.10	0.20	0.12	0.13
N	83,917	83,917	56,697	58,932	52,603	56,807

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

The parameters in all columns measure the qualification effects from the change in outcomes between the year before the individual completed the qualification and the year they report it as completed.

Table 10: VET qualification effects, all outcomes, first year after completion, fixed effects

	FTE	PTE	Hours	Earnings	Wages	Occ
Males						
Completed qualification						
First post-school qual	-0.003 (0.013)	0.025** (0.012)	-0.692 (0.480)	0.057* (0.031)	0.061*** (0.017)	-0.343 (0.563)
New qual, lower level	0.009 (0.014)	0.001 (0.011)	0.201 (0.438)	-0.042 (0.027)	-0.019 (0.016)	-0.790 (0.574)
New qual, same level	0.018 (0.017)	0.004 (0.016)	1.290** (0.586)	0.018 (0.037)	-0.039* (0.022)	1.636* (0.866)
Higher post-school level	0.014 (0.015)	0.013 (0.013)	-0.252 (0.488)	0.082** (0.032)	0.084*** (0.019)	2.044*** (0.747)
Qualifications commenced						
First post-school qual	0.098*** (0.013)	-0.050*** (0.012)	3.216*** (0.485)	0.173*** (0.032)	-0.043*** (0.016)	0.551 (0.550)
New qual, lower level	0.037** (0.015)	-0.027** (0.013)	0.712 (0.517)	0.039 (0.034)	0.002 (0.019)	-0.882 (0.709)
New qual, same level	-0.003 (0.018)	0.009 (0.015)	-0.200 (0.596)	0.086** (0.037)	0.023 (0.021)	0.232 (0.899)
Higher post-school level	0.038** (0.016)	-0.011 (0.013)	0.070 (0.503)	0.011 (0.031)	0.014 (0.018)	2.234*** (0.721)
Females						
Completed qualification						
First post-school qual	0.082*** (0.014)	-0.015 (0.015)	2.162*** (0.520)	0.208*** (0.034)	0.033** (0.014)	1.112** (0.496)
New qual, lower level	0.002 (0.015)	0.026* (0.015)	-0.250 (0.467)	-0.067** (0.032)	-0.021 (0.014)	-0.885* (0.506)
New qual, same level	0.067*** (0.021)	-0.033 (0.022)	1.501** (0.629)	0.146*** (0.046)	0.001 (0.018)	0.489 (0.787)
Higher post-school level	0.083*** (0.020)	0.012 (0.021)	1.635*** (0.604)	0.084** (0.041)	0.001 (0.019)	2.260*** (0.737)
Qualifications commenced						
First post-school qual	0.064*** (0.013)	0.004 (0.013)	2.425*** (0.481)	0.194*** (0.035)	-0.022 (0.015)	-0.695 (0.500)
New qual, lower level	-0.016 (0.016)	0.010 (0.016)	-0.232 (0.530)	-0.012 (0.033)	-0.034** (0.015)	-0.916 (0.564)
New qual, same level	-0.018 (0.023)	0.016 (0.022)	0.009 (0.784)	0.028 (0.051)	0.012 (0.022)	-0.264 (0.812)
Higher post-school level	0.036** (0.017)	-0.030* (0.017)	0.033 (0.481)	0.053 (0.033)	-0.000 (0.014)	0.698 (0.577)

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

The parameters in all columns measure the qualification effects from the change in outcomes between the year before the individual commenced (completed) the qualification and the year they commenced it (reported it as completed).

Table 11: VET qualification effects, hourly wages, years after completion, fixed effects

	Yr1	Yr2	Yr3	Yr4	Yr5
Males					
First post-school qual	0.050***	0.055***	0.046**	0.035	0.026
	(0.017)	(0.019)	(0.021)	(0.022)	(0.024)
New qual, lower level	-0.016	-0.024	-0.026	-0.020	-0.011
	(0.016)	(0.017)	(0.020)	(0.021)	(0.022)
New qual, same level	-0.033	-0.044*	-0.045	-0.045	-0.059*
	(0.022)	(0.024)	(0.028)	(0.030)	(0.032)
Higher post-school level	0.090***	0.095***	0.091***	0.091***	0.095***
	(0.019)	(0.021)	(0.022)	(0.024)	(0.025)
R^2	0.14	0.14	0.14	0.14	0.14
N	54,679	53,088	51,811	50,854	50,070
Females					
First post-school qual	0.027**	0.027*	0.031*	0.034**	0.031*
	(0.014)	(0.015)	(0.016)	(0.017)	(0.018)
New qual, lower level	-0.027*	-0.024	-0.022	-0.027	-0.019
	(0.014)	(0.016)	(0.017)	(0.019)	(0.020)
New qual, same level	0.004	0.008	0.006	0.009	0.010
	(0.018)	(0.019)	(0.021)	(0.022)	(0.023)
Higher post-school level	0.002	0.003	0.006	-0.010	-0.006
	(0.017)	(0.020)	(0.022)	(0.022)	(0.023)
R^2	0.12	0.12	0.12	0.11	0.11
N	52,603	50,688	49,183	48,033	47,095

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

The parameters in all columns measure the qualification effects from the change in outcomes between the year before the individual completed the qualification and the specified years since they reported it as completed.

Table 12: VET qualification effects, full-time employment, years after completion, fixed effects

	Yr1	Yr2	Yr3	Yr4	Yr5
Males					
First post-school qual	0.029**	0.037***	0.025	0.026	0.025
	(0.012)	(0.014)	(0.015)	(0.017)	(0.017)
New qual, lower level	0.015	0.023	0.032**	0.034**	0.039**
	(0.014)	(0.015)	(0.016)	(0.017)	(0.018)
New qual, same level	0.022	0.030	0.027	0.022	0.017
	(0.017)	(0.019)	(0.021)	(0.023)	(0.024)
Higher post-school level	0.026*	0.019	0.016	0.012	0.015
	(0.014)	(0.016)	(0.018)	(0.019)	(0.020)
R^2	0.12	0.12	0.12	0.12	0.12
N	76,580	74,554	72,990	71,811	70,846
Females					
First post-school qual	0.104***	0.103***	0.104***	0.103***	0.107***
	(0.013)	(0.015)	(0.016)	(0.017)	(0.018)
New qual, lower level	-0.006	-0.007	-0.005	0.000	-0.004
	(0.015)	(0.016)	(0.018)	(0.020)	(0.021)
New qual, same level	0.065***	0.058***	0.053**	0.047*	0.045*
	(0.020)	(0.022)	(0.024)	(0.026)	(0.027)
Higher post-school level	0.097***	0.105***	0.107***	0.113***	0.118***
	(0.018)	(0.021)	(0.022)	(0.023)	(0.024)
R^2	0.06	0.05	0.05	0.04	0.04
N	83,917	81,377	79,433	77,936	76,716

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

The parameters in all columns measure the qualification effects from the change in outcomes between the year before the individual completed the qualification and the specified years since they reported it as completed.

Table 13: Broad VET qualification effects – interaction with post GFC time measure, all outcomes, first year after completion

	FTE	PTE	Hours	Earnings	Wages	Occ
			GFC timing effects - OLS			
Males						
Difference pre- to post GFC	-0.024**	0.004	-0.973**	0.035*	0.090***	-0.011
	(0.012)	(0.009)	(0.426)	(0.029)	(0.017)	(0.581)
Females						
Difference pre- to post GFC	-0.017	-0.001	-0.338	0.020*	0.060***	-0.210
	(0.012)	(0.012)	(0.474)	(0.033)	(0.017)	(0.579)
Males			OLS			
Year 12 plus VET qualification	-0.014*	-0.003	0.038	-0.055***	-0.048***	0.740*
	(0.008)	(0.007)	(0.283)	(0.018)	(0.011)	(0.424)
No Year 12, VET qualification	-0.013*	-0.011**	-0.401	-0.058***	-0.026***	-0.443
	(0.007)	(0.005)	(0.249)	(0.017)	(0.010)	(0.345)
p-value	0.088	0.081	0.222	0.000	0.000	0.042
Females						
Year 12 plus VET qualification	-0.001	0.011	-0.315	0.017	0.027***	1.042**
	(0.009)	(0.009)	(0.308)	(0.021)	(0.010)	(0.415)
No Year 12, VET qualification	-0.009	0.008	-0.308	-0.020	0.014	0.804**
	(0.008)	(0.008)	(0.297)	(0.022)	(0.010)	(0.367)
p-value	0.550	0.387	0.425	0.382	0.021	0.010
Males			Fixed effects			
Year 12 plus VET qualification	0.022**	-0.013	0.650*	0.011	-0.022*	0.037
	(0.011)	(0.009)	(0.344)	(0.022)	(0.013)	(0.432)
No Year 12, VET qualification	0.007	-0.013*	-0.084	-0.033*	-0.011	-0.345
	(0.009)	(0.007)	(0.320)	(0.019)	(0.011)	(0.374)
p-value	0.135	0.130	0.120	0.128	0.216	0.611
Females						
Year 12 plus VET qualification	0.019	0.010	0.248	0.078***	0.026**	0.033
	(0.013)	(0.013)	(0.424)	(0.027)	(0.012)	(0.453)
No Year 12, VET qualification	-0.020	0.028**	-0.874**	-0.032	0.027**	-0.067
	(0.013)	(0.013)	(0.408)	(0.027)	(0.013)	(0.405)
p-value	0.059	0.082	0.051	0.003	0.024	0.980

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

The parameters in all columns show the change in the qualification effects following the onset of the GFC from 2009 compared to the estimated qualification effects up to 2008.

Table 14: New VET qualification effects – interaction with post GFC time measure, all outcomes, first year after completion

	FTE	PTE	Hours	Earnings	Wages	Occ
Males						
First post-school	0.037**	-0.003	2.038***	0.042	-0.012	0.586
qual	(0.017)	(0.015)	(0.574)	(0.035)	(0.019)	(0.671)
New qual, lower	-0.002	0.000	0.039	-0.014	-0.019	0.062
level	(0.016)	(0.013)	(0.493)	(0.030)	(0.018)	(0.695)
New qual, same	-0.001	-0.020	0.496	0.033	-0.010	-0.805
level	(0.022)	(0.018)	(0.711)	(0.039)	(0.024)	(0.985)
Higher post-school	-0.008	0.024	-0.877	-0.018	0.024	-0.447
level	(0.018)	(0.017)	(0.639)	(0.038)	(0.023)	(0.950)
p-value	0.320	0.611	0.009	0.621	0.671	0.798
Females						
First post-school	-0.018	0.041**	-0.357	0.079**	0.030*	-0.393
qual	(0.017)	(0.018)	(0.546)	(0.036)	(0.015)	(0.566)
New qual, lower	0.054***	-0.044**	1.652***	0.012	0.001	0.658
level	(0.020)	(0.019)	(0.582)	(0.038)	(0.018)	(0.645)
New qual, same	0.014	0.010	0.030	0.005	0.012	-0.321
level	(0.028)	(0.025)	(0.758)	(0.050)	(0.026)	(0.965)
Higher post-school	-0.029	0.009	0.265	-0.059	-0.018	-0.197
level	(0.023)	(0.024)	(0.638)	(0.045)	(0.021)	(0.908)
p-value	0.029	0.024	0.065	0.211	0.339	0.771

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Equations include quartic experience terms and wave indicator variables.

The parameters in all columns show the change in the qualification effects following the onset of the GFC from 2009 compared to the estimated qualification effects up to 2008.

Table 15: VET qualification field of study effects: all outcomes, Year 1, males

	FTE	PTE	Hours	Earnings	Wages	Occ
[1] Natural and physical sciences	0.010	-0.036	-1.334	0.013	0.106	4.497
	(0.107)	(0.098)	(3.212)	(0.199)	(0.118)	(4.100)
[2] Information technology	-0.235***	0.168***	-10.345***	-0.080	0.025	-3.363
	(0.069)	(0.063)	(2.648)	(0.155)	(0.097)	(3.381)
[3] Engineering	-0.064*	0.047	-1.673	0.039	0.120**	-0.981
	(0.039)	(0.036)	(1.274)	(0.078)	(0.049)	(1.619)
[4] Architecture and building	0.092	-0.006	-3.223	-0.119	0.056	-0.775
	(0.076)	(0.070)	(2.452)	(0.163)	(0.111)	(3.130)
[5] Agriculture, environment	0.010	-0.068	0.725	0.523***	0.039	4.408
	(0.078)	(0.072)	(2.466)	(0.154)	(0.091)	(3.148)
[6] Medicine	0.083	-0.017	4.306	-0.456	-1.061***	-1.042
	(0.194)	(0.179)	(7.092)	(0.442)	(0.260)	(9.054)
[7] Nursing	-0.307*	0.037	-7.601	-0.298	-0.179	1.898
	(0.169)	(0.156)	(5.829)	(0.314)	(0.214)	(6.428)
[8] Other health-related	-0.150*	0.075	-4.447*	0.083	0.067	5.338
	(0.080)	(0.073)	(2.602)	(0.149)	(0.098)	(3.321)
[9] Education	-0.103	0.136*	-2.999	0.029	0.351***	12.126***
	(0.080)	(0.074)	(2.709)	(0.158)	(0.103)	(3.458)
[10] Management and commerce	0.004	0.006	1.166	-0.090	-0.092*	1.288
	(0.040)	(0.037)	(1.334)	(0.079)	(0.050)	(1.703)
[11] Law	0.086	-0.107	-2.321	-0.051	0.007	-2.850
	(0.092)	(0.085)	(3.341)	(0.186)	(0.123)	(4.264)
[12] Society and culture	-0.060	0.090	-5.603**	-0.008	0.131	4.094
	(0.073)	(0.067)	(2.536)	(0.150)	(0.096)	(3.238)
[13] Creative arts	0.094	-0.099	30.126***	0.322	-0.714***	-30.453***
	(0.140)	(0.129)	(7.426)	(0.371)	(0.272)	(9.479)
[14] Food, hospitality etc	-0.007	0.112*	-0.389	0.033	0.041	-0.056
	(0.071)	(0.065)	(2.517)	(0.145)	(0.093)	(3.213)
R^2	0.01	0.01	0.01	0.00	0.01	0.01
N	15,401	15,401	11,152	10,432	9,230	11,167

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Equations include quartic experience terms, wave indicator variables and qualification effects for the new qualifications categorisation, as used in Table 9, for example. The parameters in all columns measure the qualification effects from the change in outcomes between the year before the individual completed the qualification and the year they report it as completed.

Table 16: VET qualification field of study effects: all outcomes, Year 1, females

	FTE	PTE	Hours	Earnings	Wages	Occ
[1] Natural and physical sciences	-0.187	0.177	-10.803**	-0.082	-0.014	-15.215***
	(0.116)	(0.147)	(4.706)	(0.334)	(0.205)	(5.731)
[2] Information technology	0.097	0.056	-3.084	0.102	0.003	11.230*
	(0.126)	(0.159)	(5.506)	(0.433)	(0.290)	(6.704)
[3] Engineering	-0.259*	0.052	3.723	-0.175	0.387	-38.354***
	(0.137)	(0.173)	(5.449)	(0.429)	(0.288)	(6.636)
[4] Architecture and building	0.002	-0.012	5.488	0.096	-0.160	-9.774
	(0.178)	(0.225)	(5.529)	(0.435)	(0.241)	(6.733)
[5] Agriculture, environment	-0.152	0.045	-3.872	0.143	0.106	-0.756
	(0.103)	(0.129)	(3.611)	(0.265)	(0.157)	(4.397)
[6] Medicine	-0.255**	0.398**	-7.330	0.035	0.253	-3.108
	(0.127)	(0.160)	(4.784)	(0.376)	(0.209)	(5.825)
[7] Nursing	0.126***	-0.087	4.353***	0.152	0.106	4.230**
	(0.042)	(0.053)	(1.542)	(0.120)	(0.072)	(1.877)
[8] Other health-related	0.040	0.060	-1.168	-0.076	0.120	-0.689
	(0.045)	(0.057)	(1.701)	(0.124)	(0.076)	(2.071)
[9] Education	0.043	-0.068	0.356	0.234**	0.183***	2.399
	(0.042)	(0.052)	(1.494)	(0.113)	(0.067)	(1.819)
[10] Management and commerce	0.005	0.062*	-0.618	0.104	0.062	1.582
	(0.029)	(0.037)	(1.100)	(0.084)	(0.050)	(1.339)
[11] Law	0.004	-0.072	0.355	0.093	0.084	-2.966
	(0.129)	(0.163)	(4.025)	(0.316)	(0.176)	(4.901)
[12] Society and culture	0.067*	-0.017	2.080	0.365***	0.184**	2.313
	(0.040)	(0.051)	(1.660)	(0.118)	(0.075)	(1.970)
[13] Creative arts	0.074	0.065	5.015*	0.461**	0.111	3.042
	(0.069)	(0.087)	(2.606)	(0.205)	(0.124)	(3.174)
[14] Food, hospitality etc	0.196***	-0.065	4.382**	-0.128	0.009	-2.528
	(0.045)	(0.057)	(1.775)	(0.129)	(0.078)	(2.160)
R^2	0.01	0.00	0.01	0.00	0.00	0.01
N	17,287	17,287	8,555	9,002	7,635	8,587

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Equations include quartic experience terms, wave indicator variables and qualification effects for the new qualifications categorisation, as used in Table 9, for example. The parameters in all columns measure the qualification effects from the change in outcomes between the year before the individual completed the qualification and the year they report it as completed.

Table 17: Highest qualification, VET field effects: all outcomes, males

	FTE	PTE	Hours	Earnings	Wages	Occ
[1] Natural and physical sciences	0.053**	0.021	-2.939***	0.111**	0.199***	7.713***
	(0.022)	(0.018)	(0.637)	(0.056)	(0.028)	(1.240)
[2] Information technology	0.041***	0.012	-2.666***	0.052*	0.092***	14.528***
	(0.014)	(0.010)	(0.431)	(0.031)	(0.016)	(0.685)
[3] Engineering	0.083***	-0.021***	0.464**	0.224***	0.143***	2.487***
	(0.006)	(0.004)	(0.206)	(0.013)	(0.008)	(0.286)
[4] Architecture and building	0.054***	-0.008	0.032	0.122***	0.104***	1.138***
	(0.008)	(0.006)	(0.276)	(0.020)	(0.012)	(0.348)
[5] Agriculture, environment	0.066***	0.007	2.009***	-0.135***	-0.130***	-3.268***
	(0.011)	(0.008)	(0.438)	(0.027)	(0.017)	(0.576)
[6] Medicine	-0.056	-0.062**	-0.905	0.182***	0.041	15.703***
	(0.060)	(0.025)	(1.394)	(0.062)	(0.067)	(3.118)
[7] Nursing	-0.164***	0.072***	-5.427***	-0.300***	-0.068**	5.683***
	(0.030)	(0.024)	(0.879)	(0.089)	(0.034)	(1.676)
[8] Other health-related	0.043**	0.020	-1.976***	0.046	0.044**	7.582***
	(0.020)	(0.015)	(0.663)	(0.037)	(0.022)	(0.934)
[9] Education	-0.104***	0.110***	-5.796***	-0.045	0.105***	17.350***
	(0.017)	(0.016)	(0.621)	(0.035)	(0.023)	(1.007)
[10] Management and commerce	0.062***	-0.002	-0.422	0.156***	0.124***	9.665***
	(0.008)	(0.006)	(0.270)	(0.018)	(0.011)	(0.434)
[11] Law	0.065***	-0.023	-2.993***	0.238***	0.195***	15.474***
	(0.021)	(0.015)	(0.620)	(0.040)	(0.027)	(1.006)
[12] Society and culture	-0.066***	0.086***	-4.501***	-0.144***	-0.033	6.984***
	(0.015)	(0.013)	(0.528)	(0.035)	(0.021)	(0.689)
[13] Creative arts	-0.126***	0.041***	-2.669***	-0.251***	-0.022	7.780***
	(0.021)	(0.015)	(0.718)	(0.052)	(0.023)	(0.975)
[14] Food, hospitality etc	-0.022*	0.039***	-0.750*	-0.131***	-0.101***	-6.739***
	(0.012)	(0.009)	(0.398)	(0.025)	(0.013)	(0.490)
R^2	0.23	0.08	0.17	0.40	0.26	0.43
N	76,560	76,560	61,646	59,585	54,663	61,713

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Equations include quartic experience terms, wave indicator variables and variables capturing the broad highest qualifications of individual, the categorisation used in Table 4. Parameters estimate the field effects relative to the group that completed a qualification, but did not provide any or sufficient information to identify the field studies.

Table 18: Highest qualification, VET field effects: all outcomes, females

	FTE	PTE	Hours	Earnings	Wages	Occ
[1] Natural and physical sciences	-0.003	0.098***	-2.504**	-0.246***	0.001	5.146***
	(0.029)	(0.031)	(1.028)	(0.082)	(0.030)	(1.442)
[2] Information technology	0.083***	-0.073***	0.848	0.130**	0.076**	9.141***
	(0.023)	(0.020)	(0.639)	(0.059)	(0.031)	(1.110)
[3] Engineering	-0.025	0.056*	-1.091	0.115**	0.114**	-3.452**
	(0.031)	(0.032)	(1.082)	(0.057)	(0.047)	(1.472)
[4] Architecture and building	0.070*	0.035	1.415	0.356***	0.111***	6.945***
	(0.036)	(0.034)	(1.418)	(0.055)	(0.041)	(1.123)
[5] Agriculture, environment	-0.000	0.013	-1.159	-0.268***	-0.077**	-6.226***
	(0.026)	(0.025)	(0.927)	(0.070)	(0.036)	(1.035)
[6] Medicine	-0.108**	0.142***	-6.802***	-0.171*	0.151***	3.660
	(0.043)	(0.049)	(1.499)	(0.092)	(0.056)	(2.569)
[7] Nursing	-0.037***	0.106***	-1.454***	0.049**	0.048***	6.607***
	(0.011)	(0.011)	(0.346)	(0.025)	(0.011)	(0.526)
[8] Other health-related	-0.027**	0.111***	-2.469***	-0.010	0.026**	1.155**
	(0.012)	(0.013)	(0.397)	(0.029)	(0.013)	(0.503)
[9] Education	-0.001	0.045***	-1.280***	0.014	0.076***	11.945***
	(0.010)	(0.010)	(0.347)	(0.024)	(0.011)	(0.514)
[10] Management and commerce	0.104***	-0.013*	1.421***	0.163***	0.056***	5.571***
	(0.008)	(0.007)	(0.267)	(0.019)	(0.009)	(0.318)
[11] Law	0.090**	-0.042	-0.264	0.258***	0.202***	10.120***
	(0.038)	(0.035)	(1.271)	(0.080)	(0.028)	(1.216)
[12] Society and culture	-0.037***	0.055***	-1.615***	-0.142***	-0.024*	4.873***
	(0.012)	(0.012)	(0.401)	(0.031)	(0.014)	(0.556)
[13] Creative arts	0.026*	0.017	1.269**	0.025	0.034	4.524***
	(0.015)	(0.014)	(0.581)	(0.038)	(0.024)	(0.634)
[14] Food, hospitality etc	0.020**	0.013	0.455	-0.080***	-0.070***	-5.059***
	(0.010)	(0.010)	(0.361)	(0.026)	(0.012)	(0.377)
R^2	0.10	0.04	0.11	0.28	0.25	0.44
N	83,903	83,903	56,685	58,918	52,591	56,795

Note: * $p<0.1$; ** $p<0.05$; *** $p<0.01$. Equations include quartic experience terms, wave indicator variables and variables capturing the broad highest qualifications of individual, the categorisation used in Table 4.

Parameters estimate the field effects relative to the group that completed a qualification, but did not provide any or sufficient information to identify the field studies.

Table 19: VET field of study: highest and new qualifications in HILDA, males and females

	Highest qualifications		New qualifications	
	Males %	Females %	Males %	Females %
[1] Natural and physical sciences	1.3	1.2	1.3	1.2
[2] Information technology	4.4	2.1	6.6	1.5
[3] Engineering and related technologies	38.3	1.0	27.1	1.2
[4] Architecture and building	13.8	0.9	10.5	0.5
[5] Agriculture, environment	6.3	1.6	6.2	2.2
[6] Medicine	0.3	0.5	0.3	0.8
[7] Nursing	1.0	10.7	1.3	10.1
[8] Other health-related	2.0	8.0	3.9	10.4
[9] Education	3.0	14.2	3.0	10.5
[10] Management and commerce	14.2	30.7	19.6	30.7
[11] Law	1.4	0.8	2.0	0.5
[12] Society and culture	4.3	8.8	5.4	11.6
[13] Creative arts	2.5	5.4	2.4	3.9
[14] Food, hospitality and personal services	7.2	14.1	10.0	14.4
N	22,270	21,726	1,105	1,458

Attachment: Number of completed qualifications observed in HILDA data after wave 1 – by level and field of study[(a)]

	Cert Unknown	Cert I	Cert II	Cert III	Cert IV	Dip, AssDip, AssDeg	Total
[1] Natural and physical sciences	1	0	5	8	8	3	25
[2] Information technology	3	5	14	23	25	18	88
[3] Engineering and related technologies	19	22	42	93	65	25	266
[4] Architecture and building	3	11	16	44	20	11	105
[5] Agriculture, environment and related	5	4	20	40	17	7	93
[6] Medicine	1	1	3	4	1	3	13
[7] Nursing	6	6	11	64	41	21	149
[8] Other health-related (e.g. Pharmacy)	9	15	17	65	49	29	184
[9] Education	6	2	13	61	44	39	165
[10] Management and commerce (e.g. Accounting)	26	34	98	170	144	145	617
[11] Law	1	2	3	7	4	13	30
[12] Society and culture (e.g. Economics)	5	11	24	69	54	41	204
[13] Creative arts	4	3	11	18	23	18	77
[14] Food, hospitality and personal services	14	24	54	124	36	34	286
Total	103	140	331	790	531	407	2302

(a) Measured up to wave 12
(b) Excludes those whose completed VET qualification was lower than a previously held qualification