

Lower-level Qualifications as a Stepping Stone for Young People

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Abstract

This article investigates whether lower-level qualifications (certificate I and II qualifications) serve as a 'stepping stone' to further study or into the labour market. Using data from the Longitudinal Surveys of Australian Youth (LSAY), the research matches certificate I and II graduates to other young people who share similar characteristics but who have neither completed, nor are undertaking, study or training at a higher level. Two years after completing a certificate I or II qualification, young males are more likely to have undertaken an apprenticeship or traineeship, when compared with other individuals with similar background characteristics. After two years, young female certificate I and II graduates are more likely to be employed and to have undertaken an apprenticeship or traineeship when compared with other similar females. At age 26, the benefits of completing a certificate I or II qualification are still apparent for males but at the same age, females in the control group have caught up to their counterparts who are certificate I and II graduates.

Keywords: Education and inequality, Education: Government policy, Personnel economics – Training

JEL Classification: I240, I280, M530

1. Introduction

A number of studies have consistently shown that while higher-level vocational education and training (VET) qualifications generate positive economic returns, the economic benefit for an individual completing a lower level qualification is negligible (Long and Shah, 2008; Leigh, 2008; Karmel and Nguyen, 2007; Ryan, 2002). However, these studies have typically been careful in their conclusions not to completely dismiss the value of completing a lower level certificate, noting that this may be a 'stepping stone' or springboard to further study (see, for example, Long and Shah, 2008, p. 42; Harris *et al.*, 2006) or have other less tangible benefits, such as improved self-esteem or foundations skills like literacy and numeracy (Dawe, 2004). The underlying assumption is that certificate I and II programs prepare students who would otherwise

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not be capable of enrolling in and completing a higher level qualification or making a successful transition into the workplace, because of their ability, social circumstances, or previous educational experiences.

The purpose of this paper is to examine whether, in the absence of immediate positive economic returns, certificate I and II programs really do provide a springboard to higher study, aid the transition into the workforce, or improve general well-being. In this paper, we exclude traineeships that involve a certificate I or II qualification from our consideration of lower-level qualifications. Other studies have examined outcomes from traineeships (Karmel, Blomberg and Vnuk, 2010; Cully and Curtain, 2001). Instead, we concentrate on certificate I and II qualifications that do not involve a contract of training, such as foundation programs, bridging courses, pre-apprenticeships, and pre-vocational courses.

Lower-level qualifications are designed and promoted as being targeted toward disadvantaged or discouraged learners, yet we find a sizeable proportion of lower-level VET students display characteristics that suggest they are neither particularly disadvantaged nor discouraged. Using data from the National Centre for Vocational Education Research (NCVER) National VET Provider Collection, we also find that completion is very important in determining whether or not a certificate I or II qualification confers any benefit, especially in relation to further study. Poor targeting could obscure positive outcomes from lower level qualifications among the type of students for whom lower level qualifications are intended.

When we turn to data from the Longitudinal Surveys of Australian Youth (LSAY), we find further confirmation that young people who complete lower-level VET qualifications are not so different from other young people. The broad profile of lower level VET graduates in the LSAY sample means that, based on their characteristics, some lower-level VET graduates could have just as easily completed an apprenticeship or traineeship, some a university qualification, while others most resemble young people who have not completed any post-school qualification. Therefore we restrict the scope of the control group to focus on young people who have the most to benefit from completing a lower level qualification. Using the information on who completes a lower level qualification, we match each certificate I or II graduate with someone who hasn't completed a certificate I or II (or any other post-school qualification) but who shares similar background characteristics. We do this using an econometric technique called propensity score matching.

When certificate I and certificate II graduates are paired with similar non-graduates, we find that, after two years, both males and females are more likely to have completed or be undertaking an apprenticeship or traineeship. Females are also more likely to be employed and males are on average happier if they have completed a certificate I or certificate II. Over a slightly longer period, to age 26, the benefits for males of completing a certificate I or certificate II solidify, and males remain more likely to have completed or be undertaking an apprenticeship or traineeship and are more likely to have completed a certificate III or higher qualification. However, the benefits for females are not as apparent at age 26. We attribute this to the different occupational labour markets and training paths typically open to males and females.

The structure of this paper is straightforward. The following section provides

a background on lower level qualifications, including their place in the qualifications framework, the characteristics of students who undertake them, completion rates and the payoffs from completion. Next, we provide an explanation of how we have constructed our treatment and control groups and a brief, non-technical overview of the propensity score matching methodology. In the results section, we compare the treatment and control groups against a range of further study and labour market outcomes. We conclude with a discussion of the results and some of the policy implications.

2. Background

Within the Australian Qualifications Framework (AQF), lower-level qualifications (certificates I and II) exist to provide individuals with a path to further study or entry into the workforce. The purpose of a certificate I is to equip individuals with ‘basic functional knowledge and skills to undertake work, further learning and community involvement’ (AQF Council 2011, p.25). A certificate II ‘qualifies individuals to undertake mainly routine work and as a pathway to further learning’ (AQF Council 2011, p.28). The typical volume of learning for both a certificate I and a certificate II is between six months and a year full-time, although it may be possible to complete particular courses more quickly.

The current Australian Qualifications Framework introduced ten levels of learning and certificates I and II correspond to the first two levels. Certificate I and II qualifications are by definition at a lower level than other VET qualifications and higher education qualifications. There is no formal equivalence in the framework between certificate I or II qualifications and the Senior Secondary Certificate of Education (commonly known as Year 12). This was a deliberate decision of the council, in recognition that Year 12 may fit within any of a number of levels, depending on the subjects chosen by the individual student. Lim and Karmel (2011) support this decision. They found that compared with Year 12, a certificate II does not produce equivalent further study or employment outcomes and it is questionable whether even a certificate III can be considered a vocational equivalent to Year 12.

Data from the National VET Provider Collection (NCVER, 2011a) show a sharp division between lower-level qualifications and higher-level qualifications, even among enrollees under the age of 25 years. Compared with young people enrolled in higher-level VET qualifications, young people enrolled in certificate I and II qualifications are typically younger, more likely to be an early school leaver, more likely to be Indigenous and more likely to have a disability. Half of all enrolments in certificate I and II programs are from students still attending school. Where students participating in VET in Schools are eligible to complete an AQF qualification, it will typically be at the certificate I or II level. Of those who are not at school, most are early school leavers (although a third of certificate II students have completed Year 12).

Less than one in five certificate II students and one in 20 certificate I students is enrolled as part of an apprenticeship or traineeship. More common within lower-level certificates is the pre-apprenticeship, a course designed as a pathway into an apprenticeship, particularly in the traditional trades. Foley and Blomberg (2011, p.22) estimate that most (58 per cent) pre-apprenticeship activity is at the certificate II level, corresponding to approximately 38,000 course enrolments in 2009, predominantly in

the engineering and related technologies field of education. Most of the remaining pre-apprenticeship activity (39.4 per cent or approximately 26,000 enrolments in 2009) is at the certificate I level. Most certificate I pre-apprenticeships are in the architecture and building field of education. Based on data from the 2010 National VET Provider Collection, pre-apprenticeships account for one in three (32.6 per cent) certificate I enrolments and one in five (20.3 per cent) certificate II enrolments.

In the introduction, we referred to a number of studies that show no positive economic returns from certificate I and II qualifications. These findings are consistent with the results of the latest NCVER Student Outcomes Survey (SOS, NCVER, 2011b), which show that certificate I and II graduates are less likely to be employed than graduates of higher-level qualifications. If there is merit in a lower-level qualification, it is mainly that it functions as a stepping stone or springboard to further study (see, for example, Long and Shah, 2008, p.42; Harris *et al.* 2006).

Bearing this in mind, it is not sufficient just to commence a lower-level qualification – completion really matters. Recent research by NCVER (Karmel and Fieger, 2012) indicates that certificate I and II students who complete their qualification are 2.82 times more likely to enrol in further study than those who do not complete. This difference is much larger than for certificate III and IV students (2.09) and diploma and above students (1.65). Likewise, certificate I and II students are more likely to be employed if they complete their qualification. Further, the completion payoff in terms of employment after training is higher among certificate I and II students (1.25) than certificate III and IV students (1.23) and diploma and above students (1.12). However, less than one in four students commencing a certificate II qualification in 2007 completed the qualification. Less than one in five students commencing a Certificate I qualification in 2007 completed. As table 1 shows, the proportion is higher when the population is restricted to students aged 25 years and under and who did not have a post-school qualification but the completion rates for certificate I or II qualifications are consistently lower than those for other qualification levels.

Table 1 - Estimated completion rates for qualifications at certificate I and above, commencing 2007

| <i>AQF qualification</i> | <i>Estimated qualification completion rate</i> | |
|--------------------------|--|---|
| | <i>All students</i> | <i>Full-time students aged 25 years and under, with no post-school qualifications</i> |
| Certificate I | 17.2 | 30.3 |
| Certificate II | 21.2 | 30.1 |
| Certificate III | 32.5 | 42.0 |
| Certificate IV | 31.4 | 32.4 |
| Diploma and above | 32.6 | 36.5 |
| Total | 27.2 | 35.6 |

Source: NCVER 2011a, Tables 3 and 4.

Low completion rates are a persistent problem. Evidence from previous NCVET research (Stanwick, 2005) is that only about 40 per cent of certificate II graduates and 28 per cent of certificate I graduates under 25 years of age went on to complete a further qualification at the same or higher level.

Therefore, the treatment we are most interested in is completion of a certificate I or II qualification. Because of the limitations of the data sources, existing studies have not been able to identify the characteristics of certificate I and II graduates who do complete a further qualification or compare the outcomes over time for certificate I and II graduates with other young people with similar characteristics. This paper overcomes the limitations by using LSAY data from cohorts from the 1995 (Y95) and 1998 (Y98).

3. Methodology

Having established that young people who undertake and complete lower level qualifications differ from other young people, we cannot simply compare the outcomes of certificate I and certificate II graduates with other young people who do not share the same background. To do so would ignore the influence of family background, academic ability and personal attributes. We need some way of taking into account the characteristics of certificate I and II graduates. To do that, we use an econometric technique called propensity score matching.

Propensity score matching is an attempt to unlock the counterfactual by matching each person who has undergone the treatment (completing a certificate I or II) with someone who has similar characteristics but who has not undergone the treatment, and then comparing the outcomes of the two groups. To be valid, propensity score matching must not violate two assumptions. The first, in common with many other approaches, is conditional independence. After controlling for a set of exogenous control variables, potential outcomes should be independent of the treatment assignment. As a result, the effects identified can be causal. Here, none of our ultimate outcomes of interest (including employment, further study and hourly wage) are dependent on completing (or not completing) a lower-level qualification. The second assumption is overlap: Any individual with the same background characteristics should have a positive probability of both being in the treatment group and in the control group.

Propensity score matching is well suited in situations like the current one, where there is a relatively small proportion of cases that have undergone the treatment and a large pool of diverse cases that have not. To set up the propensity score matching requires preparation, which is described in the following sections. First, the LSAY data are described, with a breakdown of the treatment and control categories. Next, the propensity scores are calculated and presented. Once we have the propensity scores, we describe the technique for finding suitable matches. Once a matched sample is in place that is balanced on the relevant background characteristics, it suffices to compare the average outcomes of the two groups.

The results presented in the background section drew on the National VET Provider Collection and the NCVET Student Outcomes Survey. LSAY is a good complement to this. LSAY is a longitudinal study that first surveys students (in the case

of the Y95 and Y98 cohorts) in Year 9 and interviews them successively for a further 11 years. At the end of the survey, the median age of respondents is 26. In the first wave of the survey, students undertake a short test of their reading and mathematics ability. They also complete questions relating to their family background. We combine data from the Y95 and Y98 cohorts, the two most recent LSAY cohorts that are complete. Combining them maximises the number of responses, which is especially important considering the low proportion of young people completing lower-level certificates.

Constructing the control and treatment groups

We are interested in the role of certificate I and II programs as pathways into further study and employment. As we saw in the previous section, completing a certificate I or II greatly increases the likelihood of commencing another qualification. We therefore examine the first qualification completed by participants after leaving school, up to age 26 when the survey ends. (For Y95 and Y98 cohorts, LSAY did not collect information on qualifications completed by participants while still at school. This means that lower-level qualifications completed as part of VET-in-Schools activity are not within scope).

To take account of timing, we construct a treatment and control group for each wave of each cohort. This important step means that the post-treatment periods are the same for the treatment and control groups. For each year, the treatment group comprises any respondent who completed a certificate I or II qualification in that year, provided the respondent had not previously completed any qualification and that the qualification was not completed as part of an apprenticeship or traineeship.¹

The control group comprises all other respondents present in that wave who

- are not in school
- have not already completed a higher post-school qualification and
- are not currently studying for a higher qualification.

Implicit in this decision is the assumption that a certificate I and II qualification is inappropriate for anyone who could otherwise gain direct entry into a certificate III or higher qualification. In this sense, we have applied a narrower scope for the control group than if we had only excluded graduates of higher qualifications. We did this more in response to the policy rationale of lower level qualifications as a pathway to higher qualifications than out of any strict methodological requirement. The control group also excludes respondents who subsequently complete a certificate I or II, to avoid any inappropriate matching because of sequencing issues in the survey. Respondents who have completed a certificate I or II in that year as part of an apprenticeship or traineeship are included in the control group, since traineeships may be thought of as an alternative pathway directly into employment. By definition, the control group also includes anyone who was studying a certificate I or II qualification in that year but who did not complete the qualification (provided they had not already completed a higher qualification). We emphasise completion of a certificate I or II as

¹ Most likely any certificate I or certificate II completed as part of a contract of training would be part of a traineeship rather than an apprenticeship, but it is not always possible to distinguish the two in the LSAY dataset.

the criterion for inclusion in the treatment group because of the previous research that has demonstrated that the payoff is large and also for the pragmatic reason that it is much more straightforward to identify graduates in the survey.

The other restrictions are that there must be observations two years before completing the qualification (so that we can observe unemployment history before the respondent commenced the qualification) and observations two years after completing the qualification (so that we can observe outcomes). We can only observe a smaller number of cases at age 26, because over the longer period, attrition further erodes the sample.

Table 2 shows the number of cases in the treatment and control groups before matching. The cases are broken down by wave. Both LSAY95 and LSAY98 began with a survey of Year 9 students and lasted for twelve waves in total. Because we want to observe outcomes two years after completing the lower level qualification, there are no treatment or control cases from wave 11 or wave 12. There are no treatment cases from wave 1 or wave 2, because we include in our propensity score model a measure of unemployment experience two waves before completing the qualification (to be sure that any incidence of unemployment occurred before the qualification was commenced). Most of the treatment cases come from waves 4, 5, and 6. The control group for each wave is as described earlier. Respondents who remain in the survey but who already completed a post-school qualification in a prior wave, or who complete a certificate III or higher qualification in the current wave, or who are studying for a certificate III or higher qualification in the current wave, are excluded from the control group. The total number of cases declines over time because of sample attrition.

Table 2 - Treatment and control group counts by wave

| <i>Wave</i> | <i>Treatment</i> | <i>Control</i> | <i>Excluded</i> | <i>Total¹</i> |
|----------------------------|------------------|----------------|-----------------|--------------------------|
| 3 | 47 | 971 | 8183 | 9201 |
| 4 | 95 | 1276 | 7104 | 8475 |
| 5 | 179 | 3787 | 4834 | 8800 |
| 6 | 96 | 4033 | 3958 | 8087 |
| 7 | 57 | 3044 | 3661 | 6762 |
| 8 | 22 | 2386 | 3338 | 5746 |
| 9 | 20 | 2024 | 3118 | 5162 |
| 10 | 13 | 1715 | 2948 | 4676 |
| Total – all waves in scope | 529 | 19 236 | 37 144 | 56 909 |

Source: LSAY, Y95 and Y98 cohorts.

Note: ¹Declining counts reflect the influence of attrition.

The propensity scores

Propensity scores reflect the predicted probability of undergoing a treatment, in this case completing a certificate I or II as the first qualification after leaving school. The logistic model used to estimate the probability of completing a lower-level VET qualification follows Lim and Karmel (2011), who modelled Year 12 completion also using the Y95 and Y98 LSAY cohorts. Table 3 provides a summary of the variables entered into the model. In addition, the Y95 or Y98 cohort was entered as a random effect. The regression was weighted using the most recent weight calculated for each respondent.

The following variables were included in the model:

- State
- Size of local area
- School type
- Academic achievement and ability
 - Highest school level
 - Reading score
 - Maths score
 - Tertiary entrance rank (where applicable)
- Family background and personal characteristics
 - Indigenous status
 - Disability status
 - Parental occupational status
 - Highest level of parental education
 - Students' country of birth
 - Parents' country of birth
- Motivation factors
 - Views learning as fun
 - Treated fairly in class
 - Views self as successful student
 - Believes school is useful to later life
- Unemployment history, t-2
- Sample characteristics
 - Survey wave
 - Cohort

The motivation items were selected on the following basis. In both cohorts, respondents were asked in wave one 20 items about how they felt about school. A factor analysis identified four separate factors:

- the first associated with liking learning,
- the second associated with a positive view of self as student,
- the third associated with receiving fair treatment at school, and
- the fourth associated with viewing school as useful for life as an adult.

A full description of the variables included in the model is contained in table A1 the Appendix.

The logistic model used to determine the propensity scores is:

$$\text{logit}(y) = X\tau + Zu + \varepsilon$$

where X represents the design matrices for the intercept and the independent variables, τ the regression co-efficients for the intercept and independent variables, $Z = [Z_1^{n \times 2}]$, the design matrices for the random cohort factor, $u = [u_1^{2 \times 1}]$, represents the random regression co-efficients for cohort, further we assume $u_1^{2 \times 1} \sim N(0, \sigma_c^2 I_2)$, and $u_2^{574 \times 1} \sim N(0, \sigma_{sc}^2 I_{592})$, and $\varepsilon \sim N(0, \sigma_e^2 I_n)$. Further, we note that $\text{cov}(u, \varepsilon) = 0$, that is, u and ε are uncorrelated.

The results of the logistic regression are shown in table 3.

Table 3 - Model estimates from the propensity scores regression
(for outcomes after two years)

| Parameter | Categories | Male | | | Female | | |
|----------------------------------|----------------------------------|---------------------------|-------|---------|----------|-------|---------|
| | | Estimate | SE | Pr > z | Estimate | SE | Pr > z |
| Intercept | | -1.520 | 2.486 | 0.541 | 0.251 | 0.913 | 0.783 |
| Time | | -1.520 | 2.486 | 0.541 | -0.576 | 0.287 | 0.045 |
| Time^2 | | -0.430 | 0.757 | 0.570 | 0.019 | 0.022 | 0.389 |
| State | | <i>Reference category</i> | | | | | |
| | ACT | 0.708 | 0.168 | <0.001 | 0.771 | 0.434 | 0.076 |
| | NSW | 0.982 | 0.178 | <0.001 | 0.419 | 0.105 | <.0001 |
| | VIC | 0.716 | 0.137 | <0.001 | 0.285 | 0.090 | 0.002 |
| | QLD | 0.905 | 0.078 | <0.001 | 0.274 | 0.030 | <.0001 |
| | SA | 1.056 | 0.101 | <0.001 | 0.588 | 0.077 | <.0001 |
| | WA | 0.634 | 0.432 | 0.142 | 0.156 | 0.147 | 0.290 |
| | TAS | 1.031 | 0.349 | 0.003 | 0.347 | 0.200 | 0.083 |
| | NT | | | | | | |
| School type | | <i>Reference category</i> | | | | | |
| | Government | -0.145 | 0.028 | <0.001 | -0.384 | 0.011 | <.0001 |
| | Catholic | -0.481 | 0.265 | 0.070 | 0.446 | 0.051 | <.0001 |
| | Independent | | | | | | |
| Highest school level | | <i>Reference category</i> | | | | | |
| | Year 12 | -0.319 | 0.284 | 0.260 | -0.326 | 0.564 | 0.563 |
| | Year 11 | -0.740 | 0.196 | 0.000 | -0.565 | 0.402 | 0.160 |
| | Year 10 or below | 0.029 | 0.019 | 0.115 | -0.021 | 0.019 | 0.261 |
| Reading score | | -0.081 | 0.003 | <0.001 | -0.050 | 0.025 | 0.047 |
| Maths score | | | | | | | |
| Tertiary entrance rank | | -0.011 | 0.006 | 0.048 | -0.010 | 0.001 | <.0001 |
| Missing tertiary entrance rank | | -0.409 | 0.370 | 0.269 | -0.462 | 0.032 | <.0001 |
| Parental occupational status | | <i>Reference category</i> | | | | | |
| | Bottom quartile | -0.003 | 0.121 | 0.979 | -0.400 | 0.125 | 0.001 |
| | Second quartile | -0.289 | 0.191 | 0.129 | 0.090 | 0.187 | 0.629 |
| | Third quartile | -0.334 | 0.097 | 0.001 | -0.307 | 0.005 | <.0001 |
| | Top quartile | 0.263 | 0.034 | <0.001 | 0.219 | 0.493 | 0.656 |
| | None (unemployed or missing) | | | | | | |
| Parents' highest education level | | <i>Reference category</i> | | | | | |
| | University | 0.104 | 0.092 | 0.255 | -0.175 | 0.253 | 0.489 |
| | Technical or trade qualification | 0.323 | 0.110 | 0.003 | -0.348 | 0.040 | <.0001 |
| | Completed secondary school | 0.592 | 0.086 | <0.001 | 0.091 | 0.095 | 0.336 |
| | Some secondary school | -0.161 | 0.118 | 0.174 | -0.331 | 0.036 | <.0001 |
| | No information available | | | | | | |
| Students' country of birth | | <i>Reference category</i> | | | | | |
| | Australia | -0.464 | 0.224 | 0.038 | 0.080 | 0.190 | 0.676 |
| | Another English-speaking country | -0.794 | 0.343 | 0.021 | 0.110 | 0.078 | 0.158 |
| | Non-English speaking country | 0.521 | 0.246 | 0.034 | -0.439 | 0.577 | 0.447 |

Table 3 - Model estimates from the propensity scores regression
(for outcomes after two years) (continued)

| Parameter | Categories | Male | | | Female | | |
|---------------------------|--|---------------------------|-------|---------|----------|-------|---------|
| | | Estimate | SE | Pr > z | Estimate | SE | Pr > z |
| Parents' country of birth | Neither born in a non-English speaking country | <i>Reference category</i> | | | | | |
| | One born in a non-English speaking country | 0.494 | 0.069 | <0.001 | 0.284 | 0.091 | 0.002 |
| | Both born in a non-English speaking country | 0.228 | 0.457 | 0.619 | 0.195 | 0.299 | 0.513 |
| Motivation factors | Views learning as fun | -0.134 | 0.001 | <0.001 | 0.042 | 0.036 | 0.247 |
| | Treated fairly in class | 0.130 | 0.077 | 0.090 | 0.033 | 0.056 | 0.549 |
| | Views self as successful student | -0.035 | 0.084 | 0.677 | -0.153 | 0.024 | <.0001 |
| Indigenous | Thinks school will help with life as adult | 0.043 | 0.037 | 0.248 | 0.198 | 0.046 | <.0001 |
| | With a disability | -0.156 | 0.457 | 0.732 | -0.430 | 0.036 | <.0001 |
| Size: | Metropolitan | <i>Reference category</i> | | | | | |
| | Regional | 0.318 | 0.052 | <0.001 | 0.001 | 0.175 | 0.997 |
| | Rural or remote | 0.415 | 0.111 | <0.001 | 0.043 | 0.090 | 0.637 |
| | Missing location information | -0.064 | 0.202 | 0.752 | -0.076 | 0.059 | 0.199 |
| Unemployed, t-2 | | 0.861 | 0.082 | <0.001 | 0.521 | 0.026 | <.0001 |

Background characteristics largely have the expected influence. For example, respondents whose parents work in jobs with low occupational status are more likely to be certificate I or II graduates, as are respondents who have one parent from a non-English speaking country. Respondents with a disability are more likely to complete certificate I or II qualifications. We also find that academic achievement plays a role. For both males and females, lower maths scores and tertiary entrance ranks (where present) increase the probability of completing a certificate I or II. Females who do not think that school will help them later in life but who view themselves as successful students are more likely to complete a certificate I or II as their initial qualification than those who do not, once other factors are controlled for. Different factors are at play for males. Male students who think they were treated fairly in class but who do not view learning as fun, are more likely to complete a certificate I or II than other respondents. For both males and females, a period of unemployment increases the likelihood of completing a certificate I or II qualification. Because of missing data on some covariates, the number of treatment cases with a propensity score reduces to 249 males and 236 females.

Our approach is to match the treatment group of certificate II completers to a sub-sample of the control group using the propensity scores. The propensity score

is the probability of completing a certificate I or certificate II as the first qualification after leaving school, determined from the results of the logistic regression using:

$$\hat{\pi}_i = \frac{\exp(X\hat{\tau} + Z\hat{u})}{1 + \exp(X\hat{\tau} + Z\hat{u})}$$

By matching cases based on the propensity scores, we assume that we have addressed selection issues and any differences in outcomes can be attributed to the effect of the treatment. However, we have only controlled for observable covariates and not on any unobserved covariates (the conditional independence assumption).

Matching was performed using Stata software by Leuven and Sianesi (2003). Callipers apply a restriction to the process by only allowing a match if the control's propensity score is within a certain distance. Radius matching matches a treatment case to all control cases with propensity scores within a certain distance. We adopt the most straightforward matching method. Each treatment case is matched to its nearest neighbour in the control group, which is made up of all other respondents whether they have completed a higher qualification or no qualification at all. A calliper of 0.008 is applied, meaning that a control case will not be matched to a treatment case if the difference between the propensity scores is greater than 0.008. The calliper value was selected as it is one quarter of the standard deviation of the propensity scores (Rosenbaum and Rubin, 1985). To simplify, the same calliper was used for all propensity score matches. Control cases are not replaced once matched. Matching was done separately for males and females, for each cohort and for each period. In total, 12 cases (seven males and five females) were off support, meaning that no remaining case in the control group had a propensity score within the calliper range. Removing treated cases off support removes results in 241 matched cases for males and 231 matched cases for females. Results are then weighted using the most recent weight for each treated case.

Figure 1 plots the propensity scores for the treatment group and the matched control group respectively. Unsurprisingly, given the calliper rule applied during the matching process, there is a very high degree of overlap between the two groups. The graphs also demonstrate that, despite the inclusion of a rich set of controls, most propensity score values for both the treatment and control groups are less than 0.2. Nonetheless, following matching, the treatment sample and the matched control sample are much more balanced in respect of the observed covariates. As the t-tests in table A3 demonstrate, only a few of the selection variables remain unbalanced. This was confirmed by chi-square tests, which show no significant differences between the treatment and control groups for 13 out of 15 covariates for the male propensity score model and 13 out of 15 covariates for the female propensity score model.

Figure 1a - Kernel distribution of propensity scores, treatment and control groups (males)

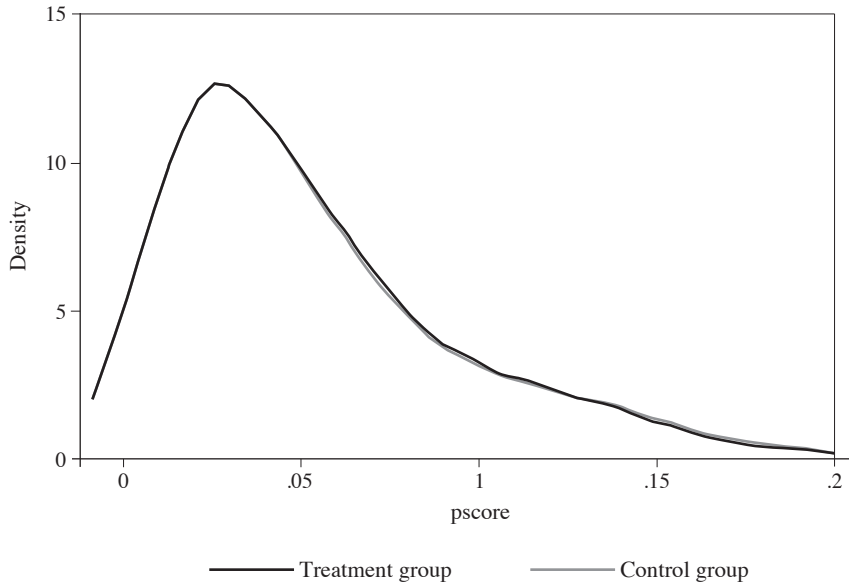
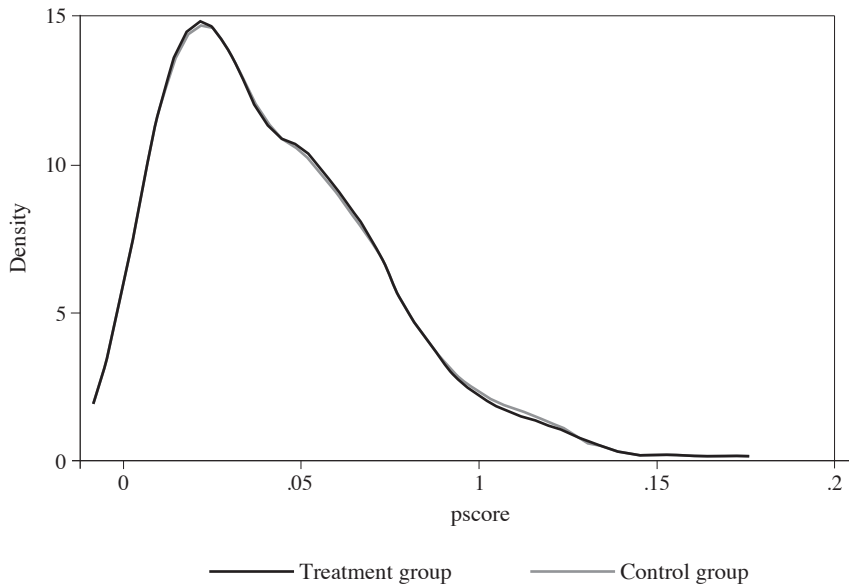


Figure 1b - Kernel distribution of propensity scores, treatment and control groups (females)



The initial model included all respondents for whom there was information at least two years after completing a qualification (where one had been completed). Propensity score models (and matching routines) were re-estimated for those in employment only and with outcomes after two years, for all respondents in the treatment and control groups with outcomes at age 26, and for employed respondents only with outcomes at age 26. These were similar to the initial models. Details are available upon request to the author.

4. Results

Having achieved a balanced control sub-sample, we can now compare the outcomes for respondents who completed a certificate I or II after finishing school to the outcomes for respondents with similar characteristics. We look at three broad outcomes:

- Completion of a certificate III or higher qualification, completion of or current engagement in an apprenticeship or traineeship. This is a test of the ‘stepping stone’ idea.
- Employment, hourly wage and occupational status. This is to determine if lower-level qualifications assist people make positive transitions into the labour market
- Overall life satisfaction. This tests whether lower-level qualifications might have less observable benefits such as boosted self-esteem and improved general well-being.

A full description of how the outcome variables were measured is contained in table A2 in the appendix.

By nearly 10 percentage points, male certificate I and certificate II graduates are more likely to have completed or be undertaking an apprenticeship or traineeship than other similar individuals. On average, they are also more satisfied with their life overall. A higher proportion of male certificate I/II graduates than other similar individuals are employed, and a higher proportion have completed or are undertaking a certificate III or higher qualification (this is almost entirely due to the higher participation in apprenticeships). Male certificate I and certificate II graduates are in jobs with similar occupational status but earn slightly less than other similar individuals. This finding is likely due to the effect of lower training wages for people undertaking an apprenticeship. Full details are shown in table 4.

Table 4 - Summary of outcomes after two years in the treatment and control groups (males)

| | <i>Treatment</i> | <i>Control</i> | <i>Difference</i> | <i>T</i> | <i>P < t </i> |
|--|------------------|----------------|-------------------|----------|-------------------|
| Completed or undertaking a Certificate III or higher ¹ | 29.5% | 23.2% | 6.3% | 1.46 | 0.146 |
| Completed or undertaking an apprenticeship or traineeship ¹ | 28.9% | 19.2% | 9.8% | 2.35 | 0.019 |
| Employed ¹ | 83.5% | 82.1% | 1.4% | 0.35 | 0.726 |
| Overall life satisfaction ¹ | 4.5 | 4.1 | 0.1 | 1.72 | 0.086 |
| Average hourly wage ² | \$17.05 | \$20.19 | -\$3.14 | -1.47 | 0.144 |
| Occupational status ³ | 31.9 | 31.4 | 0.5 | 0.29 | 0.770 |

Notes: ¹N=241; ²N=178; ³N=191.

Source: LSAY, Y05 and Y98 cohorts..

After two years, female certificate I and II graduates are also more likely to be undertaking or have completed an apprenticeship or apprenticeship when compared with other similar individuals, by a similar margin to males (8.4 percentage points). Female certificate I and II graduates are more likely to be employed (79.7 per cent compared with 72.1 per cent in the control group). There are also benefits in terms of completing or undertaking a certificate III or higher qualification, overall life satisfaction, and hourly wage, but the differences are not statistically significant. Females in the treatment group work in jobs with slightly lower occupational status, but the difference is not statistically significant. The outcomes are summarised in table 5.

Table 5 - Summary of outcomes after two years in the treatment and control groups (females)

| | <i>Treatment</i> | <i>Control</i> | <i>Difference</i> | <i>T</i> | <i>P < t </i> |
|--|------------------|----------------|-------------------|----------|-------------------|
| Completed or undertaking a Certificate III or higher ¹ | 31.0% | 25.1% | 5.9% | 1.32 | 0.187 |
| Completed or undertaking an apprenticeship or traineeship ¹ | 18.7% | 10.3% | 8.4% | 2.20 | 0.028 |
| Employed ¹ | 79.7% | 72.1% | 7.5% | 1.69 | 0.092 |
| Overall life satisfaction ¹ | 4.5 | 4.4 | 0.1 | 1.21 | 0.228 |
| Average hourly wage | \$28.03 | \$26.47 | \$1.56 | 0.16 | 0.871 |
| Occupational status | 36.0 | 38.3 | -2.3 | -1.04 | 0.300 |

Notes: ¹N=231; ²N=142; ³N=154.

Source: LSAY, Y05 and Y98 cohorts.

To assess whether the benefits of completing a certificate I or II are short-term or long lasting, we repeated the entire process (construction of treatment and control group, propensity score calculation, and matching) looking only at respondents who remain in the survey until age 26. Respondents are still matched on a year by year basis. Because of attrition, we have approximately only half the number of treated cases available for matching. Table 6 shows the results for males at age 26. The pathway into apprenticeship effect that was evident after two years has strengthened. By between 11 and 13 percentage points, males in the treatment group are more likely to have completed a certificate III or higher qualification, more likely to be undertaking or already have completed a certificate III or higher qualification, and more likely to have completed or be undertaking an apprenticeship or traineeship. All three outcomes are related, since apprenticeships invariably involve undertaking a qualification at certificate III level. There are small, positive, non-significant differences between the treatment group and the control group in the proportion employed, average life satisfaction and average occupational status. As occurred in the results after two years, there is a small, negative, non-significant difference in the average hourly wage, which can be easily explained by the lower training wages received by respondents currently undertaking an apprenticeship.

Table 6 - Summary of outcomes at age 26 in the treatment and control groups (males)

| | <i>Treatment</i> | <i>Control</i> | <i>Difference</i> | <i>T</i> | <i>P < t </i> |
|--|------------------|----------------|-------------------|----------|-------------------|
| Completed a certificate III or higher ¹ | 32.0% | 20.7% | 11.3% | 1.85 | 0.066 |
| Completed or undertaking a certificate III or higher ¹ | 38.0% | 25.0% | 13.1% | 2.17 | 0.032 |
| Completed or undertaking an apprenticeship or traineeship ¹ | 30.2% | 18.7% | 11.5% | 2.23 | 0.028 |
| Employed ¹ | 92.2% | 89.3% | 2.9% | 0.78 | 0.436 |
| Overall life satisfaction ¹ | 4.5 | 4.5 | <0.1 | 0.09 | 0.929 |
| Average hourly wage ² | \$29.76 | \$31.65 | -\$1.89 | -0.99 | 0.325 |
| Occupational status ³ | 39.0 | 37.1 | 1.9 | 0.77 | 0.444 |

Notes: ¹N=126; ²N=99; ³N=114.

Source: LSAY, Y05 and Y98 cohorts.

There is a very different picture looking at the results for females (table 7). The benefits that were present after two years have disappeared by age 26. On average, participation in the treatment group leads to poorer outcomes; although the differences are relatively small and only in one instance (occupational status) does the difference approach conventional levels of statistical significance. However, the reason for the difference between the two sets of results is because females in the control group have 'caught up' and now have employment and further education and training outcomes that are comparable to females who complete lower level qualifications. This suggests that over time, a variety of alternative paths are open to females to improve their education and labour market chances.

Table 7 - Summary of outcomes at age 26 in the treatment and control groups (females)

| | <i>Treatment</i> | <i>Control</i> | <i>Difference</i> | <i>T</i> | <i>P < t </i> |
|--|------------------|----------------|-------------------|----------|-------------------|
| Completed a certificate III or higher ¹ | 36.3% | 38.6% | -2.3% | -0.40 | 0.690 |
| Completed or undertaking a certificate III or higher ¹ | 41.3% | 46.0% | -4.7% | -0.81 | 0.421 |
| Completed or undertaking an apprenticeship or traineeship ¹ | 16.9% | 14.1% | -2.8% | -0.59 | 0.554 |
| Employed ¹ | 80.0% | 81.2% | -1.1% | -0.18 | 0.854 |
| Overall life satisfaction ¹ | 4.5 | 4.6 | -0.1 | -1.07 | 0.286 |
| Average hourly wage ² | \$25.90 | \$31.84 | -5.94 | -1.50 | 0.139 |
| Occupational status ³ | 43.1 | 48.4 | -5.3 | -1.73 | 0.087 |

Notes: ¹N=130; ²N=70; ³N=88.

Source: LSAY, Y05 and Y98 cohorts.

5. Discussion

Most of the evidence published to date has shown poor outcomes for certificate I and II graduates. To overcome some of the limitations of previous studies, we used propensity score matching to test the treatment effect of a certificate I or certificate II qualification. However, we have also constructed a very narrow control group, excluding anybody that has completed a certificate III or higher qualification as well as anybody who is already studying for a qualification at certificate III level or above. Initially, both males and females exhibit generally positive outcomes after completing a certificate I or certificate II. However, by age 26 the gap between the treatment group and the control group remains for males but has disappeared for females.

Thus, in the longer run we see positive outcomes for males undertaking lower level qualifications but the benefits are not apparent for females. We suggest that lower level qualifications work as a pathway into apprenticeships in the traditional trades. This not only explains the large difference at age 26 between the treatment and control groups in the proportion of males undertaking or having completed an apprenticeship but also the proportion that have completed or are undertaking a certificate III or higher qualification (since apprenticeships in the traditional trades are typically at the certificate III level).

In the short-term, outcomes for females are improved by completing a certificate I or certificate II qualification. Two years after completing the qualification, female certificate I and certificate II graduates are more likely to be employed and are more likely to be undertaking or have completed an apprenticeship or traineeship. By 26 years, this benefit has disappeared, not because outcomes for females in the treatment group deteriorate but because females in the control group catch up. We suggest this reflects the multiple paths into occupations typically held by females, such as traineeships, direct entry into VET study at higher levels, and employment without any further post-school study. By age 26, the impact of these different paths has evened out. This finding is consistent with Karmel and Liu (2011), who found that the best pathway for females is clearly completion of Year 12 followed by university study, whether they have a relatively high or low academic orientation. It should be borne in mind that the labour market during the survey period (1995-2006 for the Y95 cohort and 1998-2009 for the Y98 cohort) was relatively strong. The employment benefits of lower level qualifications for females could be more persistent during times of higher unemployment.

Overall, our findings suggest that lower level qualifications offer distinctive benefits to young males and females, provided they do not have an alternative viable pathway into higher study or training. For males, the advantage conferred by lower level qualifications is as a pathway into apprenticeships. The benefits are enduring, still apparent at age 26. For females, the benefits of lower level qualifications appear more general and pre-vocational in nature. There is a short-term boost to employment levels (and participation in apprenticeships and traineeships) but the advantage is no longer apparent at age 26. At least in good economic times, alternative pathways for females (such as traineeships, direct entry into certificate III level study or higher, or finding employment without completing any post-school study) provide comparable outcomes over the longer term.

Appendix

Table A1- Variables used in modelling completion of a Certificate I or Certificate II

| <i>Variable</i> | <i>Values</i> |
|-----------------------------------|---|
| Background | |
| State | ACT (<i>reference category</i>) NSW Vic. Qld SA WA Tas. NT |
| School type | Government Catholic Independent |
| Respondent's highest school level | Year 10 or below Year 11 Year 12 |
| Parental occupational status | Measured based on ASCO, reported in wave 1, using ANU3 scale (McMillan and Jones 2000). Higher score is taken. Results then divided into quartiles. Fifth category comprises cases where there is no occupational status (either because no parent is in the labour force or because of missing data). |
| Parents' highest education level | 4 Completed university 3 Technical or trade qualification 2 Completed secondary school 1 Some secondary school 9 Missing information from both parents |
| Students' country of birth | 1 if Australia 2 if another English speaking country 3 if a non-English speaking country |
| Parents' country of birth | 1 if neither parent born in a non-English speaking country 2 if one parent born in a non-English speaking country 3 if both parents born in a non-English speaking country |
| Indigenous | 1 if Indigenous, 0 otherwise |
| With a disability | 1 if has a disability, 0 otherwise |
| Size of local area: | 1 Metropolitan 2 Regional 3 Rural or remote 9 Missing locality information |
| Ability | |
| Reading score | Score between 0 and 20, measured in wave 1 |
| Maths score | Score between 0 and 20, measured in wave 1 |
| TER | Tertiary entrance rank (0-100) |
| TER missing | No TER, because respondent did not complete year 12, was not otherwise eligible for a TER, or because TER is missing. |
| Motivation | |
| Views learning as fun | Five point scale between -2 and 2 |
| Treated fairly in class | Five point scale between -2 and 2 |
| Views self as successful student | Five point scale between -2 and 2 |
| School is useful to later life | Five point scale between -2 and 2 |
| Unemployment history (t-2) | Respondent had at least one episode of unemployment in the twelve month period two years before the qualification could have been completed. |

Note: ASCO = Australian Standard Classification of Occupations. ANZSCO = Australian and New Zealand Standard Classification of Occupations.

Table A2 - Outcome variables

| <i>Variable</i> | <i>Values</i> |
|---|---|
| Completed a certificate III or higher qualification | 1 Completed a certificate III or higher qualification 0 Has not completed a certificate III or higher qualification |
| Completed or undertaking an apprenticeship or traineeship | 1 Completed or undertaking an apprenticeship or traineeship 0 Has never commenced an apprenticeship or traineeship or commenced but did not complete |
| Employed | 1 Employed 0 Not employed (unemployed or not in labour force) |
| Hourly wage | Deflated to 1995 dollars |
| Occupational status | ANU Occupational status scale based on ASCO (McMillan and Jones 2000) or ANZSCO (McMillan, Bevis and Jones 2009). Values range from 0 to 100. |
| Life satisfaction | Five point scale. Response to question "How satisfied are you with your life overall". |

Table A3 - Mean maths and reading scores, before and after propensity score matching

| | <i>Males</i> | | | | | | <i>Females</i> | | | | | |
|----------------------|------------------------|----------------|------------------|-----------------------|----------------|------------------|------------------------|----------------|------------------|-----------------------|----------------|------------------|
| | <i>Before matching</i> | | | <i>After matching</i> | | | <i>Before matching</i> | | | <i>After matching</i> | | |
| | <i>Treatment</i> | <i>Control</i> | <i>p > t </i> | <i>Treatment</i> | <i>Control</i> | <i>p > t </i> | <i>Treatment</i> | <i>Control</i> | <i>p > t </i> | <i>Treatment</i> | <i>Control</i> | <i>p > t </i> |
| Maths test | 10.6 | 11.9 | <0.001 | 10.9 | 11.1 | 0.520 | 10.5 | 11.4 | <0.001 | 10.7 | 11.4 | 0.045 |
| Reading test | 11.5 | 12.0 | 0.056 | 11.6 | 12.0 | 0.267 | 12.1 | 12.9 | <0.001 | 12.4 | 12.7 | 0.483 |
| TER (where recorded) | 53.1 | 59.3 | 0.022 | 54.9 | 53.4 | 0.682 | 57.6 | 61.0 | 0.169 | 59.9 | 57.6 | 0.518 |

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