

Final Report

Second chance education: Re-engagement in education of early school leavers

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Executive summary

Background

There is substantial evidence in the literature that those who fail to complete school face considerable labour market disadvantage. Over the last 20 years, policy makers have attempted to address this problem by focussing mainly on measures to improve school completion rates. The most significant reform in this time was the expansion of the school curriculum in 1996 to include vocational courses for those less academically inclined (VET-in-school program). However, with the exception of a small increase in school retention rates associated with the recession of the early 1990s, school retention rates in Australia have remained stubbornly constant — school retention rates in 2009 are 76.7% compared to 77.5% in 1993 (ABS 2010a).

Policies to deal with school dropouts are now shifting towards re-engaging youth back into education. To meet its target of 90 percent attainment of at least Year 12 or equivalent for 20-24 year olds by 2015, the Australian Government has introduced a number of measures to encourage early school leavers back into education. These include a guaranteed government subsidised place in training or education for all 15-24 year olds and eligibility requirements for those under 21 on income support without a Year 12 qualification or equivalent to be in full-time study, employment or a combination of the two (so-called Learn or Earn requirements).^{1, 2}

The aim of this study is to improve the understanding of the patterns in which early school leavers re-engage in further study and the factors associated with first course completion. This study builds on the findings of a previous study Black, Polidano and Tseng (2010) in two ways. First, this study looks in more detail at the effects of factors prior to leaving school, such as academic achievement, participation in vocational education and training (VET) in school and reasons for leaving school early. Second, this study sets out to more rigorously test the relationships between time out from school and the chances of re-engaging and completing post-school courses. As pointed out by Black, Polidano and Tseng (2010), the relationships found between time and educational outcomes may be because of an incomplete set of controls for differences in individual characteristics. For example, the estimated declining chance of re-engagement with time out from school may be spuriously related to differences in numeracy and reading scores between those who re-engage early and those who do not that were not controlled for previously.

¹ The guaranteed place in training or further education is subject to availability and admission requirements. For those who already have a post school qualification, the entitlement of a government subsidised place is only for courses that lead to a higher qualification than already attained.

² Income support recipients who are subject to earn or learn requirements are Youth Allowance (other) and Family Tax Benefit (Part A) recipients.

We analyse the factors affecting the patterns of qualification acquisition of early school leavers by estimating separate models for the chance of re-engaging in education in the months after leaving school and the chance of completing the first post-school course. For course re-engagement, we estimate a log-normal duration model that controls for differences in unobserved characteristics between individuals, which is important for the robust estimation of the effect of time out from school. For course completion, we estimate a probit model, where the dependent variable is coded 1 if the individual completes and 0 otherwise. Both models are estimated using the first 7 waves of the 1995, 1998 and 2003 cohorts of the Longitudinal Survey of Australian Youth (LSAY). The sample is restricted to the first 7 waves to ensure that the patterns of qualification acquisition are examined over a consistent time period across the 3 cohorts.³ Using LSAY for examining the post-school education outcomes of early school leavers has a number of advantages over using the Household Income and Labour Dynamics Australia (HILDA) survey. Namely, it gives us a larger sample of youth and a wider set of socio-demographic and school related variables.

Key findings

Numeracy and reading skills

Although early school leavers have lower numeracy and reading skills in Year 9 than those who complete school, we find no evidence that their chances to re-engage and complete further study are hampered by their low scores. We suggest two possible reasons why this may be the case. First, by international standards Australian students perform well in numeracy and reading (Thomson et al. 2011), so that even those who are in the bottom quintile (in numeracy and reading combined) in Year 9 are still able to participate and complete post-school education, regardless of the fact that they didn't finish school. Second, post-school education options for early school leavers in Australia are available at a wide range of levels, making the acquisition of post-school qualifications possible for people from all education backgrounds.

Importance of a career plan

Results presented in this paper suggest that a post-school career plan before exiting school or finding a career job soon after are important to the chances of post-school qualification acquisition of early school leavers. We find that the 50% of all early school leavers who dropout of school for employment reasons (to find, or already have, a job, apprenticeship or traineeship) are more likely to re-engage and complete their first course than those who left for other reasons (mostly because they didn't like or didn't perform well in school). For example, on average those who leave school for employment reasons on average are estimated to re-engage 31% earlier than

³ At the time this research was conducted, there were only 7 waves of the 2003 cohort available.

those who left school because they didn't like school or were not doing well at school. Similarly, those who find a job that they would like as a career re-engage 33% earlier than those who work in jobs that they would not like as a career.

Evidence presented in Black, Polidano and Tseng (2010) support the view that early school leaver decisions to re-engage and complete are based on the expected (discounted) net benefits of doing so. On this basis, it is reasonable to assume that the uncertainty surrounding the expected net benefits of acquiring post-school qualifications is lower for those with a career plan because there is less of a chance that they will waste time and resources by choosing a course that is not a good match. Given that over 90% of early school leavers re-engage by choosing among vocationally oriented courses rather than enrolling in general education, for example by returning to school, the risk of choosing the wrong course can be high for early school leavers who don't know what career path to follow. When faced with such risks, many early school leavers may delay the decision to re-engage until they have a better idea of what career to follow, but the worry is that some may wait too long and not return at all.

An implication of these finding is that while programs to improve numeracy and literacy levels may help retain youth at school, for those who are at risk of dropping out and for those who have already dropped out, transition programs to help them develop a post-school career plan may be more effective in improving their chances of acquiring post-school qualifications. A possible reason why some youth have difficulty forming career plans may be related to a low stock of non-cognitive skills. According to the social cognitive model (Zimmerman 1989), self-esteem (or perceived self-efficacy) is central to the establishment of challenging goals that drives self-regulated motivation (Zimmerman 1989). Using data from wave 2 of the 1998 LSAY cohort, we find that those who leave school with a career plan to find employment or continue studying are statistically more confident, agreeable, calm and hardworking than those who leave for other reasons. This underlines the importance of transition programs, such as the Victorian Government's Managed Individual Pathways (MIPs) program, that emphasises student welfare and the building of non-cognitive skills alongside career counseling.

Role of VET in schools

In theory, participating in VET in schools programs, that are designed to offer alternative career paths for less academically orientated students, should help youth at risk develop an appropriate career path. However, evidence presented in this report is mixed. We find that while early school leavers who start an apprenticeship or traineeship as part of a VET in schools program are more likely to re-engage and complete, there is no strong evidence that those participating in more

general VET in school programs are more likely to re-engage or complete than those who do not participate in VET in schools. A possible explanation is that while apprentice and trainee programs are for those with a clear idea about what they want to do after school, more general programs are designed as ‘taster’ courses for students unsure about their future career path, but their introduction is too late to have an impact. VET in schools programs are not available to at least a third of early school leavers who leave school before commencing Year 11. Another possible explanation for the insignificant effects of the general VET in schools program is that there is a lot of variation in this program between schools, for example, the program may vary by field of study, mode of delivery (on or off campus) and whether it involves workplace learning. The various models of VET in school and their relative effectiveness is an issue that the authors will address in 2011.

Effect of time out from school

Results presented in this paper add considerable weight to the findings of Black, Polidano and Tseng (2010). After controlling for differences in individual characteristics, we find that after leaving school the chances of re-engaging increases up until 4 months out (positive duration dependence), but decreases rapidly afterwards (negative duration dependence). The initial short-term increase in the probability of returning to study is a result of many early school leavers having to wait till the start of the next academic year to commence post-school study. The estimated negative duration dependence is consistent with the findings of Black, Polidano and Tseng (2010) and suggests that there is a limited window of opportunity to re-engage early school leavers before the opportunities diminish.

Also consistent with the findings of Black, Polidano and Tseng (2010), we find that the 20% of early school leavers who re-engage within a month of leaving school are less likely to complete than those who delay. We find no evidence that this relationship is related to differences in characteristics of the individuals who re-engage straight after school, such as differences in reasons leaving school or differences in the types of courses chosen. As spelled-out in Black, Polidano and Tseng (2010), individuals who re-engage straight after leaving school may be coerced back into education by parents or teachers without being well matched to a course.

Taken together, the above results support government measures to encourage early school leavers to return early, but suggest that the effectiveness of these measures in improving education outcomes may be improved by helping early school leavers, or those at risk of dropping out, find courses to which they are well matched.

Choice of education pathway

The most popular post-school education pathway for early school leavers is to commence a traineeship or apprenticeship (around 50% of all first time re-engagements), usually soon after leaving school. Independent of differences in a range of personal characteristics, such as schooling outcomes, timing of re-engagement and employment arrangements, we find that those who choose to return to study through an apprenticeship or traineeship are estimated to be 22 percentage points and 15 percentage points less likely to complete than those who re-engage in other vocational courses respectively. The low completion rates for apprentices and trainees in Australia have been found in previous studies (see for example Commonwealth of Australia 2011), but these estimates put the low completion rates into perspective and highlight the importance of improving apprenticeship and trainee outcomes for some of the most vulnerable in the labour market.

While some researchers have pointed to issues related to the training schemes themselves, including poor relationships with employers, poor quality training and low wages (Snell and Hart 2008), another possible explanation is that many early school leavers enter apprenticeships or traineeships ill-prepared and simply do so because these pathways are widely considered as the best option for students not going-on to higher education.

1. Introduction

For those who do not finish school, findings from the literature suggest that they face poorer prospects than youth who complete school. In the labour market, early school leavers have much greater difficulty in finding and retaining employment and are more likely to be in low-paid jobs (Heckman and Rubinstein 2001, Rumberger and Lamb 2003). Especially for those from disadvantaged backgrounds, difficulties finding and keeping work can spill-over into social and health problems, such as depression, substance abuse, criminal behaviour and suicide (see, for example, Morrell et al. 1998; Fergusson et al. 2001; Hammarstrom and Janlert 2002).

The focus of this study is on the patterns of re-engagement in, and completion of, post-school courses by early school leavers. A better understanding of such patterns is a first-step to designing measures to encourage further qualification acquisition of this group. To the best of our knowledge, there are only three studies to date that have attempted to shed light on this issue. The first two, published in international journals, (Rumberger and Lamb 2003, and Hill and Jepsen 2007), focused on how socio-demographic factors and school performance affect rates of re-engagement up to a point in time after leaving school and did not take into account the timing of re-engagement. The third study in this area by Black, Polidano and Tseng (2010), built on this work by examining the effect of time out from school and the effect of post-school employment outcomes. Two main findings from the Black, Polidano and Tseng (2010) study were that the chances of re-engaging in education were highest in the first year out, after which the chances diminish rapidly, but that those who re-engaged in the year after school were much less likely to complete their qualification.

Given the importance of early years out from school, the aim of this study is to explore in more detail how factors prior to leaving school influence the chances of post-school qualification acquisition of early school leavers. To do this, we use the 1995, 1998 and 2003 cohorts of Longitudinal Survey of Australian Youth (LSAY) and a duration model that allows timing of re-engagement to vary with explanatory variables and controls for the effect of time-invariant unobserved individual differences, such as motivation, that may affect the chances of re-engagement. By better controlling for differences between individuals, we can also more rigorously test the relationships between time and the chances of re-engagement and completion estimated in Black, Polidano and Tseng (2010). In particular, we can better test whether any relationships are due to the effect of time itself, often called ‘duration dependence’, or are related to differences in characteristics of individuals who re-engage at different points in time or not at all, often called ‘individual heterogeneity’.

Separating duration dependence from individual heterogeneity is crucially important for policy makers because the importance of one over the other would dictate different policy responses. For example, if negative duration dependence dominates the chances of re-engagement, that is, the chances of re-engaging decline with time, an appropriate response would be to coerce early school leavers back to education soon after leaving school. Alternatively, if differences in the chance of re-engaging between individuals are driven more by individual heterogeneity, for example, due to differences in numeracy and reading scores, then a more effective response would be to focus on improving numeracy and literacy programs.

2. Data

The primary data source for this report is the Longitudinal Survey of Australian Youth (LSAY). LSAY is a longitudinal dataset that collects information on the same cohort of individuals (panel dataset) from around age 15 to around age 24. The longitudinal nature of LSAY, combined with detailed information on labour market and education experiences, makes it ideal for examining various pathways from school into post-school education and beyond. To maximise the sample size and the robustness of the analysis, three cohorts of the LSAY survey are used in this study — 1995, 1998 and 2003. Because there are only 7 waves of data for the 2003 cohort, to make the time periods comparable across the cohorts, we restrict the sample of analysis to the first 7 years of LSAY. This means examining the patterns of re-engagement and first course completion for around the first 5 years after leaving school.

A limitation of the LSAY data is the high attrition rates (see Box 1), which may bias analysis in this report. From a review of the current literature on dealing with attrition, we conclude that there is no way of properly accounting for sample selection bias for our re-engagement model (duration model) using standard econometric software. A method proposed by Van den Berg, Lindeboom and Ridder (1994) is currently not available in standard software and programming such a model is beyond the scope of this project.⁴ The simple approach of using weights is often suggested as a method of dealing with attrition. While such an approach may be used to derive unbiased estimates of univariate population statistics, the use of weights in multivariate analysis is more controversial. Winship and Radbill (1994) argue that because sample weights are generally a function of many of the same independent variables included in a multivariate model, it is

⁴ In theory, another possible approach would be to estimate a competing risk model, where the risk of attrition competes with the risk of re-engagement. However, such a model is not feasible in this setting because most of attrition occurs in the early years of the survey before we observe whether youth complete school or not (refer to Table A.1 in Appendix A). Therefore, in practice, such a model is not feasible because the two events, in the main, are not competing.

preferable to unweight data in multivariate analysis. This is the case in this study where both of the variables used to construct attrition weights in LSAY (combined Year 9 achievement in numeracy and literacy and gender Sheldon 2009) are controlled for in the analysis. Although we do not explicitly control for attrition, from analysis presented in Appendix A, we find no strong evidence to suggest that the re-engagement results presented in this paper may be systematically biased by the high attrition rates in LSAY.

Besides attrition, LSAY also suffers from a high rate of non-response. In the main, we do not impute values for non-response observations and omit them from the analysis, which means that the actual number of observations used in the multivariate analysis is fewer than the numbers presented in the descriptive tables below. Having said that, for some key variables, such as timing of school exit and the timing of re-engagement, values were imputed using available information to try and maximise the available sample. From tests conducted, the findings of this study are not sensitive to these imputations, but that the extra observations derived considerably reduce the uncertainty of the findings. For other key variables with large numbers of missing observations, such as course completion, we conduct analysis using alternative assumptions for the missing values to give a sense of how sensitive the findings may be to bias from the missing observations. How we dealt with missing observations to key variables is part of the discussion in sections 2.1-2.2.

Box 1: Attrition in LSAY

A limitation of all panel datasets is that they are affected by attrition: when individuals leave the survey before it is completed. High rates of attrition can reduce the precision of estimates using the survey data, but more worrying, non-random attrition can bias the sample and call into question any research findings based on the data. Compared to other comparable large-scale panel data surveys, attrition rates in LSAY are high. In the first 5 years of the LSAY surveys, spanning the crucial period from pre-compulsory education (Year 9) until the first year after school ends, only 65%, 55% and 64% of the original sample remains in the 1995, 1998 and 2003 cohorts respectively (see data in Table A.1 in Appendix A). In contrast, a comparable longitudinal survey from the United States, the National Longitudinal Survey of Youth 1997 (NLSY97) has a retention rate of 88% up to period 5 (Aughinbaugh and Gardecki 2007). To give the LSAY retention rates Australian context, 74% of the original Household Income and Labour Dynamics Australia (HILDA) sample remained in the survey up until period 5 (Watson and Wooden 2006).

2.1 Early school leavers

We define early school leavers as those who left school after the legal minimum age for leaving school, but before attaining their High School certificate.⁵ In essence, this means that those who stayed in school to the end of Year 12 and did not receive a High School certificate are treated as early school leavers because they are academically equivalent to those who left in Year 11.⁶ Also, those who left school, but later returned to complete their High School certificate are also treated as early school leavers. We note that there are a small number of early school leavers who completed a vocational qualification before leaving school as part of a VET in schools program. Most of those for whom we can identify an outcome, report completing a certificate level I and are treated as non-completers, while those who report completing a certificate level II are treated as completers.⁷ The numbers of early school leavers in each cohort are presented in Table 1.

Table 1: Sample of early school leavers in LSAY

	1995 cohort		1998 cohort		2003 cohort	
	(N)	(%)	(N)	(%)	(N)	(%)
<i>School outcome</i>						
Early school leavers	2,648	19.5	2,043	14.5	1,902	18.3
Year 12 completers	6,763	49.7	6,295	44.6	6,337	61.1
Unknown ^a	4,191	30.8	5,764	40.9	1,949	18.8
Missing ^b	11	0.1	8	0.1	182	1.8
Total	13,613	100.0	14,110	100.0	10,370	100.0

^a‘Unknown’ cases arise because individuals attrite from LSAY sample before we ever observe them leaving school.

^b‘Missing’ cases arise because individuals do not respond to the survey question on whether they obtained a High School certificate and they report leaving School in the November – December period of Year 12 (the period when most Year 12 completers report leaving school).

The unknown category in Table 1 mainly comprises those who attrited from the survey before they left secondary school. Missing observations are those who were observed to have left school in Year 12 during November or December and did not record whether they attained a High School certificate. Those who left school in Year 12 prior to November and did not record whether they attained a High School certificate in the following period are assumed to be early school leavers. From Table 2, we calculate a completion rate of 72%, 75% and 77% in the 1995, 1998 and 2003 cohorts amongst those for which there is data.

⁵ For most of the time period spanning the data collection period, the minimum legal age for leaving school was 15 or 16, depending on the state or territory. From January 2006 and January 2010, the minimum leaving age in Western Australia and New South Wales respectively was increase to 17 years. Those who left school before the minimum leaving age were omitted from the sample.

⁶ They will not receive a High School certificate because they did not fulfill the academic requirements (such as school attendance).

⁷ Certificate II is widely regarded as a secondary school equivalent.

The school year in which early school leavers exit is presented in Table 2. The timing of exit is important because it may affect the possible motivations for re-engaging in education at a later date. All else being equal, it is possible that those who leave school later may be better equipped to participate in education after school. The earliest youth are observed leaving school is during Year 9 (after completing Year 8). These students left school at age 15, which at the time was the minimum age for leaving school in their state. Students are asked the secondary school year in which they left school in the survey following school dropout.⁸ An exception is in wave 2 of the 1998 cohort, in which the question is not asked. For this wave, we assign school year of exit based on the date in which early school leavers exit school. Therefore, we assume that among those who left school in this wave, those whose date of exit was prior 1996 left school in Year 9, while those who left school in 1996 are assumed to have left in Year 10.⁹ From Table 3, we can see that the majority of early school leavers (60-70%), for which there are data, leave in senior school (Year 11 and Year 12).

Table 2: Early school leavers by the year of secondary school completed in LSAY

	1995 cohort		1998 cohort		2003 cohort	
	(N)	%	(N)	%	(N)	%
<i>Early school leavers</i>						
Left school during Yr 9	65	2.5	31	1.5	16	0.8
Left school during Yr 10	917	34.6	617	30.2	422	22.2
Left school during Yr 11	1070	40.4	946	46.3	878	46.2
Left school during Yr 12 ^a	596	22.5	449	22.0	586	30.8
Sub-total	2648	100.0	2043	100.0	1902	100.0
<i>School completion status unknown (Leaving school not observed due to attrition)</i>						
Last observed during Year 9	1996	47.6	2978	51.7	74	3.8
Last observed during Year 10	1146	27.3	1475	25.6	710	36.4
Last observed during Year 11	366	8.7	552	9.6	585	30.0
Last observed during Year 12 (Prior to completing) ^a	647	15.4	692	12.0	579	29.7
School Year not reported in last year of LSAY	36	0.9	67	1.2	1	0.1
Sub-total	4191	100.0	5764	100.0	1949	100.0

^aIncludes small number of individuals who report leaving during Year 13 (which is equivalent to the final year of High School in South Australia).

⁸ There are some anomalies in the data. First, in most waves, there are individuals who did not answer the question of whether or not they were in the survey in the previous year. In these cases, we assume that they are still in school. Second, in the 1995 cohort (wave 2), there are a number of double responses to the question of whether they have left school (report both yes and no). If they report the date they left school, then we assume that they have left, otherwise, we assume that they are still in school. Third, in wave 3 in the 1995 and 1998 cohorts, because of the increase in the sample size in this period (and to some extent the wording of the survey in this period) it is possible that there is some double counting of the exits in wave 3.

⁹ For those who report leaving school since the last interview, we observe the month and year they left. For convenience, we assume that they left on the first day of each month. In wave 2 of the 1995 cohort, individuals who left school were not asked the date they left. To fill this missing information, it was assumed that they left on the first of January 1996. In waves 2 and 4 of the 1998 cohort, there are a significant number of individuals with erroneous dates. These are treated as missing observations and are omitted from the sample.

Reasons for leaving school early

Across the three cohorts, around half of youth report that the main reason why they leave school early is for employment reasons, either to get a job or apprenticeship or because they already have a job or apprenticeship to go to (Table 3). The next most important main reason for leaving school is poor academic performance, with around 20 percent of students reporting that they left because they didn't enjoy school or because they were not doing well at school. Less than 10 percent of early school leavers report leaving school because they wanted to undertake training that wasn't available at school, which possibly reflects the wide availability of vocational education and training (VET) courses available in most schools.

Table 3: Main reason given for leaving school early in LSAY

	1995 cohort	1998 cohort	2003 cohort
	%	%	%
<i>Work related</i>			
You wanted to get a job or apprenticeship	48	25	31
Already have a job or apprenticeship ^a	-	17	20
You wanted to earn your own money	-	3	2
<i>School related</i>			
The school didn't offer what you wanted to do	5	7	5
Wanted to do training not available at school	5	7	6
Not doing very well at school	8	18	16
You didn't like school	14	1	1
Your teachers thought you should leave	8	3	2
<i>Other</i>			
Financially, it was hard to stay at school	1	5	7
Having Year 12 wouldn't help you get a job	-	1	1
Don't need Yr 12 to go on to further study or training	-	3	4
Other	11	10	6
Count (N)	1,916	1,817	1,387

^aThis alternative was combined with the above option in the 1995 cohort. - Respondents were not offered these alternatives in the 1995 cohort.

Characteristics of early school leavers

Early school leavers differ from school completers in some important ways. From the data in Table 4, it is clear that early school leavers are more likely to be male and come from outside metropolitan regions. Possible reasons for the higher rate of early school leavers amongst regional and remote areas may be because lower skilled jobs are more available outside of metropolitan areas and that they are also areas of lower socio-economic status.

Consistent with previous studies, such as Maani and Kalb (2007), the data shows parents' education is important in explaining the rate of school completion. However, parents' education appears only to be relevant for youth whose parents either hold a degree or diploma or for youth whose parents did not finish school. Specifically, youth whose parents hold a degree or a diploma

are much more likely to complete school; in contrast, youth whose parents did not complete school are more likely to dropout. For those whose parents hold a secondary school certificate or trade or technical qualification, there appears to be no significant difference in the rates of completion.

Table 4: Key characteristics of early school leavers compared to school completers^a

	Early school leaver	School completer
	%	%
Male	58	46
Place of residence		
Metropolitan	49	64
Regional	31	22
Rural and remote	20	14
Father's highest education qualification		
Didn't complete secondary school	32	21
Completed secondary school	12	12
Trade or Technical	28	25
Degree or diploma	10	22
Don't know	18	20
Mother's highest education qualification		
Didn't complete secondary school	34	26
Completed secondary school	19	17
Trade or Technical	18	18
Degree or diploma	12	20
Don't know	17	19
20th percentile of Year 9 reading score	37	13
20th percentile of Year 9 mathematics score	36	14
Parents' post-school aspirations in Year 9 ^b		
University	21	59
Apprenticeship/traineeship	21	4
TAFE	10	4
Work without studying	13	5
Other	13	13
Don't know	21	14
Own post-school aspirations ^c		
University	18	62
Apprenticeship/traineeship	29	6
TAFE	21	11
Work without studying	15	8
Other	4	3
Don't know	13	9
Count (N)	6593	19395

^aProportions are calculated on available data. For all variables, except for parental post-school aspirations, there are fewer than 10% of observations missing. ^bInformation on parents' aspirations at this level of detail is only available in the 1998 and 2003 cohorts. For 1995 and 1998 cohorts this question is for any-time after leaving school, whereas in 2003 cohort, the question is specifically for the year after leaving school. Source: LSAY 1995, 1998 and 2003 cohorts.

Not only are there differences in parents' education, but there are also differences in parents' post-school aspirations for their children. Only 18% of early school leavers report that their

parents want them to go onto university after school, compared to 62% of school completers. Parents of early school leavers are much more inclined to encourage their children to undertake apprenticeships or traineeships or to find work without study. An important point of note is that own post-school aspirations mirror reported parental aspirations. Of early school leavers, only 18% plan to go onto university and 50% plan on undertaking VET, either as part of an apprenticeship/traineeship or not. In contrast, 62% of school completers planned to go on to university after school. The relationship between parental and own aspirations most likely reflects the strong influence of parents.

A possible explanation for the lower aspirations of parents of early school leavers may be because their children have lower academic achievement in Year 9 compared to children who complete school. However, we find no strong evidence of this is in the data. If we examine only youth who have mathematics and reading scores above the median; of those that are early school leavers, 40% report that their parents want them to go on to university, compared to 67% of parents of school completers. Parents of early school leavers who perform above the median in Year 9 may be less likely to expect their children to go onto university than parents of school completers above the median because they do not value higher education to the same extent.

2.2 Re-engagement in education

There are many varied post-school education pathways for early school leavers in Australia.¹⁰ The pathways identified in LSAY, which are the most common, are: continuing secondary school studies either by returning to school or by continuing studies as a VET institute, undertaking a VET certificate as part of an apprenticeship or traineeship or undertaking a tertiary course that is unrelated to a trade or traineeship, in most cases a VET qualification.^{11, 12}

Re-engagement is defined as the first enrolment in education, including a return to secondary studies, since leaving school for the first time. In LSAY, an enrolment is identified by whether an individual reports currently being in study or enrolled in a course since the last interview. However, in waves 4 to 6 of the 1995 cohort and wave 4 of the 1998 cohort, respondents are not asked information on course enrolments, only information on whether or not they completed a course since the last interview. Information on course enrolments for these periods is identified

¹⁰ This is in contrast to some other countries, such as the United States, where there is a specially designed pathway for early school leavers to return to education, the General Educational Development (GED) test, to attain a secondary school certificate equivalent.

¹¹ Approximately 6% of those who undertake a tertiary qualification unrelated to a trade or apprenticeship enroll in a higher education degree, the remainder enroll in a VET qualification – certificate I-IV, Diploma or Advanced Diploma.

¹² VET institutes include both Technical and Further Education (TAFE) providers and private providers.

from information on all post-school enrolments in wave 7 for the 1995 cohort and in wave 5 for the 1998 cohort and is backfilled. However, this means that information on course enrolments in these periods is only available for individuals who were in the sample in waves 7 and 5 in the 1995 and 1998 cohorts respectively. There is not sufficient information in LSAY to determine whether an individual enrolled in a VET course to only undertake a set number of modules (module completer) and not to complete the course.

From the LSAY data, we can see that returning to secondary education is a rarely followed pathway for early school leavers, with only 9% taking this option either by returning to school or by continuing their secondary studies at a VET institute (Table 5). The two main pathway pursued by early school leavers is to undertake a VET course as part of an apprenticeship or traineeship with an employer (around 46%) or to take a VET course that is unrelated to an apprenticeship or traineeship (around 45%).¹³ In the latter case, the most popular courses are business, tourism hospitality and community services (NCVER 2010). While both major pathways involve VET, apprentices and trainees typically undertake higher level courses, in particular, they are more likely to enroll in a certificate level III or above.

Table 5: Early school leaver choice of educational pathway up to 7 years after leaving school

	Count	Proportion
	N	%
Return to school	38	1
Continue secondary education at VET Inst.	358	8
VET as part of an apprenticeship	1296	29
VET as part of a traineeship	745	17
Other tertiary study ^a	1959	45
Count	4396 ^b	100

^a94% of enrolments are VET qualifications – certificates I-IV, Diploma or Advanced Diploma. The remainder is bachelor degrees.

^bThere are 4683 early school leavers observed to re-engage, but only 4396 have information regarding the timing of re-engagement. Source: LSAY 1995, 1998 and 2003 cohorts, waves 1-7.

From the data in Table 6, it is clear that the choice of post-school study path depends on the timing of the re-engagement. In the first 3 months out from school, enrolling in an apprenticeship or traineeship is the most popular pathway back to study, but after this time, re-engagement in other tertiary study is the most popular path. Interestingly, there appears to be differences in the patterns of re-engaging in traineeships from the patterns of re-engaging in apprenticeships, with the former becoming more popular with time out from study, and the latter becoming less popular.

¹³ We also generated statistics on the choice of education pathway by the level of secondary school completed, but found only modest differences in choice across years of schooling.

Table 6: Early school leaver choice of educational pathway at different points in time up to 7 years after leaving school

	Return to school education at VET	Continue secondary	VET as part of an Apprenticeship	VET as part of a Traineeship	Other tertiary study ^a
	%	%	%	%	%
<i>Time since left school</i>					
<3months	0	6	37	14	44
3-6months	1	11	23	16	49
6-12months	2	19	18	20	41
1-2years	3	12	17	28	41
2-3years	2	4	15	25	55
More than 3 years	4	0	14	24	59
Count	38	358	1296	745	1959

^a94% of enrolments are VET qualifications – certificates I-IV, Diploma or Advanced Diploma. The remainder is bachelor degrees. Source: LSAY 1995, 1998 and 2003 cohorts, waves 1-7.

Overall, 84% of early school leavers are estimated to re-engage (at least once) in the first 7 years after leaving school (Table 7). More than half of all early school leavers are estimated to re-engage within the first 6 months and 75% within the first 2 years. The high rate of re-engagement in the first 6 months out from school suggests that many youth leave school with the intention of going on to further study, which underlines the importance of schools in helping prepare early school leavers for further study.

Table 7: Proportion of early school leavers who re-engage for the first time at different points in time up to 7 years after leaving school^a

	Proportion who re-engaged within the time period	Cumulative
	%	%
<i>Time since left school</i>		
Within 1 month	20	20
1-6 months	35	56
7-12 months	11	66
12-18 months	5	71
19-24 months	4	75
24 months-7 years	9	84

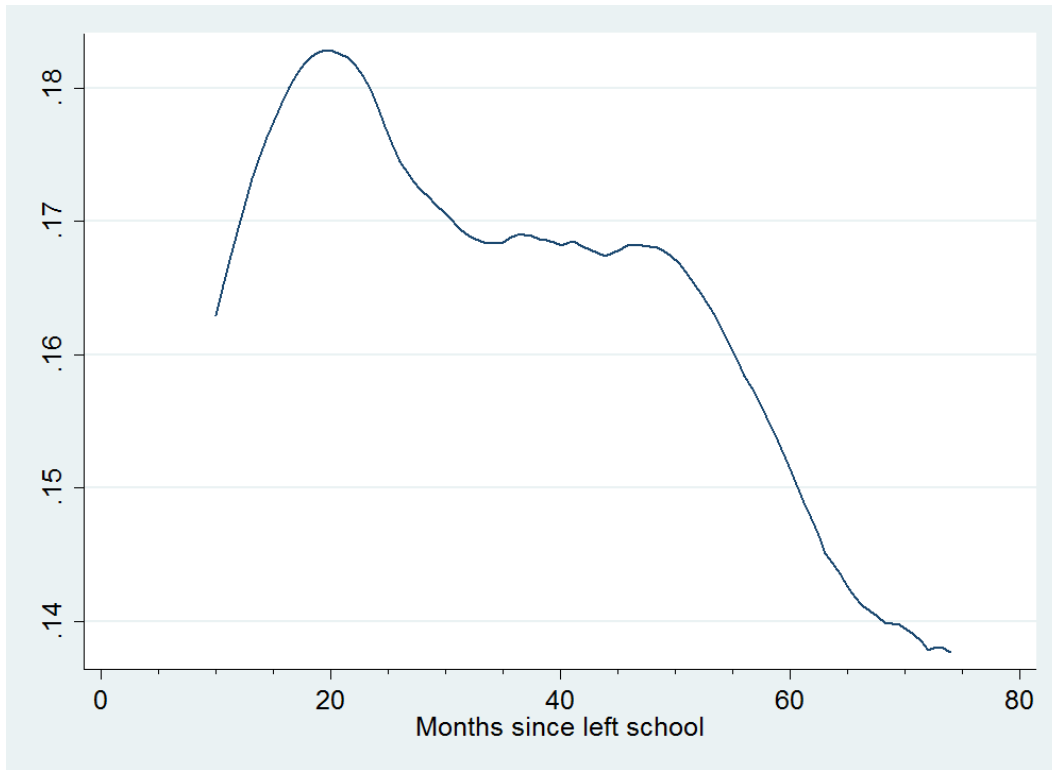
^aThese statistics are estimated on a sample of 3546 early school leavers who remained in the sample until wave 7. Source: LSAY 1995, 1998 and 2003 cohorts, waves 1-7.

To gauge how the probability of re-engaging early school leavers changes over time, we present a hazard function in Figure 1.¹⁴ The definition of hazard function is originally linked to the medical literature and it can be interpreted as the probability that a certain event (for example the death of a patient) occurs at a certain point in time, given that it has not yet occurred. In the context of this report, the hazard function represents the probability that an early school leaver will re-engage in

¹⁴ The figure is a non-parametric hazard smoothed using a weighted kernel density approach.

education, given that they are yet to do so. The hazard function can be used to detect the presence of duration dependence, that is, whether or not the probability of re-engaging for the first time depends on the time since leaving school.

Figure 1: Hazard function of re-engagement for early school leavers up to 7 years after leaving school



Source: LSAY 1995, 1998 and 2003 cohorts, waves 1-7.

From the shape of Figure 1, there is evidence of both positive and negative duration dependence in the first 7 years out from school. In approximately the first 2 years out from school it appears that the chances of re-engaging for the first time increases with time, between 2 and 4 years there is a window of opportunity where the rates of re-engagement decline only marginally, after which they fall rapidly. This pattern is generally consistent with the pattern found in the first 7 years of a hazard of re-engagement over a working life presented in Black, Polidano and Tseng (2010). Black, Polidano and Tseng (2010), found similarly increasing chances of re-engaging up to one year out, steadily declining chances between 1 and 4 years and then rapidly declining chances. An important point to keep in mind is that if we were to extend the period of analysis, the hazard function in Figure 1 would continue to show further declines in the chances of re-engagement, which suggests possible negative state dependence over a working life, which is consistent with

Black, Polidano and Tseng (2010).¹⁵ That said, we should keep in mind that this function does not account for individual heterogeneity and it is premature to conclude whether duration dependence exists or not. This issue is discussed further in the results section.

2.3 Course completion

Whether or not the first re-engagement in education is completed is identified by whether or not an individual reports ending a course since the last interview and if so, whether the course ended with a qualification attainment, a change of course, deferment or non-completion. In this report, if those who defer return to the same course (ASCED) level within three years, it is treated as a continuation of the original course, if not, it is treated as a non-completion. When individuals transfer from one course to another, the original course is treated as a non-completion. Whether individuals complete their apprenticeship or traineeship is identified when they cease study and not when they change employers.

For courses that continue for multiple periods, the course is tracked over the remaining waves of available data until the course is ceased, at which point completion or otherwise is identified. If an individual in their first course is still in study in the last wave of available data, their outcome cannot be observed and they are removed from the sample.¹⁶ This does raise the possibility that the sample may be biased against those who enroll later and/or those in longer courses. As a test of robustness, we re-estimated the results presented in this report assuming all these courses were completed and all of the courses were not, without any note worthy changes in the results.

A problem with the data is that we do not observe the outcome of 52 percent of first re-engagements (or 2549 individuals) – 33 percent have missing outcomes because of non-response and 19 percent have missing outcomes because they left the sample before they finished their studies (attrition) (Table 8). Because the likelihood of attrition increases with the duration of the course, estimated outcomes from apprenticeships and traineeships are likely to be worst affected by attrition bias. Non-responses are particularly problematic in the 1995 and 1998 cohorts because, as discussed above, in waves 4 to 6 of the 1995 cohort and wave 4 of the 1998 cohort, course information in these periods is limited to whether a course was completed since the last interview. For first-time re-engagements identified in these periods, it is uncertain whether the

¹⁵ We confirmed this by re-estimating the hazard model using early school leavers from the the full 10 waves of the 1995 and 1998 cohorts only.

¹⁶ Because we only have 7 waves of data for the 2003 cohort, we do not observe outcomes of individuals still in their first course in wave 7. To be consistent, the outcomes of individuals in the 1995 and 1998 cohorts in their first course in wave 7 are also omitted. In all, this means excluding around 50 individuals from the sample.

non-response means that the course was not completed or the individual completed, but failed to respond.

The standard approach used in this study is to omit from the sample non-responses in the problematic years, which gives an estimated completion rate of 73%. As a test of robustness, we also conduct analysis using two samples with alternative treatments of non-response in the problematic years — ‘high completion sample’ and the ‘low completion sample’. Under the ‘high completion sample’ all the non-responses in the problematic years of the survey are treated as completions and in the ‘low completion sample’, all of the non-responses in problematic years are treated as non-completions. Using the ‘high completion sample’, the completion rate is 79% and using the ‘low completion sample’, the completion rate is 56% (see Table B.1 in Appendix B). Assuming that non-response in periods outside of the problematic years is random, model results under the low and high completion samples give an upper and lower bound on the possible impacts from non-response bias in these problematic years. Unless otherwise stated, the analysis of completion is based on the ‘standard sample’.

Table 8: Data on completion of first re-engagement for the standard sample

	1995 cohort	1998 cohort	2003 cohort	Total
	%	%	%	%
Outcome observed	38	47	63	48
Did not complete	9	10	20	12
Completed	29	37	43	36
Course Outcome not observed	62	53	37	52
Attrition	15	19	24	19
Non-response	48	33	13	33
Count	1,917	1,607	1,377	4,901

Note: This table does not include the 50 individuals who were omitted because they were still enrolled in their first course in wave 7. Source: LSAY 1995, 1998 and 2003 cohorts, waves 1-7.

From the descriptive statistics using the standard sample (Table 9), those who return to study through an apprenticeship or traineeship appear more likely than others to discontinue their course. Compared to estimates by Ball and John (2005) based on administrative data from the National Centre for Vocational Education Research (NCVER), the estimated completion rates for apprentices and trainees presented using the standard sample (Table 9) are high. For example, Bull and John (2005) estimate that for those whose highest year of schooling is Year 10, the completion rate is around 50%. A possible explanation for the higher completion rates estimated in this report is that apprentices and trainees who change employers, but continue their training, are not treated as non-completers.

From Table 9, there appears to be no clear relationship between the timing of re-engagement and the likelihood of completion. However, from descriptive statistics we cannot conclude that the timing of re-engagement doesn't affect the chances of completion because there are several other factors that are likely to affect the chances of completion that are correlated with time, especially employment outcomes. The relationship will be more rigorously tested later in this report using multivariate analysis.

Table 9: Completion rates of first re-engagement for the standard sample

	%
<i>Type of first re-engagement</i>	
Returned to secondary school	69
Continued secondary education at a VET institute	84
VET as part of an apprenticeship	65
VET as part of a traineeship	66
Other study ^a	79
Count(N)	2 348
<i>Timing of first re-engagement</i>	
<3months	75
3-6months	70
6-12months	70
1-2years	74
2-3years	69
More than 3 years	69
Total	74
Count(N) ^b	2,154

^aOf all enrollments, 94% of enrolments are VET qualifications – certificates I-IV, Diploma or Advanced Diploma, the remainder are bachelor degrees. ^bThe smaller sample size is because there are a number of individuals for whom we identify the path of their first re-engagement, but not the timing. Source: LSAY 1995, 1998 and 2003 cohorts, waves 1-7.

3. Modelling strategy

To examine the patterns of qualification acquisition of early school leavers, we estimate both models of re-engagement and models of course completion.

3.1 Model for re-engaging in education

The hazard function in Figure 1 demonstrates that the chances of re-engaging for early school leavers, given that they are yet to re-engage, initially increases and then declines over time. However, this hazard function is naïve, in that it fits the data without explaining how the declining pattern of re-engagement is related to observed individual and environmental factors. In this paper, we estimate an econometric model, known as a duration model, which maps the hazard function (dependent variable) to a set of observable factors. Because LSAY contains information on the month that individuals left school and the month that they re-engaged, we can identify the

time in months to re-engagement, and hence the dependent variable (time to first re-engagement, given no prior re-engagement) can be treated as a continuous variable.

The advantage of a duration model over a static model where re-engagement is treated as a binary outcome in each year (re-engage or not) is twofold:

- 1) It does not rely on the assumption that the time to an event (conditional on the set of covariates we are controlling for) follows a normal distribution, which is a highly restrictive (and very often not reasonable) assumption (Cleves, Gould and Gutierrez 2008).
- 2) Survival analysis allows for separating the effect of duration dependence (i.e. how the hazard varies with survival times) from the effect of the inter-temporal change in the covariates.

In estimating a duration model, there are a number of different functional forms that may be used to fit the data. We estimated a number of parametric (Weibull, log-normal, log-logistic) and semi-parametric (Cox proportional hazard, piecewise-constant) models.¹⁷ Overall, we find that the estimated model coefficients are highly robust to the choice of model functional form, with only minor differences across the models. Because of the non-monotonic nature of the hazard function (Figure 1), we choose to present results of the log-normal model. We choose flexible parametric model over a semi-parametric model because given the relatively small number of observations, a parametric model is easier to fit. The log-normal model includes controls for time invariant unobservable characteristics that may affect the chances of re-engaging, for example, intelligence. It is assumed that this unobserved element follows a Gamma distribution and that it is uncorrelated with the other explanatory variables. Results for the Cox proportional hazard model and for the Piecewise-constant model with heterogeneity and two time segments are presented in Appendix C.

3.2 Models for Completion

The econometric procedure employed to investigate completion of first post-school course is relatively simple as no dynamic element needs to be taken into consideration. Once the individual has decided to re-engage, in fact, the probability she/he will complete the course can be studied as a function of the characteristics of the person at the time in which she/he completes the course or not. The decision to avoid modelling completion rates within a survival analysis framework is related to the nature of the possible re-engagement choices. The spectrum of feasible options

¹⁷ A piecewise-constant model is an exponential hazard rate model where the constant rate is allowed to vary within pre-defined time-segments (see Jesper B. Sorensen's accompanying material for STATA command `stpiece`). Results were generated under a range of time segments and time segment durations.

faced by an individual willing to re-enrol in education is in fact extremely large. As a result, the duration of the education spell is not informative *per se* as it directly depends on type of path chosen for re-entering in education. Explicitly modelling the length of spell within our econometric strategy would have led to misleading coefficients. Hence, a static approach has been preferred. In particular, having defined the individual completion outcome as a dichotomous variable which takes value 1 in case the individual successfully completes the course and 0 otherwise, we run a probit regression to study the relation between completion and the set of included explanatory variables. This procedure is undertaken for the three completion samples.

3.3 Specifying the models

The variables included in the re-engagement model are also included in the completion model because we assume that the factors that affect the chances of re-engaging are the same as the factors that affect the chances of completion. As well as the variables from the re-engagement model, the completion model also includes variables on the characteristics of the first re-engagement, in particular, the timing and course type. Below is a discussion on the use and derivation of the key variables included in the re-engagement and completion models.

The models estimated in this report are reduced-form in that they do not explicitly model course supply and course demand, but just the realisation of the two. That said, because the education pathways open to early school leavers are highly accessible, we assume that most of the variation in re-engagement among early school leavers is due to differences in demand-side factors, in particular, by differences in human capital motivations (Becker 1962).¹⁸ Under the human capital model, an individual decides to undertake further education or training (or to complete a course if enrolled) if the expected discounted future utility of doing so outweighs the cost, where the expected future benefits may include finding a job, finding a more satisfying job, higher wages and the (dis)utility of study itself. Costs of studying are likely to depend mainly on the opportunity cost of time, or the value of time foregone to undertake study, and tuition fees and non-tuition costs, such as equipment and transport. The opportunity cost of time is likely to vary according to individual circumstances, which affects what individuals have to give up.

When deciding upon which factors to include in the models to represent the costs and benefits of further study, we also have to take into account the number of missing observations that the variable has and how it may impact on the sample size and robustness of results if it is included.

¹⁸ Course availability is not fixed, but set according to projected course demand. Unlike Higher Education, VET courses cater for all educational backgrounds. As part of the Australian government's Compact with Youth initiative, a government-funded place in education or training is guaranteed for all 15-24 year olds.

For instance, some variables may have considerable missing observations because information was only collected in some of the cohorts, such as parents' educational aspirations, or because of high numbers of non-response, for example, income earned from employment that could have been used to generate wage rates (a measure of the opportunity cost of time).

This report adds to the findings of a previous study by Black, Polidano and Tseng (2010) by examining not only how post-school outcomes affect the chances of completing further study, but also how school experiences affect the chances as well. From a policy perspective, an important question is whether participation in VET in schools programs encourages those who leave school early to obtain post-school qualifications? We identify participation in two types of VET in school courses, those that involve courses associated with an apprenticeship or traineeship and those that are not. While those who undertake VET in schools as part of an apprenticeship or traineeship may have already decided on a post-school career path that involves further study, those who take courses unrelated to an apprenticeship or traineeship may be tasting different types of vocational courses to decide upon an appropriate career and whether to pursue post-school study and if so, which course.

An important school factor that determines the effort and cost of re-engaging for early school leavers is school-aged academic achievement. All else being equal, the net benefits of further study should be greater for higher achieving early school leavers. In this study we proxy academic achievement by combining each individual's Year 9 numeracy and reading scores. The scores in each cohort are measured on different scales and to make them comparable, we divide the combined numeracy and reading scores of all Year 9 students in each cohort into quintiles. Therefore, by construction, an early school leaver who is in the bottom quintile in numeracy and reading is in the bottom quintile for *all* Year 9 students in their cohort, not just in the bottom quintile for early school leavers. Alternative treatments of numeracy and reading scores were trialed, including percentiles of combined numeracy and reading scores and separate percentile scores for numeracy and reading. The former alternative made no difference and the latter alternative lead to problems with multi-collinearity. As well as including information on numeracy and reading, we also include information on the highest year of secondary school education attained.

The perceived benefits of acquiring post-school qualifications are likely to depend on having a well established career plan. Given that early school leavers are forced to make career choices from a young age, it is likely that many may not be well-placed to make good decisions. When faced with uncertainty about a suitable career path, many may delay their decision until they have

a better idea on what path to follow, which may or may not involve further study. Alternatively, those who leave school with a clear idea of what they'd like to do longer-term may be more motivated to re-engage and complete further study. To capture the effect that having a career plan can have on acquisition of post-school qualifications, we include information on the reasons for leaving school. Due to the small number of responses, information on the reasons for leaving school early (see Table 3) is grouped into the following categories: Employment (to get an apprenticeship, already had an apprenticeship and wanted to earn money), Problems at school/not doing well (not doing well at school, didn't like school), School didn't offer training/courses (school didn't offer what you wanted to do, wanted to do training not available at school), Teachers told you to leave, Financial reasons and Other (having Year 12 wouldn't help you get a job, don't need Year 12 to go onto further study, other).

Related to non-cognitive skills, we test whether an individual's attitude to education while in school affects the chances of re-engagement. Early school leavers who may have poor attitudes to education while in school may also not be able to properly evaluate the benefits of further study after leaving school or not apply the required effort to complete. Student attitudes to education are individual average responses to a series of statements on teachers, education in general and the school environment asked in Year 9. For each statement, individuals are asked to report the degree to which they agree with the statement (where 1 is totally disagree and 4 is totally agree). Before deriving the average scale, the responses to negatively worded statements were recoded to ensure that the resulting index is positively coded. Initially, we performed a factor analysis to derive 3 factors that were loaded according to their broad classification (attitude to teachers, education in general and the school environment). However, none of the scores were individually significant in the model and were combined for the sake of parsimony.

A key finding from Black, Polidano and Tseng (2010) is that early employment outcomes of early school leavers are important to their chances of completing further study, which maybe because time in work helps early school leavers develop the confidence and career path needed to return to study. We include many of the same employment variables, such as labour market status and job satisfaction, measured as whether the job is one that they would like as a career. Consistent with the notion that finding a career path is important to the chances of re-engaging, we expect that those who find a job that they would like as a career are more likely to re-engage. However, it is unclear whether working in a career job will have a positive or negative effect on completion. On the one hand, assuming that those working in a career job are more likely to be taking a course that is relevant to their job, they may be more likely to complete because of greater employer support. On the other hand, if they are already working in a career job, the incentive to complete

may be diminished if ongoing employment in the job is not linked to course completion. Also included is a measure of the regional unemployment rate, which is either the relevant capital city rate if the individual lives in a capital city or the relevant rate for the remainder of the state if they do not. Data is from the ABS (2011) and is the average annual regional rate for the preceding year (from the time of interview). To try and avoid reverse causation, where re-engaging affects labour market outcomes, all employment variables (except for regional unemployment, which is already an historical variable) are lagged by one year.

A limitation of LSAY is that we do not have information on parents' income. To measure family socio-economic status (SES), we used parents' highest education. The variables were entered in both models one at a time and both together and a variable that was the higher of the two. However, we found consistently that only mother's education had an impact on the chances of re-engaging and the other measures were omitted.

Also related to the benefits and costs of completion are the types of courses enrolled in, which are taken from the time in which first re-engagement is observed. The extent to which benefits and costs of completing change in the years out from school is an important empirical and policy question. Black, Polidano and Tseng (2010) found that the rates of completion were higher among those who delayed re-engaging to after the first year out. However, the study was based on a small number of observations and did no control for other factors, such as type of course enrolled in, that may be correlated with the timing of re-engagement. In particular, those who re-engage straight after school are more likely to be in an apprenticeship or traineeship, than those who delay their re-engagement beyond the first year (see Table 6).

In this study, we enter time since left school as a three category variable: re-engaged in education within a month, re-engaged between 1 and 6 months and re-engaged after 6 months. The choice of this treatment is based on the main patterns of re-engaging. Those who re-engage within a month have disrupted their academic year at school to commence post-secondary study. Those who re-engage between 1 and 6 months have mostly ended their academic year at school and have decided to go on to further study. Finally, those who re-engage after 6 months have taken some time out of study, perhaps to work, travel or generally contemplate their future. A range of alternative treatments of time to re-engagement were trialed, but they did not affect the results.

4. Model results

4.1 Re-engagement

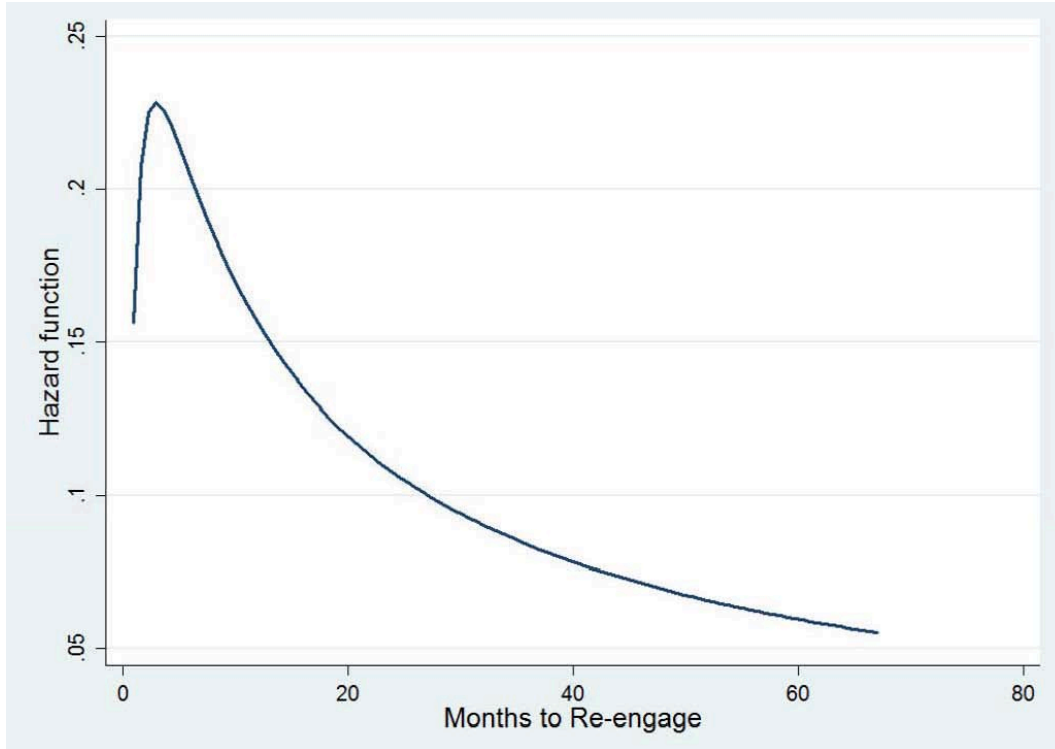
An important motivation of this report was to examine the effect of duration dependence or the effect that time out from school has on the chances of re-engaging in education. The presence of duration dependence matters because it affects the optimal timing of measures to encourage re-engagement. For example, the presence of negative duration dependence — the chances of re-engaging for the first time fall with the time out from school — suggests that governments should intervene early to return early school leavers back to education. The hazard function presented in Figure 1 suggests that duration dependence is positive up to around 2 years out from school, after which it becomes negative. However, the hazard model in Figure 1 is a naïve estimate of duration dependence because it does not control for other factors, such as employment outcomes that may be correlated both with time out from school and with the chances of re-engaging.

To estimate ‘real’ duration dependence, we use results from the log-normal duration model of re-engagement to plot a hazard function for an early school leaver up to 7 years after leaving school with all other characteristics held constant at sample average levels (Figure 2). Plotting a hazard function in this way allows us to examine the effect of time on the chances of first re-engagement separate from the effect that other factors may simultaneously have on both time and the chances of re-engagement. From Figure 2, we can conclude that there is evidence of positive duration dependence up until 4 months out from school, possibly reflecting the delay in re-engagement associated with waiting till the next academic year to commence study. Consistent with findings from Black, Polidano and Tseng 2010, we find evidence of negative duration dependence after 4 months, which suggests policies aimed at engaging youth early may be most effective in ensuring early school leavers re-engage in education. The negative duration dependence may be related to the expectation that as time passes early school leavers will become financially independent.

To examine the effects of other factors on the chances of re-engagement, we present estimated time ratios and t-statistics from the log-normal duration model of re-engagement (Table 10). A time ratio can be defined as the proportional change in the expected time-to-failure for a one unit change in an explanatory variable, keeping all other factors constant. Time ratios are commonly used in the medical literature to estimate the effect of a treatment on the time-to-failure (death) of patients after a treatment. A time ratio greater (less) than one means that receiving a treatment is expected to delay (bring forward) time-to-failure relative to receiving a control; in simple terms, the treatment improves the life expectancy of patients. Another way of thinking about it, is that

the hazard function (or chances) of death in the years after treatment is lower for the treated than for the control group.¹⁹

Figure 2: Predicted hazard function of re-engagement for an average early school leaver up to 7 years after leaving school



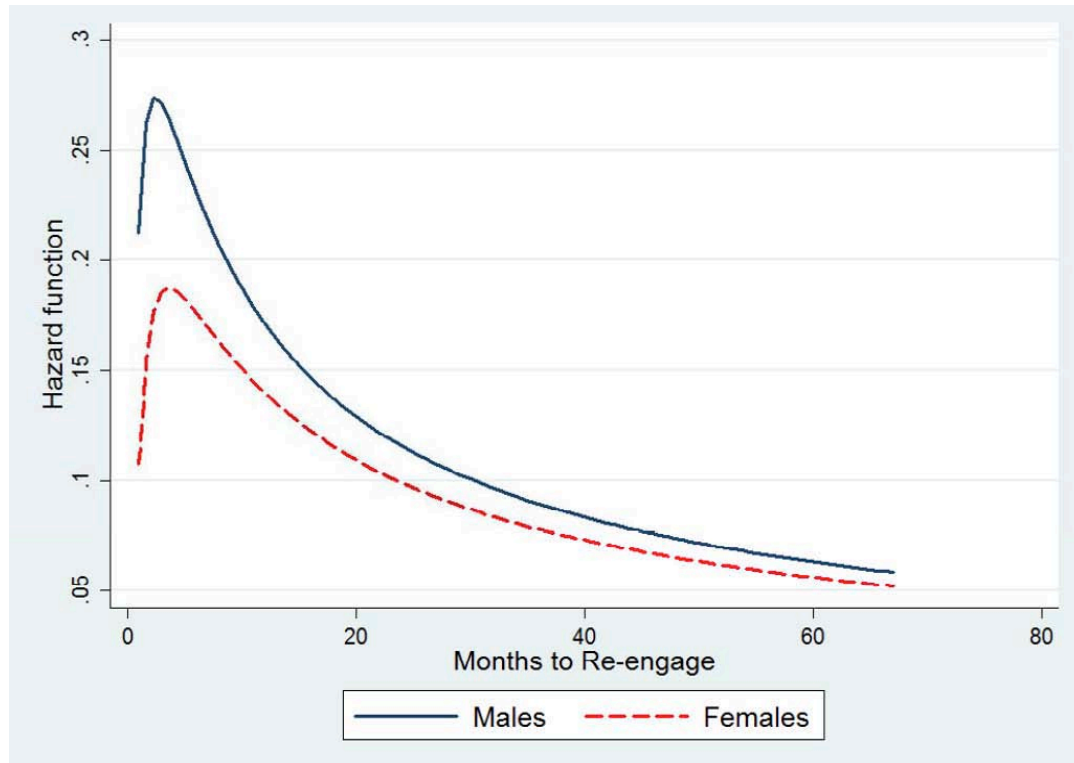
Source: predicted from the log-normal duration model for an individual with average characteristics.

In the context of this study, time-to-failure is the time to first re-engagement, therefore, the time ratios can be defined as the proportional change in the time to first re-engagement for a one unit change in an explanatory variable. For explanatory variables that take on only a fixed number of values (categorical variables), the time ratio is the proportional change in the time to first re-engagement if the variable takes on a certain value, relative to if it was at a reference category. In Table 10, the reference category for categorical variables with two categories (e.g. gender), is all others that are not in the listed category (e.g. male). For categorical variables that have more than two categories, the first category is the reference category (and is marked by 'ref. case'). To demonstrate, consider the time ratios for 'All ESL' in Table 10. The estimated time ratio for females is 1.464, which means that on average the time to re-engagement is 46% later for females than for males, all else being equal. In terms of the hazard rate of re-engagement, this means that the chances of re-engaging in the years after leaving school are higher for males than for females, as depicted in Figure 3. Similarly, the time ratio of 0.88 means that on average people from

¹⁹ Because death is inevitable, over time the hazard functions between the treatment and control groups will converge.

Western Australia re-engage 12% earlier than people from New South Wales, which implies that the chances of re-engaging for the first time are higher for people in Western Australia than for people in New South Wales.

Figure 3: Predicted hazard function of re-engagement of early school leavers by gender up to 7 years after leaving school



Source: predicted from the log-normal duration model for a male and female with otherwise average characteristics.

We report a t-statistic next to each time ratio in Table 10. A t-statistic indicates the precision of the estimate and can be interpreted as a test of the confidence with which we can state that a time ratio is different from one (in which case the variable has no effect on the probability of re-engaging). The higher the absolute value of the t-statistic, the more confident we are that the real time ratio is different from one. We use asterisks to depict significance at 10%, 5% and 1%, with the greater the number of asterisk, the greater the certainty that real time ratio is different from one. Estimates without an asterisk are not significant, which means that there is insufficient evidence to conclude whether the real time ratio is different from one.²⁰

²⁰ The reported t-statistics are based on the original, not exponentiated, coefficients. This means that they can take on negative values when the time ratios are between 0 and 1. The t-statistics associated with the original coefficients are asymptotically equivalent to t-statistics for exponentiated coefficients, but the former are to be preferred as they tend to perform better with respect to small sample efficiency properties.

Table 10: Results for the log-normal re-engagement duration model

	All		Males		Females	
	Time ratio	t-stat	Time ratio	t-stat	Time ratio	t-stat
<i>Socio-economic and demographic factors</i>						
Female	1.464***	4.00
Dependent children	1.174	1.38	1.167	1.23	0.991	-0.06
Female × Children	0.832*	-1.66
Mother's highest qualification (ref. case: less than Year 11)						
Year 11 or 12	0.851**	-2.12	0.892	-1.21	0.866	-1.25
Completed secondary school	0.807***	-2.64	0.899	-1.08	0.796*	-1.78
VET qualification	0.801**	-2.36	0.798*	-2.04	0.941	-0.40
Higher education	0.787***	-2.85	0.928	-0.71	0.699*	-2.81
Unknown	0.894	-0.91	0.973	-0.19	0.781	-1.19
Living with Parents	0.880	-1.50	0.810*	-1.72	0.929	-0.66
State of residence (ref. case: NSW)						
Victoria	1.007	0.09	0.884	-1.24	1.206	1.45
Queensland	1.106	1.07	0.853	-1.39	1.400*	2.37
South Australia	1.095	0.94	1.059	0.5	1.152	0.92
West Australia	0.880	-1.37	0.752*	-2.36	0.949	-0.39
Tasmania	0.961	-0.36	0.928	-0.58	1.038	0.23
ACT	1.270	1.39	1.157	0.68	1.315	1.04
North Territory	1.105	0.61	0.912	-0.46	1.351	1.18
Type of residential area (ref. case: metropolitan)						
Regional	0.967	-0.50	0.981	-0.24	1.002	0.00
Rural	0.924	-0.97	0.968	-0.33	0.898	-0.86
Aboriginal or Torres Straight Islander	0.914	-0.80	1.049	0.32	0.778	-1.59
English as first language	1.088	0.63	1.119	0.73	1.116	0.49
<i>School factors</i>						
Main reason for leaving school (ref. case: employment ^a)						
Problems at school/Not doing well at school	1.313***	3.73	1.323*	2.99	1.19	1.59
School didn't offer training/courses	1.264***	2.69	1.226	1.64	1.20	1.50
Teachers told you to leave	0.851**	-1.99	0.988	-0.12	0.738*	-2.41
Financial reasons	1.255*	1.66	1.269	1.58	1.164	0.63
Other	1.369**	2.22	1.075	0.44	2.100*	3.39
Year 9 numeracy and reading score (ref. case: lowest quintile)						
2nd quintile	1.019	0.27	1.005	0.06	0.975	-0.24
3rd quintile	1.023	0.31	1.192*	2.02	0.858	-1.32
4th quintile	0.949	-0.57	1.018	0.17	0.82	-1.36
Highest quintile	0.981	-0.17	0.909	-0.68	1.009	0.05
Year left school (ref. case: Years 9 or 10)						
Year 11	1.117	1.57	0.956	-0.53	1.320*	2.53
Year 12	1.391***	2.84	1.517*	2.77	1.404*	1.97

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Table 10 cont.

	All		Males		Females	
	Time ratio	t-stat	Time ratio	t-stat	Time ratio	t-stat
Positive attitude toward education (1-4)	0.986	-0.22	0.950	-0.67	1.033	0.33
Intention to complete school (reported in Year 9)	1.029	0.50	1.067	0.97	0.944	-0.64
VET in Year 11 or 12 (ref. case: none)						
VET not part of an apprenticeship/traineeship	0.956	-0.58	1.066	0.68	0.879	-1.02
VET part of an apprenticeship/traineeship	0.751*	-1.92	0.879	-0.77	0.713	-1.29
Type of school attended (ref. case: Government)						
Catholic School	0.925	-1.02	0.825*	-2.15	1.082	0.64
Independent School	1.005	0.05	1.021	0.19	1.00	0.00
<i>Employment factors</i>						
Regional unemployment rate (%)	0.964	-1.34	0.997	-0.1	0.918*	-1.97
Lagged employment status (ref. case: unemployed)						
Not in the Labour Force	0.753**	-3.62	0.709*	-3.51	0.813*	-1.74
Ongoing Part-time	0.786*	-1.75	0.683*	-2.24	0.929	-0.35
Ongoing Full-time	0.841	-1.48	0.745*	-2.08	1.036	0.19
Casual Part-time	0.710**	-3.42	0.651*	-3.32	0.843	-1.14
Casual Full-time	1.112	0.8	1.083	0.52	1.049	0.21
Lagged attitudes to work (ref. case: employed in a career job)						
Not employed in a career job	1.334**	3.49	1.321*	2.66	1.278*	1.99
Uncertain whether it is a career job	1.510**	2.24	1.418	1.49	1.639*	1.8
<i>Other factors</i>						
LSAY cohort (ref. case: 1995)						
LSAY 1998 cohort	1.283**	2.67	1.369*	2.64	1.066	0.45
LSAY 2003 cohort	1.253	1.43	1.402*	1.75	1.039	0.16
σ^b	0.915		0.758		0.972	
Log likelihood	-2640.7		-1402.3		-1201.6	
χ^2c	183.5		102.8		104.1	
Observations	3257		1712		1545	

^aIncludes those who report leaving school to start an apprenticeship or traineeship or to find work and those who report leaving to look for employment or an apprenticeship. ^bIs an ancillary parameter that affects the shape of the log-normal survival function. ^cChi-squared statistic for the log-likelihood ratio test for the presence of unobserved heterogeneity. These values suggest that for each model, unobserved heterogeneity is significantly different from zero. ***Significant at 1%, **significant at 5%, significant at 10%.

The χ^2 values at the bottom of Table 10 are results from the log-likelihood ratio test for the presence of unobserved heterogeneity. For each of the models, the values suggest that unobserved heterogeneity is significantly different from zero, which underlines the importance of controlling for these factors when examining patterns of re-engagement of early school leavers.

Socio-economic and demographic factors

For early school leavers who are yet to re-engage, the chances of doing so in the following periods are lower for females than for males, as evidenced by the time ratio for females being

significant and greater than 1. The lower rate of re-engagement among female early school leavers is likely to be because of lower rates of participation in apprenticeships. However, the results suggest that mothers are more likely to re-engage than fathers after dropping out of school; in particular, we estimate that mothers on average re-engage 17% earlier than fathers. An interpretation of this result is that fathers are less likely to re-engage because, as the financial provider, they have a higher opportunity cost of studying.

Socio-economic status, as measured by mother's highest education attainment is estimated to not only affect the chances of school completion (Marks and McMillan 2001), but also the chances of re-engaging in post-school education.²¹ In particular, the chances of re-engaging are greater for early school leavers whose mothers completed at least some senior secondary school education (Year 11 or Year 12) relative to those who did not. Youth whose mothers went on to complete school or post-school qualifications are just as likely to re-engage as those whose mother completed some senior school education. Lower re-engagement rates among low SES may be due lower parental educational aspirations for their children.

Besides setting expectations, parents, especially parents of males, can potentially play an important role in helping early school leavers return to study by providing them with a supportive place to live. We estimate that male early school leavers who are still living at home re-engage on average at 19% earlier than males who live away from home. Males may benefit from extra support and guidance because evidence points to young males having lower stocks of non-cognitive skills (Jacob 2002).

School factors

An important contribution of this report over the previous report by Black, Polidano and Tseng (2010), is that we are able to examine not only how post-school outcomes affect the chances of re-engaging early school leavers, but also how the chances of re-engagement are shaped by forces while in school. Understanding the role of such forces is important to help schools better prepare students intent on leaving.

Results from Table 10 suggest that reasons for leaving school are important in explaining the chances for re-engaging in education. Early school leavers who report leaving school mainly for employment reasons (around half) are much more likely to re-engage than those who report leaving for reasons unrelated to furthering study. For example, for those who are yet to re-engage, those who leave school for employment reasons are estimated on average to re-engage 31%

²¹ Education and occupation categories of both parents were trialed in the model, but only mother's education was significant.

earlier than those who leave school because they either had a problem with school or were not doing well at school. This result suggests that because they know what they want to do longer-term, the perceived benefits and motivation for further study are greater for students who have a career plan than for those who do not have a plan. An alternative explanation is that those who report leaving for employment reasons are leaving school to start an apprenticeship or traineeship, which is associated with further education. We tested this alternative explanation by re-running the re-engagement models on a sample *without* those who re-engaged in traineeships or apprenticeships and found much the same results, which does not support this alternative hypothesis.²²

Differences in the ability of individuals to set plans may be related to their stock of non-cognitive skills (Carneiro and Heckman 2003; Heckman, Lochner and Todd 2006). Under social cognitive model of self-directed motivation, self-esteem (or perceived self-efficacy) is important to the establishment of challenging goals that drives self-regulated motivation (Zimmerman 1989). Using data from wave 2 of the 1998 LSAY cohort, it is shown (Table 11) that on average those who leave school because they want to find employment or continue studying are statistically more confident, agreeable, calm and hardworking than those who leave for other reasons.²³

Table 11: Average personality traits of early school leavers by reason for leaving school, LSAY 1995 cohort

	Reason for leaving school early		
	Employment or study reasons	Other	Difference
Confidence	3.255	3.119	0.136***
Agreeableness	3.208	3.140	0.068**
Openness	3.376	3.343	0.033
Calmness	3.168	3.017	0.151***
Hardworking	3.573	3.492	0.081**
Outgoing	3.373	3.362	0.011
Count (N)	1118	790	-

Note: These personality traits are only available in wave 2 of LSAY 1995. The personality scores were derived by asking individuals to report on a scale of 1 to 4 (where 1 is very and 4 is not at all) how they viewed themselves on these 6 traits. The individual scores are reverse coded, so that the higher the score, the more positive their response. The significance of the

²² The magnitude of the hazard ratios was much the same, but with larger standard errors due to the smaller sample size. Results are available upon request from the authors.

²³ If the non-cognitive skills that affect reasons for leaving school also independently affect the chances of re-engagement then reasons for leaving school would be endogenous and the results biased. To test this, we omitted reasons for leaving school and re-estimated the model. Results, available upon request from the authors, were almost identical to those presented in the report, which suggests that there is no strong evidence of bias and that the main channel for non-cognitive skills to affect re-engagement is through reasons for leaving school.

difference in the average traits between the two categories of early school leavers is derived using a t-test. ***Significant at 1%, **significant at 5%, significant at 10%.

Also consistent with the importance of non-cognitive skills, we find that male early school leavers from Catholic schools are more likely to re-engage than their male Government school counterparts. Coleman and Hoffer (1983) proposed that the high performance of Catholic schools relative to public schools in the United States is because they do a better job at developing non-cognitive skills in student, which was confirmed in a paper by Peterson and Viarengo (2009).

We find no evidence that a positive attitude to education while at school has any affect on their chances of re-engaging in post-school education. Neither do we find any difference in the rates of re-engagement between early school leavers who did and did not intend completing school when in Year 9. This finding suggests that attitudes to education formed while at school may not translate into attitudes to post-school education.

Despite evidence presented in Table 5 that early school leavers have relatively low numeracy and reading skills compared to those who complete, we find no evidence that it affects their chances of re-engaging in education under a range of different model specifications – both numeracy and reading scores entered in the model, scores entered as percentiles and excluding all other variables from the model (to test for the presence of multicollinearity). Assuming that Year 9 numeracy and reading scores are a good measure of numeracy and reading levels at the time of exit from school, the insignificant impacts on post-school re-engagement reflects the highly accessible nature of post school education pathways, particularly VET. VET is available in a wide range of course levels from certificate level I, which is typically considered to be less than Year 12 equivalent, to Advanced Diploma qualifications that are close to Bachelor qualifications. Generally speaking, there are no minimum academic requirements for lower level VET courses (certificates I-IV).

We find that the likelihood of re-engagement decreases with years of schooling. For example, we estimate that on average those who leave school in Year 9 or Year 10 re-engage in education 39% earlier than those who leave in Year 12. A likely explanation is that early school leavers substitute time in school for time in tertiary study.

Evidence that participation in VET in schools programs improves the engagement in post-school education and training of early school leavers is mixed. We find that undertaking VET subjects taken as part of an apprenticeship or traineeship while in senior school (Year 11 and Year 12) does improve the chances of re-engaging in post-school education, but we find no impact for those who undertake VET subject that are not associated with an apprenticeship or traineeship. Early school leavers who undertook VET subjects as part of an apprenticeship or traineeship are estimated to re-engage 25% earlier than early school leavers who undertook no VET in schools.

From sensitivity analysis, we find no evidence that the insignificant effect of undertaking a VET subject that is not part of an apprenticeship or traineeship is confounded with the effect for reason for leaving school.²⁴ Further, we find no evidence that the effects of VET in school varies by state. These results are consistent with the findings of an NCVET report (Anlezark, Karmel and Ong 2006), which found no difference in post-school participation between early school leavers who undertook VET courses in senior school and early school leavers who left before senior school. A possible reason why VET in schools may not open up post-school education pathways for early school leavers is because it's offered too late.²⁵ From the data used in this study, around 30% of early school leavers dropout of school before reaching senior school (Table 3) and for those who reach senior school, experiences in VET may be too late to affect their career choices. A recent NCVET study found that undertaking VET subjects in senior school had little affect on reported career plans because by senior school, student career plans are fairly stable (Nguyen 2010).

Employment outcomes

Overall, our results suggest that employer sponsored education and training may not be an important path back into study for early school leavers. Those in ongoing full-time employment are just as likely to re-engage as those out of work and looking for employment (unemployed) and are less likely to re-engage than those out of work who are not looking (not in the labour force). That said, there is evidence that the importance of employer support for education and training may differ by gender with males in ongoing employment estimated to be more likely to re-engage than those unemployed. Whether the differing effect by gender is due to differences in employer readiness to support male and female employees in further education and training or due to differences in the types of jobs performed is not tested in this paper.

Regardless of the type of contract and the hours of employment, we find that the chances of re-engaging early school leavers are positively linked with finding a job that meets their career aspirations. On average, those who report finding a job that they would like as a career are estimated to re-engage 33% earlier than those who work in a job that they do not want as a career and 55% earlier than those who are unsure whether it is a career job. These results suggest that

²⁴ The relationship would be confounded if by participating in VET programs, students decided to commence an apprenticeship or traineeship after leaving school. In this case, participating in VET programs that are not part of an apprenticeship or traineeship would be correlated with reasons for leaving school. To test this, we re-estimated the model, but excluding the reasons for leaving school variable. Results for this model were much the same as those reported in Table 10.

²⁵ Encouraging participation in post-school education is one of the prime objectives of VET in schools program, as set out in the 'Common and Agreed National Goals for Schooling in the Twenty-first Century', which were endorsed at the April 1998 Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) meeting - www.curriculum.edu.au/verve/_resources/natgoals_file.pdf.

finding a career path is important in helping youth identify the benefits of further study. In particular, finding a career path helps reduce the uncertainty of the benefits of returning to study by enabling youth to choose a course that's in their long-term interest.

Overall, we find that independent of ones own employment status, the likelihood of re-engagement is not significantly linked to the rates of unemployment.²⁶ However, this result masks differences in the effects between males and females. We estimated that for every 1 percentage point increase in the regional unemployment rate, there is a 9% increase in the speed in which females re-engage. This result points to the demand for jobs performed by female early school leavers (clerical, sales and personal assistants) being more sensitive to cyclical trends in labour demand.

4.2 Completion

Results from the completion model using the standard and alternative samples are presented in Table 12. In the main, the discussion below is of results from the standard model. Results generated using alternative samples are presented only to indicate robustness of the results to alternative assumptions about the non-response observations in problematic years of the survey (refer to section 2.3 for a discussion).

Model results in Table 12 are mean marginal effects across all individuals in the sample and are accompanied by t-statistics. Marginal effects represent the estimated percentage point change in the probability of completion for a one unit change in each of the explanatory variables, independent of the effects of all other explanatory variables in the model. For categorical variables, the marginal effects represent the percentage point change in the probability of re-engaging for a given outcome, relative to the reference category that is omitted. As an example, consider the marginal effect of living in a regional area of 0.0677 (standard sample); this can be interpreted as living in a regional area is associated with a 7 percentage point higher likelihood of completion compared to a person living in a metropolitan area, all else being equal. As for the re-engagement model, the t-statistics indicate the precision of the estimate, with the asterisk indicating the level of significance or the degree of confidence that the marginal effect is different from zero (no effect). A point of note is that fewer of the results from the completion model are significant at 10% compared to the results for the re-engagement model in Table 10. In some cases, quite large marginal effects are estimated, but the error surrounding the estimates is too large to conclude that they are statistically different from zero. The main reason for the lack of

²⁶ During the period of the survey, the national unemployment rates in Australia have declined from around 8.2 percent in 1995 to around 5.6 percent in 2009 (ABS 2010b), with considerable regional variation.

precision is the smaller sample size — the sample is restricted to only those observed to re-engage for the first time and has sizeable number of missing observations.

Table 12: Results for the binary probit completion model

	Standard sample		Alternative sample			
	m.e.	t-stat	Low		High	
	m.e.	t-stat	m.e.	t-stat	m.e.	t-stat
<i>Characteristics of first re-engagement</i>						
Timing of re-engagement (ref.: within a month of leaving school)						
1 to 6 months after leaving school	0.058	1.37	0.023	0.52	0.037	1.18
More than 6 months after leaving school	0.082*	1.82	0.004	0.09	0.070**	2.11
Type of re-engagement (ref: Full-time study, VET)						
Part-time study, VET	-0.013	-0.33	-0.050	-1.18	-0.001	-0.03
Apprenticeship	-0.219***	-4.36	-0.429***	-12.21	-0.046	-1.41
Traineeship	-0.150***	-2.90	-0.385***	-10.48	-0.015	-0.46
Return to school	-0.086	-1.33	-0.081	-1.38	-0.095*	-1.79
<i>Socio-economic and demographic factors</i>						
Type of residential area (ref. case: metropolitan)						
Regional	0.067*	1.93	0.005	0.15	0.063**	2.47
Rural	0.094**	2.37	0.000	0.01	0.091**	3.40
Living with Parents	0.050	1.21	-0.004	-0.11	0.057*	1.70
Female	0.015	0.32	-0.009	-0.15	0.031	0.83
Dependent children	-0.049	-0.92	-0.111*	-1.80	-0.008	-0.18
Female × Children	-0.052	-0.94	0.013	0.21	-0.074*	-1.75
Mother's highest qualification (ref. case: less than Year 11)						
Year 11 or 12	-0.016	-0.40	-0.012	-0.30	-0.012	-0.40
Completed secondary school	0.066*	1.79	0.044	1.03	0.052*	1.91
VET qualification	-0.009	-0.20	0.011	0.22	-0.019	-0.51
Higher education	-0.006	-0.15	-0.001	-0.17	-0.019	-0.56
Unknown	0.023	0.42	0.056	0.91	0.005	0.12
State of residence (ref. case: NSW)						
Victoria	0.063*	1.71	0.012	0.29	0.059**	2.22
Queensland	-0.004	-0.09	-0.07	-1.42	0.022	0.71
South Australia	0.111***	2.82	0.067	1.33	0.081**	2.81
West Australia	0.043	0.96	0.013	0.26	0.036	1.07
Tasmania	0.160***	4.44	0.094	1.61	0.132**	5.71
ACT	-0.070	-0.77	-0.141	-1.54	-0.043	-0.63
Northern Territory	-0.181*	-1.85	-0.146*	-1.65	-0.171*	-1.96
Aboriginal or Torres Strait Islander	-0.095	-1.63	-0.058	-0.98	-0.096*	-1.91
Born in Australia	-0.055	-0.83	-0.057	-0.85	-0.047	-0.91
Australian born father	-0.020	-0.54	-0.012	-0.33	-0.014	-0.51
Australian born mother	-0.035	-0.88	-0.033	-0.82	-0.034	-1.12

Continued over page

Table 12 cont.

<i>School factors</i>						
Main reason for leaving school (ref. case: employment ^a)						
Problems at school/Not doing well at school	-0.038	-0.96	-0.086**	-2.15	-0.005	-0.18
School didn't offer training/courses	-0.026	-0.60	-0.066	-1.49	-0.013	-0.39
Teachers told you to leave	-0.051	-0.67	-0.076	-1.08	-0.019	-0.36
Financial reasons	-0.094	-1.29	-0.051	-0.72	-0.057	-1.00
Other	-0.111**	-2.18	-0.095*	-1.96	-0.074*	-1.89
Intention to complete school (reported in Year 9)	-0.075***	-2.60	-0.055*	-1.83	-0.056***	-2.58
Positive attitude toward education (1-4)	0.073**	2.40	0.047	1.49	0.058**	2.50
Year 9 numeracy and reading score (ref. case: lowest quintile)						
2nd quintile	0.034	1.00	0.008	0.22	0.016	0.62
3rd quintile	0.024	0.66	0.055	1.40	0.000	0.02
4th quintile	-0.068	-1.31	-0.109**	-2.18	-0.029	-0.78
Highest quintile	0.008	0.15	-0.017	-0.29	-0.002	-0.05
Year left school (ref. case: Years 9 or 10)						
Year 11	0.014	0.42	-0.133***	-3.84	0.0652**	2.46
Year 12 or 13	-0.073	-1.08	-0.200***	-3.33	0.0139	0.33
VET in Year 11 or 12 (ref. case: none)						
VET not part of an apprenticeship/traineeship	0.057	1.45	-0.004	-0.10	0.058**	2.09
VET part of an apprenticeship/traineeship	0.125**	2.12	0.057	0.68	0.105***	2.78
Type of school attended (ref. case: Government)						
Catholic School	0.013	0.36	0.056	1.41	-0.001	-0.05
Independent School	0.032	0.68	0.008	0.17	0.027	0.80
<i>Employment factors (last year of study)</i>						
Regional unemployment rate (%)	-0.036**	-2.40	-0.011	-0.76	-0.036***	-3.25
Employment status (ref. case: not employed)						
Ongoing Part-time	-0.021	-0.32	0.019	0.29	-0.038	-0.73
Ongoing Full-time	0.054	1.20	0.217***	4.85	-0.024	-0.60
Casual Part-time	0.109***	2.72	0.033	0.77	0.085***	3.01
Casual Full-time	-0.039	-0.60	0.049	0.79	-0.043	-0.85
Attitudes to work (ref. case: employed in a career job)						
Not employed in a career job	0.020	0.47	0.024	0.58	0.025	0.83
Uncertain whether it is a career job	-0.036	-0.38	0.014	0.15	-0.070	-0.88
<i>Other factors</i>						
LSAY cohort (ref. case: 1995)						
1998	-0.047	-0.95	0.053	1.21	-0.092**	-2.41
2003	-0.165**	-2.03	0.263***	3.86	-0.327***	-4.45
Log likelihood	-594		-864		-673	
χ^2	121		330		154	
Observations	1134		1500		1500	

^aIncludes those who report leaving school to start an apprenticeship or traineeship or to find work and those who report leaving to look for employment or an apprenticeship. *Significant at 10%, **significant at 5% and ***significant at 1%.

Characteristics of first re-engagement

A key finding from Black, Polidano and Tseng (2010), is that early school leavers who re-engaged in the first year out from school are much less likely to complete their studies. However, it is possible that this estimated relationship is due to the high rate of enrolment in apprenticeships in the early months out from study (Table 6) and not related to the timing of re-engagement. Controlling for the type of course, our results suggest that those who re-engage in the first month out from school are less likely to complete their studies compared to those who delay. A possible explanation is that these individuals are most likely leaving school during the academic year, which means that they may be less prepared for post-school study compared to youth who leave at the end of the academic year.

We find that the post-school education pathway chosen is the most important determinant of first course completion. In particular, we find that else being equal, compared to those who study full-time in a tertiary course and do not work, those who work in an apprenticeship or traineeship are 22 and 15 percentage points less likely to complete respectively. The relatively high dropout rate among apprentices and trainees is consistent across all of the samples, which suggests that the finding is robust to non-response bias. Given that the estimated apprentice completion rates in the sample are high compared to those from the NCVET administrative data, these impacts may be conservative.

Socio-economic and demographic factors

Results from the completion model suggest that early school leavers from regional and rural areas are around 7 and 9 percentage points more likely to complete than those from metropolitan areas. The higher completion rate among rural and regional early school leavers may be because VET providers in these areas cater mainly for specific local training requirements, especially training for agricultural related jobs. Therefore, rural and regional early school leavers may have a better idea of the types of jobs that they will be employed in after they finish their course and hence may better appreciate the benefits of completing.

Socio-economic status, proxied by mother's highest qualification, is estimated to affect the chances of course completion. In particular, having a mother who has completed school is associated with a 7 percentage point higher chance of completion compared to having a mother who left school prior to senior school. The insignificant affect of mothers with post-school qualifications is likely to be related to the small number of observations present.

Although female early school leavers are less likely to re-engage, we find no evidence that those who do return to education complete at a different rate to their male counterparts. Neither do we

find strong evidence that having dependent children affects the chances of completion, possibly because of the small number of observations – those with dependent children less likely to re-engage.

School factors

We find that students who leave school with a career plan, that is, they leave because they have work or because they want to find work, are not just more likely to re-engage, but are also more likely to complete their first course than those who leave for other reasons.²⁷ Of the early school leavers who re-engage, those that have a career plan may be more likely than those without to find a course that matches their longer-term interests and hence have a stronger attachment to their course. As for re-engagement, the ability of individuals to form a career plan may be related to their stock of non-cognitive skills, in particular, to their level of self-esteem. Further underlining the importance of career preparation, we find that early school leavers who in Year 9 planned to leave school early are 8 percentage points more likely to complete than those who planned to complete. Those who planned on leaving early may have had a clearer idea about their future career and were better able to utilise career counseling services to find a course that matched their interests.

Although positive attitudes to education while in school are found to have no effect on the chances of subsequent re-engagement, they are very important in explaining course completion. For every 1 point increase on the 4 point scale, the chance that an early school leaver will complete their first post-school course is estimated to increase by 7 percentage points. At the extremes, we find that those who are at the maximum of 4 are 21 percentage points more likely to complete their course than those at the minimum of 1. The positive attitude scale comprises responses to a number of aspects of education, to work out which ones are most important, we split items in this scale into three using factor analysis — usefulness of education, attitudes to learning and the school environment and attitudes to teachers — and re-estimate the model. We find that having a positive attitude to learning and school dominates and is the only significant factor.²⁸

Not only is Year 9 numeracy and reading scores estimated to have no effect on the chances of re-engagement, they are estimated to have no effect on the chances of completion. This result is robust to a number of alternative specifications, including numeracy and reading scores added

²⁷ This was done by testing the significance of a binary variable coded 1 if left for employment reasons and 0 otherwise. The t-statistic for the estimated marginal effect was significant at 1%..

²⁸ Attitude to learning and school comprises responses (on a scale of 1 to 4, where 1 is strongly disagree and 4 is strongly agree) to questions about “feel happy at school?”, “like learning?”, “like being at school?”, “learning is fun?”, “feel safe and secure at school?”.

independently as percentiles and added as a percentile composite. We also tested for multicollinearity by running a simple model with only numeracy and reading scores included as explanatory variables and also tested for interaction effects between numeracy and reading scores and the course type. No significant relationships were found. A possible interpretation is that Australian schools are doing well in teaching numeracy and reading, so that even the lowest quintile (and percentile) in Year 9 is still able to participate and complete post-school education, regardless of the fact that they didn't finish school. The strong performance of Australian schools in numeracy and literacy is born out in data from the Program of International Student Assessment (PISA), which has show that Australia consistently performs above the OECD average in both numeracy and literacy (Thomson et al. 2011). An alternative explanation is that poor numeracy and reading is not a serious barrier because post-school education and training options in Australia are available at a number of levels, making the acquisition of post-school qualifications possible for people from all education backgrounds. We do not differentiate between the different types of courses completed. Consistent with the results for numeracy and reading, we find no evidence that those who complete more years of school are better prepared to complete further study.

We find some evidence that participating in VET in school programs improves the rate of completion for early school leavers in their first course. Those who participate in the school apprenticeship and traineeship programs are estimated to be around 13 percentage points more likely to complete than those who do not participate in VET in a schools program. Those who participate in VET in school programs unrelated to an apprenticeship or traineeship are estimated to complete at a 6 percentage point higher rate than those who are not involved in VET in schools, although the estimated effect is not significant at 10%. The high degree of uncertainty around this average effect is likely to be because of the variability of VET in schools programs between schools. The greater estimated effect of the in school apprenticeship and traineeship program may be related to selection. That is, only those who want to complete an apprenticeship or traineeship enroll in this program, whereas youth may take the more general VET in schools program for a range of different reasons, for example, to try a range of different vocational subjects.

Employment outcomes

On the whole, we find that early school leavers who combine work with some part-time casual employment are more likely to complete than those who don't. The positive effect may come about because those who work may have greater financial resources to support their study and lifestyle while studying. However, we note that these estimations do not explicitly control for

the hours of work. In a study on the impacts of combining work and study, Polidano and Zakirova (2011) point out that while working while studying can be a positive experience, there are groups of students who work excessive hours (more than 25% of full-time students working more than 16 hours per week), which significantly impacts upon their chances of completion. We find no evidence that it is an important factor in the chances of completion.

Consistent with expectations, we find that the chances of completion are strongly linked to the unemployment rate. For every 1 percentage point increase in the unemployment rate, the chances of completion are estimated to increase by around 4 percentage points. This result reflects the competition for available jobs. In times when unemployment rates and competition for jobs is relatively high, early school leavers are more likely to remain in study till completion in the hope that labour market conditions improve when they complete.

5. Conclusion

The objective of this study was to add to the literature on the patterns of qualification acquisition of early school leavers up to 7 years out from school. In particular, the aim of this study was to build on the work by Black, Polidano and Tseng (2010) in two important ways. First, by taking advantage of three cohorts of the LSAY database, this study examined the role of school level factors in the acquisition of post-school qualifications of early school leavers. Black, Polidano and Tseng (2010), using the HILDA survey, only examined the role of socio-economic and post-school employment outcomes. Second, using a wider set of control variables available in LSAY and a duration model, we tested in more detail the relationship between time out from school on the chances of re-engagement and course completion. To better examine the relationship between time out from school and the chances of re-engaging, we also adopted a duration model that accounts for differences in unobserved factors (such as motivation) that may be related to the chances of re-engaging.

Overall, results presented in this study support the view that schools can play a crucial role in helping prepare early school leavers for further study. In particular, results suggest that schools can help prepare youth at risk of dropping out by assisting them in developing post-school career paths. The importance of developing career paths is evidenced by the findings that early school leavers who report leaving school for employment reasons are more likely to return and complete post-school study than students who leave for other reasons, for example, because they didn't like school. Also, independent of career plans upon leaving school; those who are successful in finding a job that they would like as a career are estimated to be more likely to re-engage in education. To be successful, evidence suggests that school programs should focus not only on

providing career information, but also on developing non-cognitive skills that are likely to affect career aspirations, especially self-esteem.

One way to help youth at risk develop appropriate career paths is through VET in schools programs. However, evidence presented suggests that while early school leavers who start an apprenticeship or traineeship as part of a VET in schools program are more likely to re-engage and complete, there is no strong evidence that those participating in more general VET in school programs are more likely to re-engage or complete than those who do not participate in VET in schools. A possible explanation is that while apprentice and trainee programs are for those with a clear idea about what they want to do after school, more general programs are designed as ‘taster’ courses for students unsure about their future career path, but their introduction is too late to have an impact. VET in schools programs are not available to at least a third of early school leavers who leave school before commencing Year 11.

While early school leavers are found to have lower numeracy and reading skills than school completers, we find no evidence that poor numeracy and reading skills is a barrier to re-engaging and completing further study. We suggest two possible reasons why this may be the case. First, by international standards Australian students perform well in numeracy and reading (Thomson et al. 2011), so that even those in the lowest quintile (and percentile) in Year 9 are still able to participate and complete post-school education, regardless of the fact that they didn’t finish school. Second, post-school education options for early school leavers in Australia are available at a wide range of levels, making the acquisition of post-school qualifications possible for people from all education backgrounds.

A key result brought to light in this study is that the choice of pathway back into education is the most important factor in explaining the chances of course completion of early school leavers. Of particular concern, given the shortage of tradespeople in Australia, is that early school leavers enrolled in apprenticeships and traineeships are 21 and 15 percentage points less likely to complete their first course than early school leavers enrolled in other forms of tertiary study. Given that apprenticeships and traineeships are a main pathway into further education for early school leavers (over half of first re-engagements), addressing low apprenticeship/traineeship completion rates would go a long way to improving their initial education outcomes. In a qualitative study, Snell and Hart (2008) identified several factors including poor relationships with employers, poor quality training and low wages. However, another possible explanation is that many early school leavers enter apprenticeships or traineeships ill-prepared and simply do so

because these pathways are widely considered as the best option for students not going-on to higher education.

Results presented in this paper support the findings of Black, Polidano and Tseng (2010) on the relationship between time out from school and the chances of re-engaging and completing post-school courses. We find that the chances of re-engaging increase with the time out from school (positive duration dependence) up to around 4 months out, but after that the chances of re-engaging decline rapidly (negative duration dependence). This result suggests that there is a limited window of opportunity to re-engage early school leavers before the opportunities diminish. By controlling for observed and unobserved differences in individual characteristics that affect the chances of re-engagement, we are able to demonstrate that duration dependence is real. For completion, we are able to confirm the finding from the previous study that those who re-engage straight after dropping out from school (within a month) are less likely to complete than those who delay, but with a greater number of control variables. These results support government measures to coerce early school leavers back into education early, but suggest that the outcomes of such measures would be most effective if they could be coupled with programs to help early school leavers, or those at risk of dropping out, find suitable career paths.

Appendix A: LSAY survey and attrition

The design of the 1995 and 1998 surveys is slightly different to the design of the 2003 survey. The 1995 and 1998 cohorts of LSAY are nationally stratified sample of students in Year 9. The major stratum considered in the design was the state of schooling in 1995 and 1998. Students from small states were over-sampled, and those from larger states were under-sampled. The selection of students within states was proportional relative to school sector. Three school sectors were used as strata: Government, Catholic and Independent schools. The two samples were constructed by randomly selecting two Year 9 classes in each school from a national sample of 300 schools intended to represent state and sector. In contrast, the 2003 cohort is a nationally representative sample of 15 year-old students who were selected to participate in the OECD PISA data collection. The sample comprised 355 schools from all states and territories, and was designed to be representative of students across Australia using state/territory, school sector and region (metropolitan or non-metropolitan) as strata. Within each school 50 students aged 15 years were selected at random. For schools with fewer than 50 students, all 15 year olds were selected. Smaller jurisdictions and Indigenous students were over-sampled to ensure that reliable results could be produced by state and Indigenous status.

The number of individuals surveyed in each of the three cohorts is presented in Table 1. In the 1995 and 1998 cohorts around 14,000 individuals are surveyed and around 10,000 in the 2003 cohort. The 2003 sample is smaller because fewer students are selected to participate in the PISA sample than for earlier cohorts of LSAY. A problem that applies to all panel data surveys is when individuals leave the survey (attrition). Compared to other large-scale panel data surveys, such as the National Longitudinal Survey of Youth 1997 (NLSY97) from the United States, the Household Income and Labour Dynamics Australia (HILDA) survey and the British Household Panel Survey (BHPS), rates of attrition in LSAY are high. For the 1995 and 1998 cohorts, only around one quarter of the initial sample remains in the sample until the end (wave 12), with the highest rate of attrition between the first and second waves – 28% and 34% respectively. A point of note is that the increase in the sample in wave 3 of the 1995 and 2003 cohorts occurs because some non-respondents from the paper survey in wave 2 were retained in the sample in wave 3.²⁹ The slowing in the attrition rates after wave 2 is because of the move away from a paper-based survey to a computer-assisted telephone interview. In the early years of the survey, the rate of attrition in cohort 3 is lower than in previous cohorts, mainly because a telephone survey was used from the outset.

²⁹ This only happened after wave 2 in the 1995 and 1998 cohorts and not in subsequent waves of these cohorts.

Table A.1: Survey size and response rates in LSAY

	Wave											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	1995 cohort											
Survey Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Avg. age (June 30)	14.5	15.4	16.4	17.4	18.4	19.4	20.4	21.4	22.4	23.4	24.4	25.4
Sample size (N)	13,613	9,837	10,307	9,738	8,783	7,889	6,876	6,095	5,354	4,660	4,233	3,914
Wave 1 retained (%)	100.0	72.3	75.7	71.5	64.5	58.0	50.5	44.8	39.3	34.2	31.1	28.8
Attrition rate (%)	-	27.7	-4.8	5.5	9.8	10.2	12.8	11.4	12.2	13	9.2	7.5
	1998 cohort											
Survey Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Avg. age (June 30)	14.5	15.5	16.5	17.5	18.5	19.5	20.5	21.5	22.5	23.5	24.5	25.5
Sample size (N)	14,117	9,289	9,548	8,777	7,762	6,905	5,979	5,356	4,729	4,210	3,859	3,596
Wave 1 retained (%)	100.0	65.8	67.6	62.2	55.0	48.9	42.4	37.9	33.5	29.8	27.3	25.5
Attrition rate (%)	-	34.2	-2.8	8.1	11.6	11	13.4	10.4	11.7	11	8.3	6.8
	2003 cohort											
Survey Year	2003	2004	2005	2006	2007	2008	2009					
Avg. age (June 30)	15.7	16.7	17.7	18.7	19.7	20.7	21.7					
Sample size (N)	10,370	9,378	8,691	7,721	6,658	6,074	5,475					
Wave 1 retained (%)	100	90.4	83.8	74.5	64.2	58.6	52.8					
Attrition rate (%)	-	9.6	7.3	11.2	13.8	8.8	9.9					

Notes: Only respondents in each wave are used to calculate average ages and figures are unweighted. For 1995 cohort, 586 individuals have 'missing' DOB (age); only respondents in each wave are used to calculate average ages and figures are unweighted. For 1998 cohort, 1,017 individuals have 'missing' DOB (age); 86 individuals have 'missing' sex; only respondents in each wave are used to calculate average ages and figures are unweighted.

Attrition is a potentially serious problem, not only does it reduce the number of observations that are available for generating robust results, but if it is non-random, it can lead to biased results in a model of course participation or completion. Results are biased if there exist unobserved factors, such as peer pressure, that drives both the values of the explanatory variables (through attrition) and re-engagement in education or course completion. Although we do not explicitly control for attrition in our modeling strategy, we do take into account its possible effects by explicitly modeling the relationship between the chances of attriting and variables included in the re-engagement and completion models.

Models to explicitly deal with attrition in duration models, such as those proposed by Van den Berg, Lindeboom and F. Ridder (1994) are not readily available in standard econometric software and coding such a program is beyond the scope of this project. One way to check for systematic bias in the re-engagement model is to estimate a duration model of attrition from the sample using the same variables for the duration model of re-engagement and compare the coefficients. If there are unobserved factors that simultaneously affect both the hazard of attrition and the hazard of re-

engaging, then we would expect that that the hazard ratios between the two models would be correlated (either positive or negative).

To perform such a check of systematic attrition bias, we estimate a duration model for attrition. The specification of this model differs from the one described for re-engagement. Unlike for re-engagement where the decision to re-engage can be observed every month, the decision to exit the survey is only observed once a year – at the time of the survey. Hence, the duration process to study the hazard of attrition can more correctly be interpreted as a discrete one rather than a continuous one, as in the case of re-engagement. In order to take this particular data feature into account, the proposed estimates are obtained through a *complementary log-logistic* (cloglog) specification, which allows for unobserved heterogeneity to be controlled for by including an error term in the estimated equation to capture across-individual unobserved differences. The error is assumed to be distributed as a normal function with zero mean. Once again, the coefficients are presented as hazard ratios in Table A.2.

Table A.2 reports the estimated coefficients with respect to the likelihood of attrition along with the parameters obtained in the analysis of re-engagement in education. The comparison between the two sets of estimates can be seen as a first attempt to shed some light on the relation between the two phenomena. In particular, both sets of coefficients aim at measuring how the probability that the event (i.e., attrition or re-engagement) takes place at a certain point in time, given that it has not occurred in the previous period, relates to a unit change in any of the independent variables.

From Table A.2, there appears to be no clear patterns in the estimated hazard rates between the two models, which suggest that systematic attrition bias in the re-engagement results may not be a serious problem.

Table A.2: Hazard ratios from the attrition and re-engagement model

	Attrition		Re-engagement	
	Hazard ratio	t-stat	Hazard ratio	t-stat
Female	0.990	-0.28	0.815***	-2.61
State of residence (ref. case: NSW)				
Victoria	0.967	-1.24	0.976	-0.37
Queensland	1.121***	4.01	0.885*	-1.65
South Australia	1.061*	1.72	0.838**	-2.21
West Australia	0.938**	-2.10	1.124	1.53
Tasmania	1.170***	3.39	0.881	-1.44
ACT	0.771***	-5.63	1.012	0.08
North Territory	0.823***	-3.02	1.083	0.59
Type of residential area (ref. case: metropolitan)				
Regional	1.066***	2.65	1.022	0.37
Rural	1.096***	3.19	1.066	0.93
Aboriginal or Torres Straight Islander	1.346***	6.76	1.065	0.67
Born in Australia	1.066*	1.92	0.929	-0.73
LSAY cohort (ref. case: 1995)				
1998	1.015	0.57	0.864**	-2.09
2003	0.596***	-13.61	0.96	-0.36
Regional unemployment rate (%)	0.857***	-15.41	1.095***	3.85
Positive attitude toward education (1-4)	0.826***	-8.86	0.986	-0.29
Type of school attended (ref. case: Government)				
Catholic School	0.999	-0.04	1.140**	2.11
Independent School	1.007	0.26	1.180**	2.1
Numeracy and reading score (ref. case: bottom quintile)				
2nd quintile	0.841***	-6.64	0.961	-0.71
3rd quintile	0.706***	-13.29	0.999	-0.01
3th quintile	0.559***	-20.07	0.924	-1.03
Top quintile	0.459***	-24.85	0.988	-0.13
VET in Year 11 or 12 (ref. case: none)				
VET not part of an apprenticeship/traineeship	0.888***	-5.16	1.009	0.14
VET part of an apprenticeship/traineeship	0.928	-1.55	1.351**	2.37
Intention to complete school (reported in Year 9)	0.851***	-7.41	0.935	-1.44
Australian born father	1.015	0.62	0.949	-0.87
Australian born mother	1.023	0.93	0.996	-0.06

Continued over page

Table A.2 cont.

Mother's highest qual. (ref. case: less than Year 11)				
Year 11 or 12	0.934**	-2.53	1.129*	1.88
Completed secondary school	0.969	-1.18	1.193***	2.69
VET qualification	0.910***	-3.37	1.164**	2.02
Higher education	0.869***	-4.72	1.158**	2.11
Unknown	1.070	1.58	1.065	0.64
Dependent children	1.009	0.24	0.651***	-4.72
Female × Children	0.972	-0.73	1.079	0.86
Living with Parents	0.684***	-14.98	1.201***	2.86
Main reason for leaving school (ref. case: employment ^a)				
Problems at school/Not doing well at school			0.831***	-3.1
Year 12 not useful			0.753***	-3.89
School didn't offer training/courses			1.052	0.75
Teachers told you to leave			0.817*	-1.8
Financial reasons			0.806*	-1.89
Lagged employment status (ref. case: out of work)				
Employed in a non-career job	1.324***	11.88	0.712***	-6.22
Employed in a career job	1.574***	15.28	0.883**	-1.98
Employed, but uncertain whether it is a career job	1.494***	6.29	0.686**	-2.44
February			6.053***	41.08
α			1.00E-228	
Log likelihood	-40822.6		-2701.4	
χ^2	2675.5		1228.3	
Observations	128232		3948	

^aIncludes those who report leaving school to start an apprenticeship or traineeship or to find work and those who report leaving to look for employment or an apprenticeship. *Significant at 10%, **significant at 5% and ***significant at 1%.

Appendix B: Alternative samples to deal with non-response

Table B.1: First course completion rates using alternative samples

Year of survey	Standard sample ^a	Alternative samples	
		Low completion sample ^b	High completion sample ^c
1995	100	100	100
1996	70	70	70
1997	63	63	63
1998	98	38	99
1999	88	45	94
2000	75	63	79
2001	87	33	95
2002	63	63	63
2003	68	68	68
2004	67	67	67
2005	72	72	72
2006	69	69	69
2007	67	67	67
2008	62	62	62
2009	67	67	67
Average	73	56	79
Count	2,154	2,797	2,797

^aNon-response in all years is omitted. ^bNon-response in wave 4 to 6 in the 1995 cohort and wave 4 in the 1998 cohort are treated as non-completion. ^cNon-response in wave 4 to 6 in the 1995 cohort and wave 4 in the 1998 cohort are treated as completion.

Appendix C: Sensitivity analysis

Table C.1: Results from alternative models

	Log-normal		Piecewise Constant		Cox	
	Time ratio	t-test	Hazard ratio ^a	t-test	Hazard ratio ^a	t-test
<i>Socio-economic and demographic factors</i>						
Female	1.464***	4.00	0.660***	-3.84	0.748***	-3.20
Dependent children	1.174	1.38	0.782**	-2.23	0.838*	-1.85
Female × Children	0.832*	-1.66	1.192	1.49	1.147	1.38
Mother's highest qualification (ref. case: less than Year 11)	-	-	-	-	-	-
Year 11 or 12	0.851**	-2.12	1.255**	2.56	1.182**	2.40
Completed secondary school	0.807***	-2.64	1.295***	2.73	1.241***	2.88
VET qualification	0.801**	-2.36	1.400***	3.15	1.299***	3.09
Higher education	0.787***	-2.85	1.251**	2.28	1.148*	1.83
Unknown	0.894	-0.91	1.049	0.33	1.046	0.39
Living with Parents	0.880	-1.50	1.033	0.39	1.029	0.41
State of residence (ref. case: NSW)	-	-	-	-	-	-
Victoria	1.007	0.09	0.921	-0.87	0.920	-1.12
Queensland	1.106	1.07	0.780**	-2.33	0.845**	-2.01
South Australia	1.095	0.94	0.831*	-1.65	0.858*	-1.75
West Australia	0.880	-1.37	1.129	1.13	1.049	0.57
Tasmania	0.961	-0.36	1.018	0.15	1.020	0.21
ACT	1.270	1.39	0.852	-0.80	0.871	-0.88
North Territory	1.105	0.61	0.904	-0.53	0.941	-0.39
Type of residential area (ref. case: metropolitan)	-	-	-	-	-	-
Regional	0.967	-0.50	1.031	0.39	1.042	0.66
Rural	0.924	-0.97	1.165	1.64	1.121	1.54
Aboriginal or Torres Straight Islander	0.914	-0.80	1.202	1.42	1.146	1.32
English as first language	1.088	0.63	1.046	0.29	1.058	0.47
<i>School factors</i>						
Main reason for leaving school (ref. case: employment ^b)	-	-	-	-	-	-
Problems at school/Not doing well at school	1.313***	3.73	0.701***	-4.25	0.806***	-3.29
School didn't offer training/courses	1.264***	2.69	0.741***	-2.94	0.836**	-2.26
Teachers told you to leave	0.851**	-1.99	1.276***	2.61	1.199**	2.45
Financial reasons	1.255*	1.66	0.663***	-2.63	0.790*	-1.95
Other	1.369**	2.22	0.657**	-2.56	0.760**	-2.11
Year 9 numeracy and reading score (ref. case: lowest quintile)	-	-	-	-	-	-
2nd quintile	1.019	0.27	0.987	-0.16	1.005	0.08
3rd quintile	1.023	0.31	1.003	0.03	1.045	0.66
4th quintile	0.949	-0.57	1.077	0.69	1.047	0.54
Highest quintile	0.981	-0.17	1.081	0.60	1.060	0.57
Year left school (ref. case: Years 9 or 10)	-	-	-	-	-	-
Year 11	1.117	1.57	0.860*	-1.95	0.911	-1.54
Year 12	1.391***	2.84	0.781*	-1.83	0.852	-1.46

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Table C.1 cont.

	Lognormal		Piecewise Constant		Cox	
	Time ratio	t-test	Hazard ratio	t-test	Hazard ratio	t-test
Positive attitude toward education (1-4)	0.986	-0.22	1.000	-0.00	0.980	-0.37
Intention to complete school (reported in Year 9)	1.029	0.50	0.922	-1.22	0.932	-1.34
VET in Year 11 or 12 (ref. case: none)	-	-	-	-	-	-
VET not part of an apprenticeship/traineeship	0.956	-0.58	1.057	0.59	1.016	0.22
VET part of an apprenticeship/traineeship	0.751*	-1.92	1.341*	1.65	1.189	1.22
Type of school attended (ref. case: Government)	-	-	-	-	-	-
Catholic School	0.925	-1.02	1.124	1.33	1.098	1.34
Independent School	1.005	0.05	1.104	0.89	1.097	1.06
<i>Employment factors</i>						
Regional unemployment rate (%)	0.964	-1.34	1.043	1.37	1.020	0.75
Lagged employment status (ref. case: unemployed)	-	-	-	-	-	-
Not in the Labour Force	0.753***	-3.62	1.222**	2.37	1.030	0.40
Ongoing Part-time	0.786*	-1.75	1.134	0.95	1.073	0.62
Ongoing Full-time	0.841	-1.48	0.986	-0.12	1.009	0.09
Casual Part-time	0.710***	-3.42	1.279**	2.48	1.171*	1.85
Casual Full-time	1.112	0.80	0.817	-1.51	0.873	-1.18
Lagged attitudes to work (ref. case: employed in a career job)	-	-	-	-	-	-
Not employed in a career job	1.334***	3.49	0.771***	-3.31	0.828***	-2.83
Uncertain whether it is a career job	1.510**	2.24	0.711*	-1.86	0.792	-1.47
<i>Other factors</i>						
LSAY cohort (ref. case: 1995)	-	-	-	-	-	-
1998 LSAY cohort	1.283***	2.67	0.707***	-3.45	0.813**	-2.57
2003 LSAY cohort	1.253	1.43	0.834	-1.18	0.930	-0.58
σ^c	0.915					
Log likelihood	-2640.7		-2766.8		-12046.4	
χ^{2d}	183.5		2080.3		130.8	
Observations	3257		3777		3257	

^a Hazard ratio represents the proportional change in the probability of re-engaging in the next period, given that an individual has not re-engaged to date, for a one unit change in the explanatory variable, all else equal. Therefore, a hazard ratio greater (less) than 1 represents an increase (decrease) in the probability of re-engaging for a one unit increase in the explanatory variable. ^bIncludes those who report leaving school to start an apprenticeship or traineeship or to find work and those who report leaving to look for employment or an apprenticeship. ^cIs an ancillary parameter that affects the shape of the log-normal survival function. ^dChi-squared statistic for the log-likelihood ratio test for the presence of unobserved heterogeneity. These values suggest that for each model, unobserved heterogeneity is significantly different from zero. ***Significant at 1%, **significant at 5%, significant at 10%.

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