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Vocational pathways and post-school transitions from VET delivered to school students

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Executive summary

Motivation and approach

This study was undertaken for the Australian Government Department of Education and examines the long-term education and labour market outcomes of vocational education and training (VET) programs delivered to secondary school students.

Studies to date have found mostly positive outcomes for VET programs delivered in schools. However, a major limitation of these studies is that they only measure initial outcomes and are silent on the long-term impacts. The current study addresses this issue by integrating information from three cohorts of the Longitudinal Surveys of Australian Youth (LSAY) to produce a longitudinal dataset with the statistical power to measure long-term effects.

This approach involves tracking students from the 2003, 2006 and 2009 LSAY cohorts who did and did not participate in upper-secondary school VET for up to 7 years after school. Outcomes from VET participation are estimated by comparing outcomes for those who did and did not participate in VET, adjusting for differences between the two groups that may also affect outcomes, such as past academic achievement and regional characteristics.

Results have been estimated separately for three models of VET delivered to secondary school students:

1. classroom-based VET *without* workplace learning (WPL);
2. classroom-based VET *with* a workplace learning component; and
3. apprenticeships/traineeships.

Measures of outcomes include high school completion, attainment of a qualification at certificate III or above, full-time employment rates, the expected earnings associated with a job, whether the job is one that the respondent would like as a career, and job satisfaction.

Research questions

The study addresses key research questions regarding the benefits of school-based VET programs and barriers to participation that, until now, could not be addressed because of data limitations.

The first key question is whether there are long-run benefits of school-based VET participation? Previous studies have only examined how VET participation in school affects initial post-secondary pathways, which may not reflect long-run qualification and employment outcomes. Evidence from this study will help to better inform policy on the benefits of school

VET programs, including the contribution that workplace learning can make in promoting any long-term benefits.

The second key question is whether participation and any benefits vary within the school population, including across different levels of academic achievement, socio-economic background, indigenous status and gender? To the extent that some groups participate and benefit differently, then this study may help identify areas for targeted support.

A final question is what are the main factors that explain participation in VET delivered in schools? The answer to this question will help identify possible barriers that could be the target of policy actions.

Summary data

The following tables present a summary of key results for each of the three models of VET delivered in secondary schools in select years (see the main text for full results). The tables show the difference in outcomes for participants compared to non-participants. The results are discussed in more detail in the key findings section below.

Table E1: Change in outcomes associated with upper-secondary VET participation[1]

	1st year after school			7th year after school		
	No WPL	WPL	App./ train.	No WPL	WPL	App./ train.
Cert. III+ attainment rate (% pt. diff.)	1	1	-	-4	-6	-4
Full-time employment rate (% pt. diff.)	3	5	15	-	-	-
Career job attainment rate (% pt. diff.)	4	7	20	-	-	4
Change in expected earnings ($A'000)	-	30	55	-	-	-
Change in job satisfaction (std. dev.)	-	-	0.16	-	-	-

Table E2: Change in outcomes in the 7th year after school, by main activity in the 1st year

	Employed in year 1			Studying in year 1		
	No WPL	WPL	App./ train.	No WPL	WPL	App./ train.
Cert. III+ attainment rate (% pt. diff.)	-6	-6	-6	-	-	-
Full-time employment rate (% pt. diff.)	-3	-	-	5	6	10
Career job attainment rate (% pt. diff.)	-5	-	-	-	7	10
Change in expected earnings ($A'000)	-	-	-	-	-	-
Change in job satisfaction (std. dev.)	-	-	-	-	0.14	0.14

[1] Estimates in black are statistically significant at 95% or higher. Estimates in grey are only significant at 90%, which is on the margins of statistical significance. Statistically insignificant results are marked '-'.

Key findings

1. ***Participation in upper-secondary VET programs is associated with an increased likelihood of a successful initial transition from school to the labour market, especially for participation in programs with workplace learning (including apprenticeship/traineeships)***

In the first year out from study, participation in upper-secondary VET is associated with a higher chance of full-time employment and a higher chance of being employed in a career job (Table E1). The types of jobs that participants in VET with workplace learning attain in their first year out are estimated to have an annual average earning potential that is $30,000 (classroom-based) and $55,000 higher (apprenticeships/traineeships) than non-participants. The positive employment outcomes, however, only result in higher reported levels of job satisfaction for participants in apprenticeships or traineeship programs.

2. ***On average, the initial post-secondary labour market benefits of participation in upper-secondary school VET shrinks over time and are statistically insignificant by the seventh year out from school***

The initial labour market benefits of upper-secondary VET study persist for around the first five years out from school but decline over time. This head start in the labour market is due in part to VET students entering the labour market earlier, on average, than non-participants. However, by year seven we observe no difference in the rates of full-time employment, job earning capacity, job satisfaction or chances that the job is a career job (Table E1).

Up until year 3 we estimate higher rates of attainment of certificate III qualifications and above, due to the higher rate of post-secondary VET participation associated with school-based VET study. However, by year 7 there is a negative association between VET participation and attainment of post-school qualifications. This is most likely due to non-participants, who are more likely to enrol in university, completing their studies (Table E1).

3. ***Long-run benefits from VET participation are found to depend on the initial post-secondary pathway. For those who transit to further study after school, we find that the labour market advantages for VET with workplace learning (including apprentices/trainees) persists to year seven. For those who transit to the labour market in the year after school, the labour market benefits are short-term only***

For those who transit to the labour market immediately after school, their head start in the labour market does not translate to an advantage by year seven. This may be because the jobs

they attain do not offer opportunities to accumulate skills and experiences that would enable them to build on their early advantage. By year seven, non-participants in school-based VET have found full-time employment and jobs that are comparable in quality, as measured here, to those held by participants (Table E2).

In contrast, among those whose main activity is study in the first year after school, having participated in classroom-based VET with workplace learning or a school-based apprenticeship/traineeship is associated with higher rates of full-time employment, career job attainment and job satisfaction by year 7 (Table E2). A possible interpretation is that VET participation with workplace learning provides the real-world experiences and employer connections to help young people find post-secondary VET courses that better match labour market needs. Help finding good pathways in post-secondary VET is important given that there are over 1000 Australian Qualification Framework (AQF) accredited VET courses to choose from.

Consistent with the above interpretation, we find that the long-run employment benefits of school-based VET are concentrated among middle-achieving students in reading in the Program for International Student Assessment (PISA). Compared to lower achieving students, those in the middle are less likely to have had a parent with a VET qualification and less likely to aspire to a post-school VET pathway. School-based VET with workplace learning may be particularly helpful to those in the middle because it provides connections with employers and labour market information that is not available through family connections.

4. ***On average, we find no evidence that the long-run benefits of VET study differ by gender, city/rural locations, indigenous or socio-economic status***

Estimates of the outcomes of VET participation up to year 7 across all sub-groups are similar in magnitude and direction. The differences in long-run outcomes that do exist are too small to be statistically significant. The one exception is the difference in earning potential associated with school-based apprenticeship/traineeship participation by gender. For males, we find that participation in school-based apprenticeships/traineeships is associated with jobs by year seven that pay around $50,000 more on average than jobs attained by non-participants. We find no such premium for female participants. This discrepancy most likely reflects the differences in pay of gender-based occupations that are associated with apprenticeship/traineeship programs, especially the higher pay of trade-based apprenticeships that are dominated by males.

5. ***The most influential factors associated with school-based VET participation are post-secondary work/study intentions, the availability/quality of VET programs within the school, and academic achievement (in PISA)***

At age 15, those who intend to continue VET study after school are estimated to have a 10 percentage point higher chance of enrolling in an upper-secondary VET program compared to those who intend to go to university. In comparison, those who intend to enter employment after school have a 4-5 percentage point higher chance of enrolment than those who intend to go to university. All else being equal, this suggests that, while preparation for work is an important motivator for VET participation in school, the motivation to prepare for post-secondary VET study is twice as strong. This underlines the role of VET in schools as an avenue for young people to explore possible post-secondary VET pathways.

Participation rates are also closely related to the proportion of peers who participate in school-based VET. Specifically, for every 10 percentage point increase in their peer's VET enrolment rate, the students' own rate of enrolment is estimated to increase by around 5 percentage points for classroom-based programs and around 3 percentage points for apprenticeships/traineeships. Given that we control for the composition of school peers, a possible interpretation is that course availability within schools (including the breadth and quality of course offerings) plays a part in determining the chances of individual participation. However, it is also possible that students who intend to enrol in school-based VET seek out schools with the best programs, such as those that offer workplace learning.

Consistent with the objective of school-based VET programs to engage less academic students in school, we find that participation is associated with lower academic achievement. The direct relationship is not as strong – at the most (the difference between those in the top and bottom 20% of PISA reading achievement at age 15), around a 6 percentage point difference.

6. ***We find no evidence that participation in school-based VET programs is directly associated with other factors such as the socio-economic status of students***

Rates of participation across the three models of school-based VET are comparable regardless of parents' highest education qualification, regional/remote/metropolitan location, the socio-economic status of school peers, whether English is spoken at home and indigenous status. This does not mean that socio-economic status does not influence VET participation, but that it only matters indirectly through its influence on academic achievement and post-secondary aspirations.

Implications for policy and practice

1. ***VET programs in school help to smooth school-to-work transitions, but more can be done to improve outcomes by supporting student access to workplace learning***

The head start in the labour market from participation in school-based VET is associated with greater cumulative earnings in the first seven years, with more benefits for programs with workplace learning. Over seven years, these extra earnings are equivalent to receiving lump-sum payments of $26,408 for VET without workplace learning, $39,954 for VET with workplace learning, and $60,294 for apprenticeships/traineeships.[2] To the extent that higher earnings provide opportunities to invest in the future (for example, by saving for a deposit on a house) there may be further benefits beyond the first seven years.

The results presented in this study suggest that the availability of VET with workplace learning may be a limiting factor for participation and greater realisation of benefits from the program.

2. ***Outcomes could be improved by helping students sort into better programs through the provision of labour market information in school career counselling***

Evidence from this study suggests that VET delivered in schools can play a key role in directing students to post-secondary courses with good labour market prospects. Although addressing barriers to work placements can help in this regard, the underlying problem is that students are given very little information about graduate outcomes to help them find good pathways in VET from the over 1000 AQF courses available. This is consistent with a key finding (21) of the 2018 Victorian Parliamentary Inquiry into career advice in schools, that "Young people and their parents are not receiving enough information about labour market trends and emerging industries to inform students' career choices."

At present, easy-to-access information on the labour market prospects of various jobs is available online, such as from the Australian Governments 'Job Outlook' website.[3] However, up-to-date information on VET study outcomes is restricted to overall employment rates from the NCVER VET Student Outcomes publication and employment and salaries outcomes by very aggregate field of study categories from the Quality Indicators for Learning and Teaching (QILT) website.[4] The paucity of graduate outcome information, such as graduate occupations, at a more granulated field-of-study level makes it difficult for students to assess the likely outcomes from alternative VET pathways. Except for trades, there is only a weak relationship

[2] Assuming a 5 percent average annual discount rate over the seven years.
[3] https://joboutlook.gov.au/.
[4] https://www.qilt.edu.au/.

between the occupation that VET courses are designed to prepare students for and the jobs that graduates attain (Karmel et al. 2008), which means that job outlook information alone is insufficient to support course choice.

Future research priorities

1. ***Future research is needed on the impact of VET participation over a 'working-life'***

It is commonly argued that VET is good at preparing young people for skills that are in demand today. However, the job-specific nature of VET training makes VET graduates more susceptible to skill need changes that diminish their employability over time, which has been shown to lead to late-career disadvantage in the labour market overseas. However, it is not clear that this is the experience of VET graduates in Australia. Compared to many other countries, Australia has a high rate of mature-age VET participation, which enables people to retrain in response to changing labour market needs.

To facilitate future research on this topic, further efforts are needed to generate longitudinal datasets that link education records (administrative and/or early cohorts of LSAY) with post-secondary outcomes such as tax, household census and Centrelink administrative data.

2. ***Support existing efforts to understand how expected labour market outcomes vary across VET and higher education courses and how best to provide this information to inform student course choice***

In recent times, both VET and higher education have moved towards 'demand-driven' models of funding. As described above, however, there is currently only very aggregated data available to help support student choice, which is problematic given the likely variation in outcomes across VET and higher education courses. There is a need for better student level information and support for existing initiatives to provide this information to students.

3. ***Research is needed to better understand the barriers to workplace learning***

Given the superior labour market outcomes associated with school-based VET with workplace learning, a priority for future research is to better understand differences in school-level availability. This may include the design of employer and school/provider surveys about perceived administrative and legal hurdles, the costs and benefits of being involved and the difficulties faced in forming and maintaining employer-school/provider networks.

1. Introduction

Vocational education and training delivered in schools was first introduced into upper-secondary school in the mid-1990s to retain less academic youth in school, to develop job-ready skills and open-up alternative post-school paths that may or may not involve further training (Ministerial Council on Employment Education and Training and Youth Affairs 1999). To date, several studies have attempted to examine the extent to which VET delivered in schools is meeting its intended purposes (Fullarton 2001; Anlezark, Karmel and Ong 2006; Lamb and Vickers 2006; Nguyen 2010; Black, Polidano and Tabasso 2011 and Polidano and Tabasso 2014; Misko, Korbel and Blomberg 2017), and overall, outcomes appear to be positive, especially for school engagement and initial employment outcomes.

However, there are two main limitations of these studies. First, they are limited in estimating outcomes across all students who take VET courses in school, without any sub-group analysis on whether and how the benefits vary. Understanding how the benefits vary in the population is important to understand the nature of the benefits from VET courses and to identify groups that may be targeted by policy. Second, previous studies focus only on initial employment and education outcomes, which may not reflect long-run benefits for two reasons. These studies only examine employment outcomes of a select group of students — those who go straight from school to the labour market.[5] It is not clear that short-term employment benefits for this select group translate to long-term benefits: for example, VET delivered in school may only help job seekers find work because it is a signal to employers of job readiness. Second, although VET delivered in school is associated with higher rates of post-school VET participation (Polidano 2014, Lamb and Vickers 2006), there is no evidence to date that it improves the employment outcomes from post-school study. It is possible that VET delivered in schools helps them find career paths that better suit their interests and the needs of the labour market, which may improve qualification attainment and career prospects. To date, this has not been tested.

The aim of this study is to fill this gap in knowledge by examining the patterns of participation in VET delivered in school and estimating the short and longer-term outcomes of program participation, including for subgroups of interest. To estimate the long-term outcomes associated with VET delivered in school we will estimate OLS regression models that adjust

[5] Misko, Korbel and Blomberg (2017) examine outcomes of students who took VET in school up to 5 years by tracking VET students from the 2006 VET in Schools Collection to 2011 using the Household Census, but by construction, they could not have a comparison group to distinguish outcomes associated with VET participation from outcomes associated with the characteristics of VET students.

for the effect of differences in the characteristics of students who do and do not participate in VET while in school. To this end, we use data from the 2003, 2006 and 2009 cohorts of the Longitudinal Survey of Australian Youth (LSAY). LSAY is one of only a handful of studies of its kind that tracks a sample of 15-year-old students who participate in the Program for International Student Assessment (PISA), an international test of reading, mathematics and science, every three years. Detailed schooling, post-secondary education and employment information of PISA participants are collected annually as part of the LSAY survey until age 25, which makes it ideal for this study.[6] To complement LSAY, for each year, we also link data on regional unemployment rates from the Department of Jobs and Small Business and average earnings by occupation from the Australian Bureau of Statistics as a measure of job earning potential.[7] Pooling 3 cohorts of LSAY data is an important feature of this study because it maximises the available data points and statistical power for long-run sub-group analysis. Sub-groups of interest include low, middle and high performing students in the Program for International Student Assessment (PISA); low, middle and high socio-economic status students; males and females; indigenous and non-indigenous students; and those who enter the labour market straight after school and those who enter study instead.

The main questions addressed are associated with the participation in and the outcomes of VET delivered in school:

> What are the patterns of engagement (timing and intensity) of different models of VET delivered in school (apprenticeships/traineeships and classroom-based VET), and how they vary by sub-group? What are the regional, school and individual factors associated with engagement in VET delivered in school and how do they vary across subgroups? Which factors are most important in explaining participation?
>
> What are the short and longer-run education and employment outcomes (up to 7 years after leaving school) of participants in VET delivered in school and how do they vary by sub-group? What are the outcomes of participants in VET delivered in school relative to those from plausible counterfactual outcomes? How do the comparative outcomes vary by sub-group?

[6] For more detailed information on LSAY, visit the website: https://www.lsay.edu.au/.
[7] This is used as an alternative to wage, which is problematic as a measure of job quality from VET delivered in schools because VET students tend to enter the labour market earlier than students who do not take VET courses. This head-start makes their wage outcomes look more favourable in the short-run and cannot be completely adjusted for in regression analysis.

2. Overview of VET delivered to secondary school students

VET courses delivered to secondary school students were introduced in upper-secondary school in the mid-1990s to retain less academic youth in school, to develop job-ready skills and open-up alternative post-school paths that may or may not involve further training (Ministerial Council on Employment Education and Training and Youth Affairs 1999). Arrangements for delivering VET to secondary students vary across states and territories, schools and school sectors. The registered training organisation delivering the program can be a school, a collection of schools in partnership (including an entire school sector) or an external training provider, for example at a Technical and Further Education (TAFE) college, that delivers training at a school, externally or a combination.

A feature of the VET courses delivered in school is that almost all count, in part or in full, towards both a nationally accredited VET certificate (equivalent of an International Standard Classification of Education (ISCED) 2C or 3C level) and a secondary school certificate (NCVER 2011).[8] VET certificate attainment is based on the demonstration of workplace (job-specific and generic) competencies stipulated in nationally endorsed training packages.[9] Outside of apprenticeship/traineeships, there is no requirement that competencies need to be attained through workplace learning, instead it is up to the school (or off-campus training provider).[10] In cases where competencies are attained in the classroom and not in the workplace, the school/training provider will simulate workplace learning in the classroom. In practice, the decision on whether or not to use workplace learning to attain skill competencies for certificate accreditation is likely to depend on a number of factors, including student demand, school resources, the availability and willingness of local employers to be involved and the cost of providing a simulated work environment.

The selection of suitable training packages and associated VET subjects for school programs is determined by the state boards of curriculum in consultation with industry groups. Suitable training packages and subjects may be part of an apprenticeship/traineeship; but require students to spend at least 15 hours per week with an employer in workplace learning. Apprenticeship/traineeships account for around 8.4% of students who enrol in VET school enrolments (NCVER 2018). Taking subjects as part of a school-based apprenticeships/traineeships gives students a head-start, but they must continue their training

[8] An exception are courses that lead to a basic level qualification - equivalent to below ISCED level 2C.
[9] There are some programs for which there is no nationally endorsed training package. In these cases, the course must be endorsed by the relevant state board of curriculum.
[10] National training packages only set-out the minimum competencies for certificate accreditation, they do not stipulate how the subjects should be taught to achieve the minimum competencies.

after finishing school to attain their qualifications. Of those who take subjects that are not part of an apprenticeship/traineeship, the most popular courses are in Society and culture (18.6%), followed by Management and commerce (18.1%) and Food, hospitality and personal services (16.3%) (NCVER 2018).

Taking a VET subject in school does not preclude students from accessing university by normal pathways, although in the main, achievement in VET subjects do not count towards ATAR scores, which may make it more difficult to attain entry to some university courses. In some states, achievement in select VET subjects count towards a student's ATAR.

3. Literature review

There is a body of literature, both domestic and international, that attempt to estimate the outcomes from VET training in schools. An issue with estimating the impacts of participation in VET in school programs is controlling for self-selection, that is, school and student-level factors (such as student interests, motivation and abilities) that may affect both participation in VET in schools and outcomes. Failure to control for self-selection means that any differences in outcomes between individuals who do and do not participate in VET in schools (schools that do and do not offer VET) will represent not only the effect of VET in schools, but also effects due to differences in the characteristics of students and schools. To the extent that VET in school participation is associated with more disadvantaged student/school characteristics, then self-selection may lead to an under-estimate of the true effects of the program (if positive).

3.1 International evidence

Most studies on school VET programs focus on the transition from school to work and generally find positive impacts. Bishop & Mane (2004) assesses the effects of VET programs on school completion and college attendance rates by comparing outcomes by VET program participation rates in the 1980s and 1990s across OECD countries using OLS regression. They find that countries with higher rates of VET participation rates have significantly higher school attendance and upper-secondary school completion rates, with no negative impacts on test scores at age 15 and college attendance rates of those 20 years and over. Using longitudinal individual record data (National Education Longitudinal Survey 1988 (NELS88) from the United States, they found, controlling for family background, student attitudes, college attendance and 8th grade test scores, that students who devoted about one-sixth of their time in high school to VET courses earned at least 12% extra one year after graduating and about 8% more after seven years. Computer courses were found to have particularly large effects. Another US study by Mane (2007) also used NELS88 to examine the returns from technical education for students in different upper-secondary tracks. Using a control function approach, where selection into academic tracks is modelled using a multinomial logit

mode, Mane finds that those in the technical education track earn a small earnings premium after seven years compared to a counterfactual scenario of enrolling in academic or business tracks.[11]

In a related study, Hanushek et al. (2017) test the hypothesis that any advantage of vocationally oriented schooling over general education in preparing students for the labour market decreases with age. This hypothesis is based on the notion that vocational education, because it is designed to provide skills to meet existing occupation demands, makes graduates more productive than generally educated students when they first enter the labour market. However, the advantage will not persist long-term because general education graduates with broader knowledge and better foundation skills in mathematics and communication are better equipped for further learning and on-the-job training to adjust to changing labour market needs. Using individual labour market data of working age people who at least completed school across 11 OECD countries from the International Adult Literacy Survey (IALS), the authors regress a binary measure of employment on age, an indicator of whether the individual received vocational training and an interaction of the two, controlling for country fixed effects and other factors that may explain program selection such as literacy scores. Their results support the hypothesis that returns from VET study fall over a working life under the assumption that unobserved factors that may have affected outcomes and selection were constant over time (i.e. the same across all cohorts in the data). This relationship is found to be most strong in countries where VET study is associated mostly with apprenticeships (Germany, Denmark and Austria). It's not clear that this result applies to Australia because, unlike the 11 OECD countries examined in this study, retraining is common throughout a working life.

A Thai study by Moenjak and Worswick (2003) suggests that the returns to taking VET courses in school may be much greater in developing countries. Using repeated cross-sectional Labour Force Survey data between 1989 to 1995, they find that, after accounting for self-selection using a two-stage selection model (albeit without an exclusion restriction), males and females who completed VET training in school earn 63.9 and 49 percentage more than comparators who did not.

3.2 Australian studies

Consistent with international studies, Australian studies generally find positive outcomes of VET in schools on school retention and initial labour market outcomes. A study by Lamb and Vickers (2006) used data from two cohorts of LSAY (1995 and 1998) to compare student outcomes across schools based on the dominant model of VET offered within schools using OLS regression to control for differences in the socio-economic background of students, school sector and state. Lamb and Vickers found that schools where the dominant VET model is one where VET subject

[11] Instrumental variables included in the multinomial logit include an indicators of whether the school offered a technical track, offers advanced placement classes, has a vocational education department and the proportion of students from the previous year's class that attended 2 or 4 year colleges.

achievement counts towards school completion (called the school model) was associated with higher rates of school completion compared to models where VET did not count towards school completion (called TAFE model). Their argument is that offering programs that allow school completion through non-academic pathways may be effective in retaining students in school. In terms of initial post-school outcomes, they find that for students who did not go onto university, those who attended schools with VET delivered in schools (year 11 or 12), especially those where the TAFE model dominates, were more likely to be full-time employed, enrolled in VET and to have attained an apprenticeship. The authors interpret this result as the importance of workplace learning, which is associated with the TAFE model, in helping to smooth initial transitions to employment and further study.

A study by Polidano and Tabasso (2014) examined the effects of workplace learning in more detail than Lamb and Vickers (2006) by using 2003 and 2006 cohorts of LSAY. Specifically, the authors examined the outcomes of student participation in any VET subject delivered in schools (either year 11 or 12); VET delivered in schools as part of an apprenticeship/traineeship; and VET delivered in schools that is not part of an apprenticeship/traineeship, but has a workplace learning component, compared to a comparison group who did not enrol in any VET while in schools. The authors use propensity score matching to construct a 'like or matched' control group among those who do not choose VET, who on average, have the same average past achievement scores (PISA), post-school education and job aspirations, family background characteristics and attend schools with the same features as those who do participate in VET. The authors find that participation in any VET is associated with around a 9 percentage point improvement in school completion, but no significant impact on engagement in post-secondary education, in the first year after leaving school. In the first year out from school, participation in any VET delivered in schools is also associated with around a 5 percentage point higher rate of full-time employment and a job that pays 33 percent more. However, the initial employment benefits were driven completely by positive outcomes associated with apprenticeships/traineeships and other programs with a workplace learning component. There were no significant employment benefits associated with VET delivered in school programs without a workplace learning component. Sensitivity tests suggest that the results are robust to unobserved differences in school-level factors.[12] Compared to Lamb and Vickers (2006), this study demonstrated the benefits of VET in school programs with workplace learning with more up-to-date data and better controls for self-selection.

In contrast to Lamb and Vickers (2006) and Polidano and Tabasso (2014) results from Anlezark et al. (2006) are less positive. Using information from LSAY 1998 and OLS regression, they find no

[12] Sensitivity analysis is undertaken by running an OLS regression model on the post-match sample with school fixed effects to control for differences in school factors that are not controlled for in the matching.

evidence that students who participate in VET in schools have higher rates of school completion. When examining labour market and study outcomes in the first year after school, they find significant positive outcomes for those who completed year 11, but not for those who completed year 12. While it is difficult to reconcile results from this study to those from Lamb and Vickers (2006) and Polidano and Tabasso (2014), a clear difference is that they do not differentiate between programs that include different levels of workplace learning. Results from Polidano and Tabasso (2014) demonstrate that initial labour market benefits are much stronger for apprenticeships/traineeships and programs that include a workplace learning component.[13]

In the main, these studies have focussed on key outcomes associated with the main objectives of VET school programs — to encourage school retention and post-school VET study and smooth transition to employment. As far as we are aware, only Polidano and Tabasso (2016) have examined performance of VET programs delivered in schools in attaining another, but not widely acknowledged objective of VET in schools, which is to provide alternative pathways to university study for less academically inclined students. In this study, Polidano and Tabasso (2016) used population administrative data from Victoria to estimate the impacts of enrolling in a 'scored VET subject' on university entry scores (ATARs) and the chances of being offered a university place. Scored VET subjects are courses offered in Victoria that, as well as counting towards a national qualification, count towards university entry in the same way as academic subjects. Using propensity score matching, the authors find that among students who apply to university, those who enrol in these courses attain a 5% lower ATAR score than those with the same average characteristics who do not enrol. Using a decomposition approach developed specifically for the paper, the authors show that most of the gap in ATAR scores is because students who take these courses perform poorly in them (lower on average than in other courses that they take). Although the gap in ATAR scores may be considered small, given that students who take these courses are in the middle of the academic distribution (on the margins of receiving a university offer), the small gap is estimated to have a large negative impact on rate of university offer receipt — 11 percentage points.

[13] Another explanation is that outcomes from VET in schools in Anlezark et al. (2006) are based on results from 10 OLS model interaction terms (highest school level completed x VET participation x gender), which given the limited sample available from LSAY 1998, means effect sizes are estimated with a high degree of uncertainty.

4. Data and modelling approach

A key feature of this study is the pooling of three cohorts of LSAY for which data from the Program for International Assessment (PISA) is available — 2003, 2006 and 2009. In this study, we treat participation in VET delivered in school based on subject choice information in years 11 and 12 from waves 2-4 in each cohort. While there is information on VET participation in the initial PISA survey (wave 1), it cannot be used because it varies from the information in LSAY in several ways. For example, in the 2003 cohort, only information from Western Australia and Queensland is available in wave 1. In cohorts 2006 and 2009, information is asked separately about TAFE courses and VET courses.

A limitation of using information from waves 2-4 to identify VET participation is that around 22% of students are already in year 12 in wave 2, so that there is no information on their year 11 VET participation. In these cases, students will be assigned to the four groups according to their year 12 VET information only, which may mean that some students are misclassified, especially if they did VET in year 11, but not in year 12. Sensitivity of our results to alternative definitions of VET participation are tested (see appendix F for results and discussion).

Data from cohort 2015 is omitted from the analysis because at the time of analysis only information up to wave 2 was available, which is insufficient data to identify VET participation in a way that is consistent with the other cohorts. Nonetheless, results estimated using the 2003, 2006 and 2009 cohorts are still relevant to contemporary VET programs. As best as we are aware, there have been no wholesale changes to the programs between 2009 and 2015 and, except for an increased proportion who live in areas that are in the lowest quintile of socio-economic disadvantage (socio-economic index for areas), there has been little change in the characteristics of the students who enrol in these courses (see Table A.1 in appendix A).

3.1 Sample construction

Students for whom we have no information on VET delivered in schools (either because they attrited prior to leaving secondary school or did not respond to the questions about VET subjects) are omitted from the sample. In total, this leaves 25,606 students (Table 1) or 66% of the starting sample across cohorts 2003, 2006 and 2009. The rate of omission due to missing data is greater for the 2006 and 2009 cohorts compared to 2003 (around 40% compared to 15% respectively). When examining outcomes from VET participation in school, the sample of analysis is further restricted to students who are observed to have left school between waves 1 and 4 and who are observed for at least one wave thereafter (that is, have at least one post-

treatment observation). Imposing these restrictions reduces the available sample from 25,606 to 21,852.

Table 1: Sample of analysis

	Count	% of full sample
PANEL A - cohorts 2003, 2006, 2009		
Full sample	38,791	100%
With non-missing VET information in waves 2-4	25,606	66%
Who left school between waves 1 & 4 and are observed at least once thereafter	21,852	56%
- no VET	15,452	40%
- Classroom-based VET without WPL	2,553	7%
- Classroom-based VET with WPL	2,503	6%
- Apprenticeship/ traineeship	1,344	3%
PANEL B - cohort 2003		
Full sample	10,370	100%
With non-missing VET information in waves 2-4	8,785	85%
Who left school between waves 1 & 4 and are observed at least once thereafter	7,805	75%
- no VET	5,438	52%
- Classroom-based VET without WPL	1,254	12%
- Classroom-based VET with WPL	679	7%
- Apprenticeship/ traineeship	434	4%
PANEL C - cohort 2006		
Full sample	14,170	100%
With non-missing VET information in waves 2-4	8,635	61%
Who left school between waves 1 & 4 and are observed at least once thereafter	7,381	52%
- no VET	5,270	37%
- Classroom-based VET without WPL	648	5%
- Classroom-based VET with WPL	968	7%
- Apprenticeship/ traineeship	495	3%
PANEL D - cohort 2009		
Full sample	14,251	100%
With non-missing VET information in waves 2-4	8,186	57%
Who left school between waves 1 & 4 and are observed at least once thereafter	6,666	47%
- no VET	4,744	33%
- Classroom-based VET without WPL	651	5%
- Classroom-based VET with WPL	856	6%
- Apprenticeship/ traineeship	415	3%

For this project, we examine outcomes from three different types of VET courses taken in upper-secondary school (year 11 and 12) against the same comparison group — students who

do not take any VET subjects in upper-secondary school. Because students are in different years in the initial sample, we draw upper-secondary school information from waves 2 to 4. The three models of VET vary according to their workplace learning, which previous studies have shown is important in explaining initial labour market outcomes (Lamb and Vickers 2006; Polidano and Tabasso 2014):

1. students who enrol in classroom-based VET subjects without workplace learning;
2. students who enrol in classroom-based VET subjects with workplace learning; and
3. students who enrol in apprenticeship/traineeships.

To construct these groups, we use all student information available in years 11 and 12. If information from one of the years is missing, to maximise the sample, we use the information available for just one year. Assignment rules for each of the above groups are the following. If students report no participation in VET subjects in either year, they are assumed to have not participated in upper-secondary VET (comparison group). If in upper-secondary school they report enrolling in at one VET subject, are not enrolled in an apprenticeship/traineeship and report no workplace learning, they are assigned to classroom-based VET without workplace learning (model 12). If in upper-secondary school, they report enrolling in at least one VET subject, do not enrol in an apprenticeship/traineeship and report some workplace learning, they are assigned to classroom-based VET with workplace learning (model 2). Finally, if they report that their VET subject is part of an apprenticeship/traineeship in either year, they are allocated to the apprenticeship/traineeship group (model 3).

4.2 Defining outcomes

Because students within a given cohort are at different school year-levels and leave school at different points in their schooling, to put all students on equal footing, outcomes from participating in VET delivered at school are measured from the time that students leave school up until 7 years later (using LSAY 2003 and 2006), which is the longest possible time using LSAY. After 7 years out from school, most students have entered the labour market after completing initial post-secondary training, which is ideal for assessing labour market outcomes from VET delivered in school. Given that LSAY 2009 data was only available to wave 9 at the time of analysis, data from this cohort only contributes to outcomes for the first 5 years out from school.

Refer to appendix B for graphs that show how key outcomes change with years out from school.

Key education outcomes

Unlike other outcomes that are examined in each year after school, we measure school completion at one point in time, wave 5. Because the initial sample starts with students in different year levels, it is not until wave 5 that we observe all students in the sample have had an opportunity to complete their schooling. Prior to this point, we cannot get a reliable estimate of what the relative outcomes of VET delivered in school are.

The main post-secondary education outcome we examine in this study is a binary measure of whether students attained a certificate level III qualification or above. We choose certificate level III because, under the Australian Qualifications Framework, it is recognised as the minimum education level for skilled work and/or preparation for further learning.[14] To help understand the effects on education participation, we also generate a binary measure for whether education was the main activity in each year after leaving school.

Key labour market outcomes

As discussed previously, a key contribution of this study is to derive estimates of the long-term labour market outcomes. A feature of our study is the use of four labour market outcome measures that capture different aspects of job quality:

- full-time employment;
- whether the job is one that the young person would like as a career job;
- overall job satisfaction; and
- expected earnings associated with current job.

Full-time employment is defined as a binary indicator, regardless of study status. We use two measures of job satisfaction, the first is a binary measure for whether the respondent's current job is the type of job they would like as a career. The second combines information about the level of satisfaction on nine different aspects of the respondent's current job. These domains are satisfaction with: the kind of work done; opportunities to utilise skills and experiences; immediate supervisor/boss; work colleagues; pay; opportunities for training; tasks assigned; recognition for tasks done well and opportunities for promotion. In each year, to deal with the

[14] https://www.aqf.edu.au/aqf-qualifications.

difference in domain scales by cohort (after reverse coding), we standardise scores and average across domains for everyone.[15]

To measure whether VET delivered in schools helps young people find jobs that have superior earning capacity, we generate a measure of annual occupation earning capacity based on the earnings of people currently employed in different occupations. The measure of average annual occupation earnings is based on biannual earnings data from the Australian Bureau of Statistic's Employee Earnings and Hours, Australia, 2004-2016 (catalogue number 6306.0). In this setting, average occupation earnings is a preferable measure of the possible labour market returns to VET delivered in school than individual wages because the latter is heavily influenced by labour market experience (which will downward bias higher education graduates who have fewer years in employment). See appendix A for a description of how average annual occupation earnings were linked to LSAY.

4.3 Modelling approach

A key focus of this study is estimating outcomes associated with participation in VET delivered in school, controlling for differences in the characteristics of students who do and do not participate in the program. Failure to control for these differences means that any estimated outcome associated with VET participation could reflect differences in the capacity of student who do and do not participate and not the causal effect of the program, which is the estimate of interest.

The approach we use to adjust for differences in the characteristics of participants and non-participants is ordinary least squares (OLS) regression, which we estimate separately at each point in time (either each wave for school completion or each year after leaving school for the rest of the outcomes). To estimate causal impacts of VET participation, the OLS approach relies on controlling for all differences in characteristics between participants and non-participants that may affect outcomes, which relies on having very rich data. Below we describe the control variables used in the analysis, but in practice, it is impossible to know if these are enough. As a result, like in any control-type study, we cannot claim causation.[16] We also estimate results from an alternative approach, propensity score matching (PSM), that restricts the comparison group in ways that reduces the scope of bias from variables that are not in the

[15] Responses in LSAY 2003 and 2006 are measured on a four-point scale (1 Very satisfied; 2 Fairly satisfied; 3 Fairly dissatisfied; 4 Very dissatisfied), whereas in LSAY 2009 they are measured on an 11-point scale (0 very dissatisfied to 10 very satisfied). Results standardised scores for each domain are averaged because results from a factor analysis suggest that all items are tapping into only one underlying factor.

[16] Only study designs that generate random assignment to treatment (VET participation) or exploit natural random assignment to treatment, such as policy changes that affect VET participation in some schools and not others, can make causal claims.

data (to the extent that restricting the comparison group on factors in the data also restricts the comparison groups on factors outside the data). See the robustness test section below and appendix F for more details.

Another form of potential bias of the OLS results is from non-random attrition — respondents with certain characteristics systematically leaving the LSAY sample. The concern is that if there are unobserved differences between those who do and do not participate in VET delivered in schools, which also affect their chances of leaving the survey and outcomes, results may be biased. We also test the sensitivity of the results to bias from this source (see the robustness test section and appendix F).

4.4 Choice and derivation of control variables

To adjust for differences in outcomes between those who do and do not participate in school-based VET that are associated with differences in school and student characteristics (and not program participation), we include a rich set of controls in the regression model. Controls used in this study and their average levels by VET participation are presented in Table 2 below. These controls are based on those from Polidano and Tabasso (2014) and are chosen because they may affect the chances of participating in VET delivered in schools and outcomes of interest. In the main, the control variables relate to academic achievement in school, student post-school aspirations, local labour market conditions, regional characteristics, school characteristics and parents' education and aspirations for their child.

Table 2: Average characteristics of the sample of analysis by VET participation

	No VET	Classroom-based VET without WPL	Classroom-based VET with WPL	Apprenticeship/ traineeship
Cohort				
2003	0.352	0.491	0.271	0.323
2006	0.341	0.254	0.387	0.368
2009	0.307	0.255	0.342	0.309
Gender				
Female	0.542	0.525	0.529	0.457
Male	0.458	0.475	0.471	0.543
Indigenous status				
Aboriginal or Torres Strait Islander	0.040	0.058	0.072	0.108
Non-indigenous	0.960	0.942	0.928	0.892
Australian-born	0.891	0.902	0.930	0.937
English spoken at home	0.917	0.944	0.949	0.951

State/Territory				
New South Wales	0.205	0.204	0.399	0.184
Victoria	0.185	0.174	0.123	0.172
Queensland	0.171	0.239	0.107	0.242
South Australia	0.119	0.100	0.086	0.087
Western Australia	0.133	0.134	0.079	0.097
Tasmania	0.068	0.045	0.116	0.094
Australian Capital Territory	0.081	0.058	0.046	0.070
Northern Territory	0.039	0.046	0.044	0.054
Region				
Major city	0.740	0.663	0.632	0.629
Regional area	0.240	0.305	0.340	0.330
Rural area	0.020	0.032	0.028	0.041
Father Australian-born	0.671	0.730	0.758	0.770
Father's highest education level				
Year 10 or below	0.143	0.228	0.194	0.208
Year 11 (or equivalent)	0.074	0.083	0.098	0.113
Secondary school certificate	0.161	0.173	0.176	0.167
Post-secondary qualification	0.240	0.266	0.331	0.312
University degree	0.382	0.250	0.201	0.201
Mother Australian-born	0.680	0.734	0.763	0.773
Mother's highest education level				
Year 10 or below	0.146	0.202	0.176	0.202
Year 11 (or equivalent)	0.076	0.083	0.102	0.105
Secondary school certificate	0.197	0.204	0.209	0.239
Post-secondary qualification	0.220	0.255	0.298	0.242
University degree	0.362	0.257	0.216	0.212
School year at age 15				
Year 9 or below	0.069	0.052	0.093	0.095
Year 10	0.700	0.704	0.799	0.734
Year 11 or above	0.231	0.243	0.108	0.171
Student's intention for first year after school				
University	0.663	0.434	0.357	0.260
Other study	0.136	0.365	0.410	0.545
Work	0.056	0.089	0.094	0.109
Other	0.144	0.112	0.140	0.085
Parent's intention for first year after school				
University	0.707	0.493	0.445	0.334
Other study	0.092	0.245	0.298	0.402

Work	0.046	0.086	0.087	0.124
Other	0.155	0.176	0.170	0.141
Prestige of intended occupation at 30	73.6	62.4	58.1	54.6
Government school at 15	0.546	0.681	0.665	0.676
Quintile of PISA mathematics score				
Lowest quintile	0.090	0.183	0.204	0.292
2nd lowest quintile	0.147	0.224	0.250	0.246
3rd lowest quintile	0.194	0.229	0.240	0.227
4th lowest quintile	0.252	0.206	0.195	0.158
Highest quintile	0.316	0.157	0.111	0.077
Quintile of PISA reading score				
Lowest quintile	0.086	0.183	0.189	0.291
2nd lowest quintile	0.141	0.223	0.252	0.275
3rd lowest quintile	0.200	0.222	0.245	0.202
4th lowest quintile	0.257	0.202	0.196	0.150
Highest quintile	0.315	0.171	0.117	0.081
SES (normalised)	0.047	-0.021	-0.065	-0.100
Any government payment	0.236	0.290	0.319	0.308
Average school peer SES (normalised)	0.033	-0.016	-0.031	-0.032
School peer VET participation				
Classroom-based VET without WPL	0.107	0.176	0.126	0.134
Classroom-based VET with WPL	0.102	0.124	0.190	0.134
Apprenticeship/ traineeship	0.057	0.069	0.070	0.086
Local unemployment rate	4.83	5.21	5.15	5.20
Number of observations	15,452	2,553	2,503	1,344

When constructing the control variables, we use information from wave 1, except for peer VET participation which is calculated over years 11-12 and postcode (wave 2). The measure of SES is a continuous variable known as the Economic, Social and Cultural Status (ESCS) index that combines information on parents' occupation, education and household resources. To make this variable easy to interpret, for each cohort we standardise the continuous measure, that is, transform it into a variable with mean zero and a standard deviation of one.

As a control for post-school job aspirations, we use a measure of social status associated with the occupation that 15-year-olds aspire to by age 30 (Australian Socio-economic Index (AUSEI06)), that ranges from 0 (low status) to 100 (high status).[17] We link AUSEI06 to the

[17] For more information: https://www.acer.org/au/ausei06.

occupation that students report that they would like to have when they are age 30, which is reported in wave 1 (age 15). Student post-secondary educational aspirations reported by students themselves at 15 and by their parents (self-reported) are also controlled for. To adjust for differences in local economic conditions, we link average annual Small Area Labour Markets (SALM) unemployment to student residential postcodes.

From descriptive statistics provided in Table 2, it appears that school-based VET participation is associated with student characteristics that are associated with labour market disadvantage. They have lower levels of academic achievement in PISA, are more likely to have parents without higher education qualifications, are less likely to aspire to university study, have intended occupations at 30 that have lower prestige and are more likely to live in a rural area. The greater level of disadvantage faced by VET students suggests that failure to control for these differences may bias the estimated effect of VET delivered in school.

5. Results

In contrast to the differences observed in Table 2, regression results from Table 3 below estimate the 'independent association' between each of the control variables and participation in each of the models of VET. This means that association between one variable and the chances of school-based VET participation, when the values of all other variables are held constant. The coefficients in Table 3 represent the percentage point change in the rate of enrolling in each of the VET models of school-based VET (relative non-participation) for a one unit change in each of the control variables. For discrete control variables (those like gender, that have limited categories) a one-unit change means the difference in rate of enrolling when the control variables is a certain level (e.g. female), relative to when it a reference category or omitted category. For categorical variables that have two categories, like female, the reference category is obvious. In other cases, we indicate the omitted or reference category by 'ref.' For example, the 0.023 coefficient for Queensland in Table 3 (column 2) is interpreted as upper-secondary students in Queensland have, on average, a 2.3 percentage point higher chance of enrolling in classroom-based VET without workplace learning compared to students in NSW.

In Table 3 we indicate whether the estimated statistic is different from zero using asterisks. In general terms, coefficients that have one asterisk reflect a 90% level of confidence that the population statistic is different from zero; two asterisks reflect a 95% confidence level and three asterisks reflect a 99% confidence level. For coefficients without an asterisk, we conclude that there is no evidence that the population statistic is different from zero.

Regression results associated with outcomes (presented in figures below) are interpreted as the difference in the outcome of interest (in the relevant units of the outcome) associated with participation in a specific model of VET, compared to non-participation. Except for school completion, which is reported in wave 5, all other outcomes are measured in each year from the time students leave school. To reflect the degree of uncertainty around the estimates, we present intervals that represent the range of regression estimates with 95% confidence level. The narrower the range, the more precisely estimated the result. In general terms, where the confidence interval includes the value 0, we conclude that the estimates are not statistically significant. In all the figures of results over time, we present a vertical line to represent the time until when LSAY 2009 contributed to the results — wave 9 or 5 years out from school.

5.1 Factors associated with participation in VET

Consistent with the descriptive statistics reported in Table 2, we find that participation in VET delivered in schools is associated with lower levels of academic achievement. Specifically, we estimate that being in the highest quintile in mathematics in PISA, relative to the reference category of the lowest quantile, is associated with around a 5 to 6 percentage point lower rate of participation in VET delivered in school.

Interestingly, we find no evidence that participation in VET delivered in schools is strongly associated with socio-economic status. We find no significant results for the continuous measure of student socio-economic status (ESCS) and school peer socio-economic status, an exception is a weak association between student socio-economic status and apprenticeship/traineeship participation — a one standard deviation increase in the student ESCS score is associated with a 0.6 percentage point decrease in apprenticeship/traineeship participation rate. There is no statistical difference between metropolitan and rural rates of participation; family receipt of a government payment has little bearing on participation, nor does the school type; except for VET without workplace learning, migrants have the same rates of participation as native born; mother's education has no significant association with participation and only students whose fathers are educated at below year 10 level have higher rates of participation in classroom-based VET without workplace learning.

The small direct effect of socio-economic background doesn't mean that socio-economic status doesn't play a role. Instead, it is likely to influence participation indirectly through lower academic achievement and a greater willingness to pursue post-school pathways that do not involve university study. These we control for in the regression and are found to be much more strongly associated with participation in VET delivered in school. The coefficient on the student's aspirations at 15 for 'other study', mostly VET study, is particularly large — around a 10 percentage point higher rate of VET participation, relative to an aspiration of university study. This suggests that an intention to undertake post-secondary VET study is an important motivator for participation in VET delivered in schools.

For results by subgroup, please see appendix D.

Table 3: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	s.e.	Coefficient	s.e.	Coefficient	s.e.
Cohorts (ref: 2003)						
'2006	-0.034***	(0.007)	0.030***	(0.006)	0.014***	(0.005)
'2009	-0.016**	(0.008)	0.045***	(0.007)	0.027***	(0.006)
Female	0.005	(0.005)	0.009*	(0.005)	-0.005	(0.004)
Aboriginal or Torres Strait Islander	-0.015	(0.015)	0.007	(0.015)	0.046***	(0.014)
Australian-born	-0.025***	(0.009)	-0.012	(0.008)	-0.003	(0.007)
English spoken at home	0.013	(0.010)	0.013	(0.009)	0.007	(0.007)
Missing info on birth country and or language	-0.010	(0.023)	0.007	(0.023)	0.003	(0.020)
State/Territory (ref: NSW)						
Victoria	0.006	(0.008)	-0.072***	(0.009)	0.007	(0.007)
Queensland	0.023**	(0.010)	-0.079***	(0.010)	0.028***	(0.008)
South Australia	-0.009	(0.009)	-0.079***	(0.010)	-0.011	(0.007)
Western Australia	0.004	(0.010)	-0.066***	(0.010)	0.003	(0.008)
Tasmania	-0.030***	(0.011)	-0.028**	(0.013)	0.008	(0.010)
Australian Capital Territory	-0.002	(0.011)	-0.074***	(0.010)	0.008	(0.008)
Northern Territory	0.005	(0.016)	-0.048***	(0.017)	0.008	(0.014)
Region (ref: major city)						
Regional area	-0.003	(0.007)	-0.004	(0.007)	-0.002	(0.006)
Rural area	0.014	(0.022)	-0.018	(0.021)	0.014	(0.020)
Father Australian-born	0.010	(0.007)	0.007	(0.006)	0.003	(0.005)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	-0.026**	(0.013)	-0.019	(0.013)	0.001	(0.011)
Secondary school certificate	-0.020**	(0.010)	0.000	(0.010)	-0.004	(0.008)
Post-secondary qualification	-0.027***	(0.009)	0.006	(0.009)	0.007	(0.008)
University degree	-0.032***	(0.009)	-0.018**	(0.009)	0.000	(0.007)
Missing info on father's birth country and/or education	-0.029**	(0.014)	-0.021	(0.014)	-0.004	(0.012)
Mother Australian-born	-0.001	(0.007)	0.002	(0.006)	-0.003	(0.005)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	-0.005	(0.013)	-0.012	(0.012)	-0.010	(0.011)
Secondary school certificate	-0.001	(0.009)	-0.002	(0.009)	0.001	(0.008)
Post-secondary qualification	0.012	(0.009)	0.012	(0.009)	-0.005	(0.008)
University degree	0.007	(0.009)	-0.005	(0.008)	-0.001	(0.007)
Missing info on mother's birth country and/or education	-0.014	(0.019)	0.002	(0.018)	-0.027*	(0.015)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.038***	(0.010)	0.011	(0.011)	0.003	(0.009)
Year 11 or above	0.024**	(0.012)	-0.033***	(0.012)	-0.022**	(0.010)
Student's intention for first year after school (ref: university)						
Other study	0.109***	(0.012)	0.104***	(0.012)	0.101***	(0.011)
Work	0.035**	(0.014)	0.050***	(0.014)	0.034***	(0.012)
Other	0.011	(0.009)	0.020**	(0.009)	-0.004	(0.006)
Missing information on intentions	0.020**	(0.009)	0.043***	(0.009)	0.026***	(0.008)
Parent's intention for first year after school (ref: university)						
Other study	0.036**	(0.014)	0.054***	(0.014)	0.067***	(0.013)
Work	0.024	(0.016)	0.018	(0.016)	0.046***	(0.015)
Other	0.017*	(0.008)	0.010	(0.008)	0.007	(0.006)
Missing information on intentions	0.014*	(0.008)	0.001	(0.008)	0.018***	(0.007)

Prestige of intended occupation at 30	-0.001***	(0.000)	-0.002***	(0.000)	-0.001***	(0.000)
Missing information on expected earnings of intended occ.	-0.096***	(0.015)	-0.181***	(0.015)	-0.106***	(0.013)
Government school at 15	-0.001	(0.005)	-0.015***	(0.005)	-0.011***	(0.004)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	-0.012	(0.013)	-0.017	(0.013)	-0.041***	(0.012)
3rd lowest quintile	-0.014	(0.014)	-0.026*	(0.014)	-0.037***	(0.013)
4th lowest quintile	-0.034**	(0.015)	-0.049***	(0.014)	-0.057***	(0.013)
Highest quintile	-0.050***	(0.015)	-0.059***	(0.015)	-0.063***	(0.013)
Quintile of PISA reading score						
2nd lowest quintile	-0.009	(0.014)	0.000	(0.013)	-0.032**	(0.013)
3rd lowest quintile	-0.025*	(0.014)	-0.016	(0.014)	-0.059***	(0.013)
4th lowest quintile	-0.034**	(0.015)	-0.037**	(0.014)	-0.064***	(0.013)
Highest quintile	-0.031**	(0.016)	-0.046***	(0.015)	-0.064***	(0.014)
SES (ESCS standardised)	0.003	(0.004)	-0.002	(0.004)	-0.006*	(0.003)
Any government payment	0.001	(0.007)	0.011*	(0.007)	-0.004	(0.006)
Missing information on government payments	-0.019**	(0.009)	0.003	(0.009)	-0.007	(0.007)
Average school peer SES (ESCS standardised)	-0.002	(0.008)	-0.007	(0.008)	-0.005	(0.007)
Rate of school peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.583***	(0.033)	0.192***	(0.030)	0.087***	(0.026)
Classroom-based VET with WPL	0.225***	(0.031)	0.533***	(0.032)	0.127***	(0.026)
Apprenticeship/ traineeship	0.098**	(0.047)	0.099**	(0.045)	0.267***	(0.046)
Local unemployment rate	0.000	(0.001)	-0.001	(0.001)	0.000	(0.001)
Number of observations	17,818		17,768		16,616	

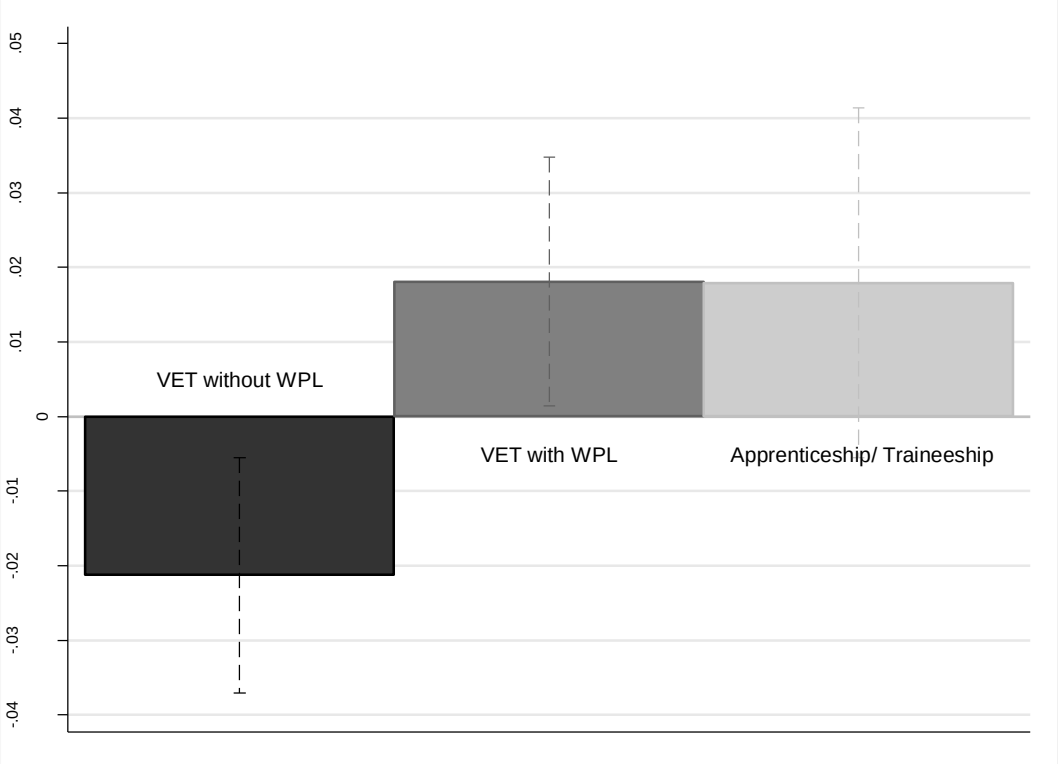
We find that having same-age peers who participate in VET is strongly associated with the individual rates of participation in VET. For example, a 10 percentage point increase in the rate of participation in apprenticeships/traineeships amongst peers is associated with a 2.7 percentage point increase in the own chances of enrolling in an apprenticeship/traineeship program in school. Because this variable is measured at the school level, it is likely to reflect both the availability and quality of the VET program across schools. Whether this variable should be included as a control is debatable. On the one hand, VET availability and quality across school may be correlated with other school-level factors that are not controlled for, such as across-the-board quality of teachers, which may also impact outcomes. Adding this as a control may limit the possibility of bias from this source. However, to the extent that higher rates of participation among peers reflects higher program quality, which is not correlated with other school-level factors, including it as a control may mean we are under-estimating the true post-school benefits.

5.2 Outcomes

Consistent with previous study by Polidano and Tabasso (2014), results in Figure 1 suggest that VET courses with workplace learning and apprenticeship/traineeship are associated with a higher chance of school completion by around 2 percentage points (at wave 5), although the result for apprenticeship/traineeship is only at the margins of statistical significance (90% significance). In contrast, we estimate that participating in VET programs without a workplace learning component are associated with around a 2 percentage point lower completion rate.

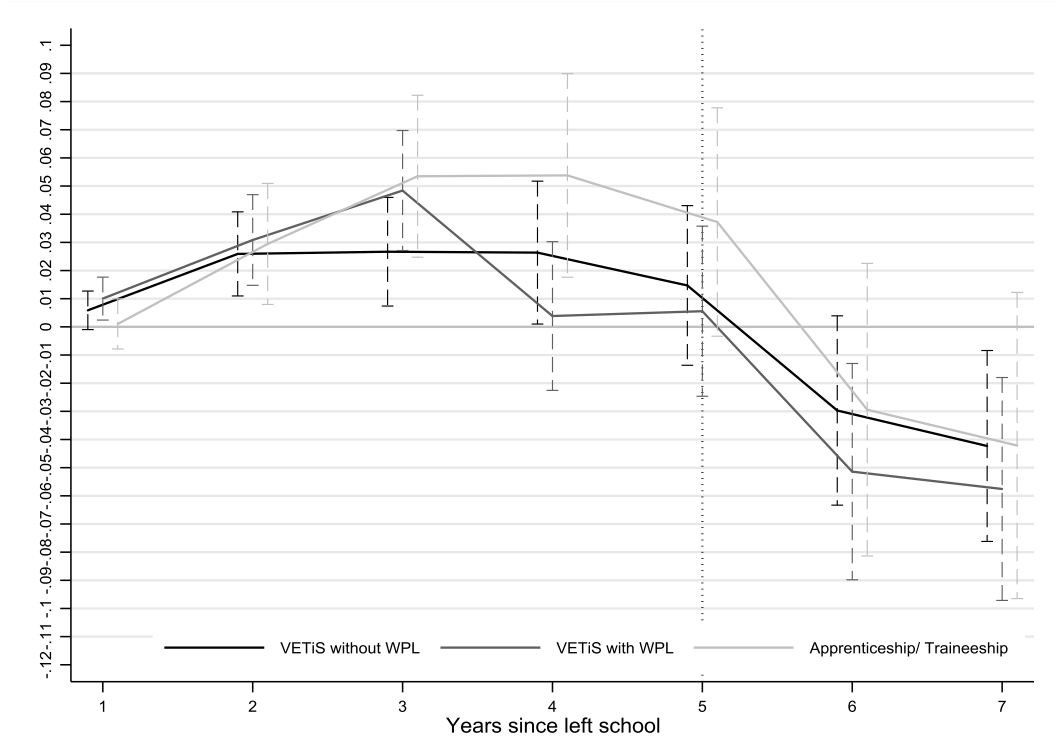
In terms of post-secondary education (Figure 2), we find that VET delivered in school improves the chances of attaining at least a certificate III qualification in the first 4 years after school, but that these positive effects disappear by the fifth year out from school. In years 6 and 7, we observe that there is a lower rates of certificate III attainment among participants of school-based VET programs, although the differences for those who participated in apprenticeship/traineeship programs is only on the margins of statistical significance (90%).

Figure 1: Percentage point difference in the rate of year 12 completion (wave 5) associated with upper-secondary VET participation, compared to non-participation (regression results)



This pattern can be explained by the association of school-based VET with a switch away from university study towards post-secondary VET courses that have a shorter duration (certificate III level courses are typically 12 to 18 months). In the first year out from school, there is very little difference in the rate of post-secondary study between school-based VET participants and non-participants (see Figure C.1 in appendix C), but the differences in the post-secondary education pathways followed means that school-based VET participants attain certificate III qualifications earlier. However, because non-participants tend to enrol in higher-level and longer courses, by year 6 out from school, their certificate III and above rate of qualification attainment overtakes that of participants.

Figure 2: Percentage point difference in the rate of certificate III and above attainment associated with upper-secondary VET participation, compared to non-participation (regression results)



The corollary of enrolling in lower-level and shorter post-secondary courses is that participants of VET delivered in schools get a head start in the labour market. Overall, in the first five years out from school, we estimate that participating in VET delivered in schools is associated with higher rates of full-time employment (Figure 3) and attainment of a career job (Figure 4). For programs with workplace learning (classroom based and apprenticeships/traineeships), we find that the jobs attained have higher expected earnings (Figure 5), although the results for classroom-based VET with workplace learning are on the margin of statistical significance, and higher job satisfaction (Figure 6). Despite the labour market benefits associated with school-based VET participation in the first five years out from school, the benefits appear to disappear over time and by year 7 the differences are all statistically insignificant.

As discussed in previous sections, there are several judgements made about the derivation of key variables, the sample and the modelling method to produce the estimates of outcomes. Robustness tests have been conducted and we find no evidence to suggest that the outcome results presented above are sensitive to these judgements (see appendix F for results). An exception is that we find the school completion results reported below are sensitive to the definition of upper-secondary VET. Specifically, if we restrict the analysis to VET in the last year of school, the results are less positive (see appendix F for a discussion).

Figure 3: Percentage point difference in the rate of full-time employment associated with upper-secondary VET participation, compared to non-participation (regression results)

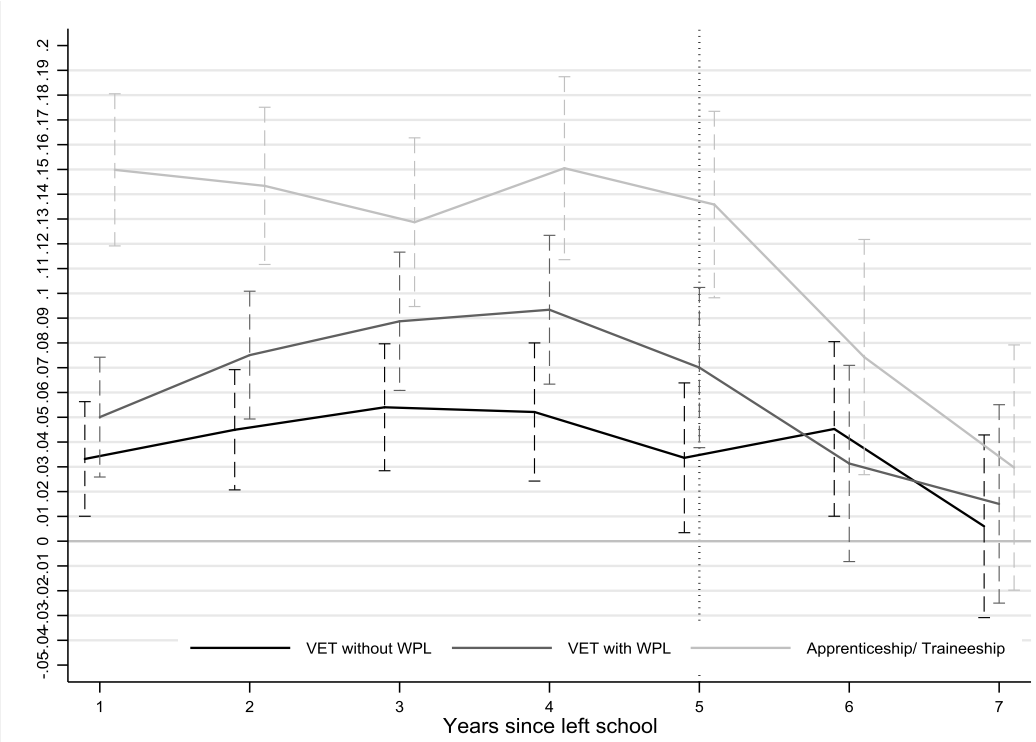


Figure 4: Percentage point difference in the rate of attainment of a 'career job' associated with upper-secondary VET participation, compared to non-participation (regression results)

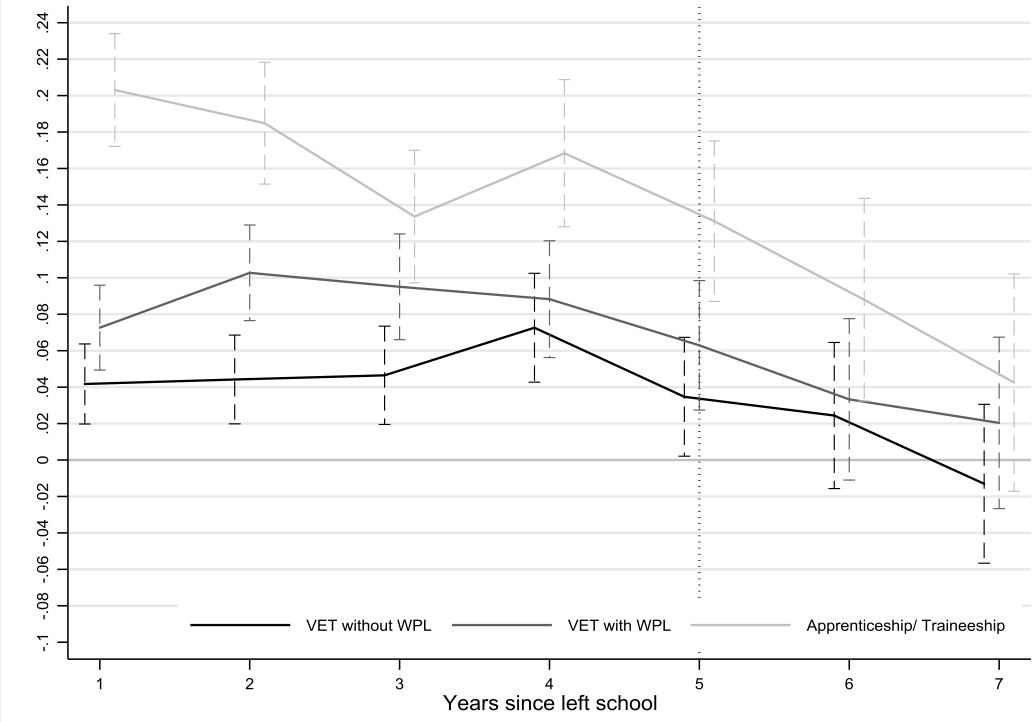


Figure 5: Difference in the average annual earnings (A$'000 2018) of jobs associated with upper-secondary VET participation, compared to non-participation (regression results)

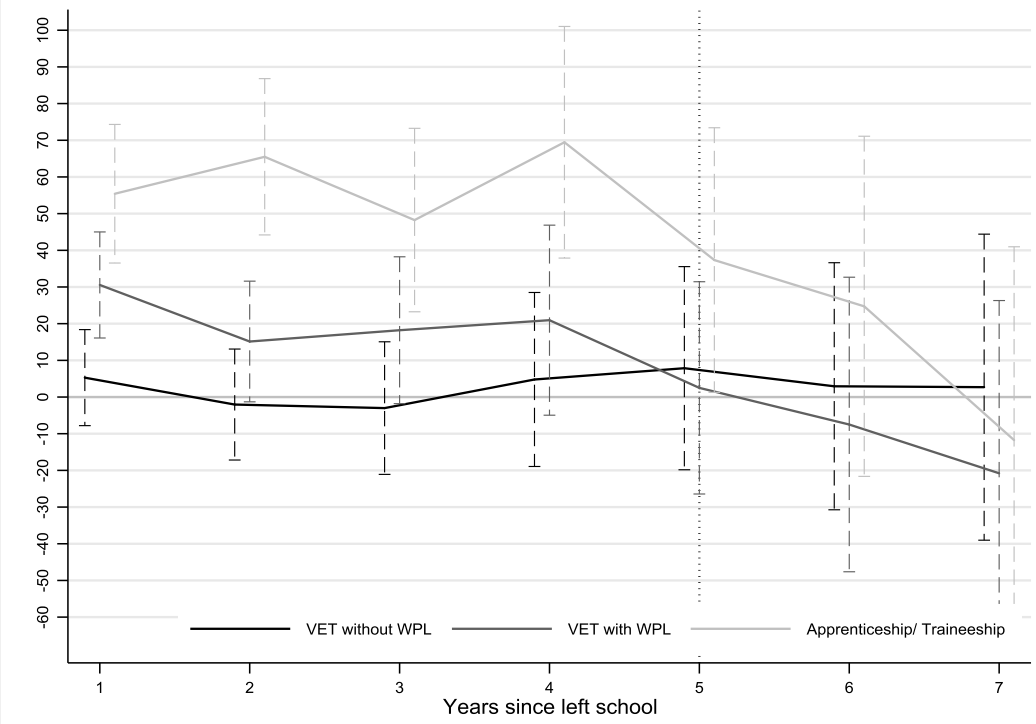
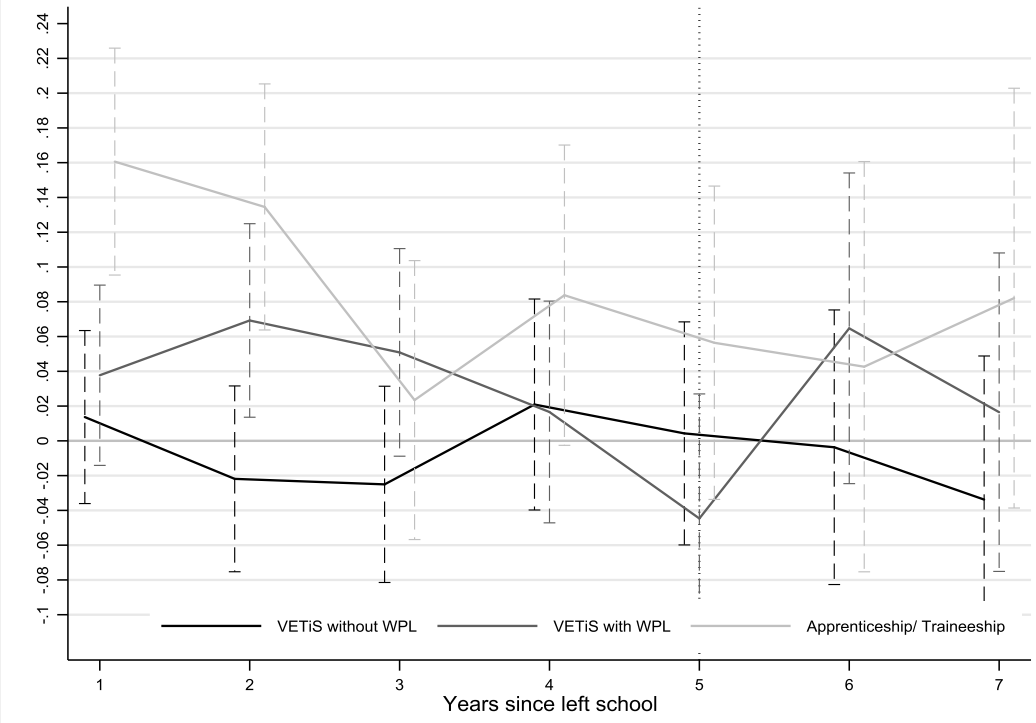


Figure 6: Difference in reported job satisfaction (standard deviations) with upper-secondary VET participation, compared to non-participation (regression results)



Explaining the short-run nature of labour market benefits

To try and better explain why the initial positive outcomes of school-based VET do not persist longer-term, we estimate long-run results separately by differences in initial post-secondary pathway, namely by those whose main activity in the first year out from school is study and those whose main activity is employment. Results presented in Figures 7 and 8 suggest that outcomes from VET delivered in school do differ by initial post-secondary pathway. Specifically, the results in Figure 8 show that for those who go onto further study, the initial labour market benefits from VET persist up to seven years out from school, but the results peter out for those who do not go onto further study. At year 7 for those who continue study after school, we estimate around a 5 percentage point higher rate of full-time employment associated with participation in classroom-based VET with and without workplace learning (albeit only at a 90% significance level for the latter), and around a 10 percentage point higher rate associated with apprenticeships/traineeships. For VET with workplace learning, we also estimate significant higher rates of attainment of a career job — 7 and 10 percentage point higher for classroom-based and apprenticeship/traineeship respectively — and a 0.14 standard deviation higher average job satisfaction. However, the job satisfaction result for apprenticeships/traineeships is only on the margins of significance (90%).

Our interpretation of these results is that for those who transit from school to employment, school-based VET gives young people a head-start in the labour market, but that the jobs that they attain do not provide the training and work experiences to develop the necessary skills to capitalise on their early advantage. For those who enter study after school, a possible interpretation is that participation in school-based VET with workplace learning helps match young people to post-secondary VET courses that have superior job prospects. VET programs with workplace learning may be particularly advantageous in this regard because the contact with employers provides real-world information to students about the nature of work in their chosen area and the relative demand for their skills upon graduation.

Figure 7: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those whose main activity is work in the first year out from school (regression results)

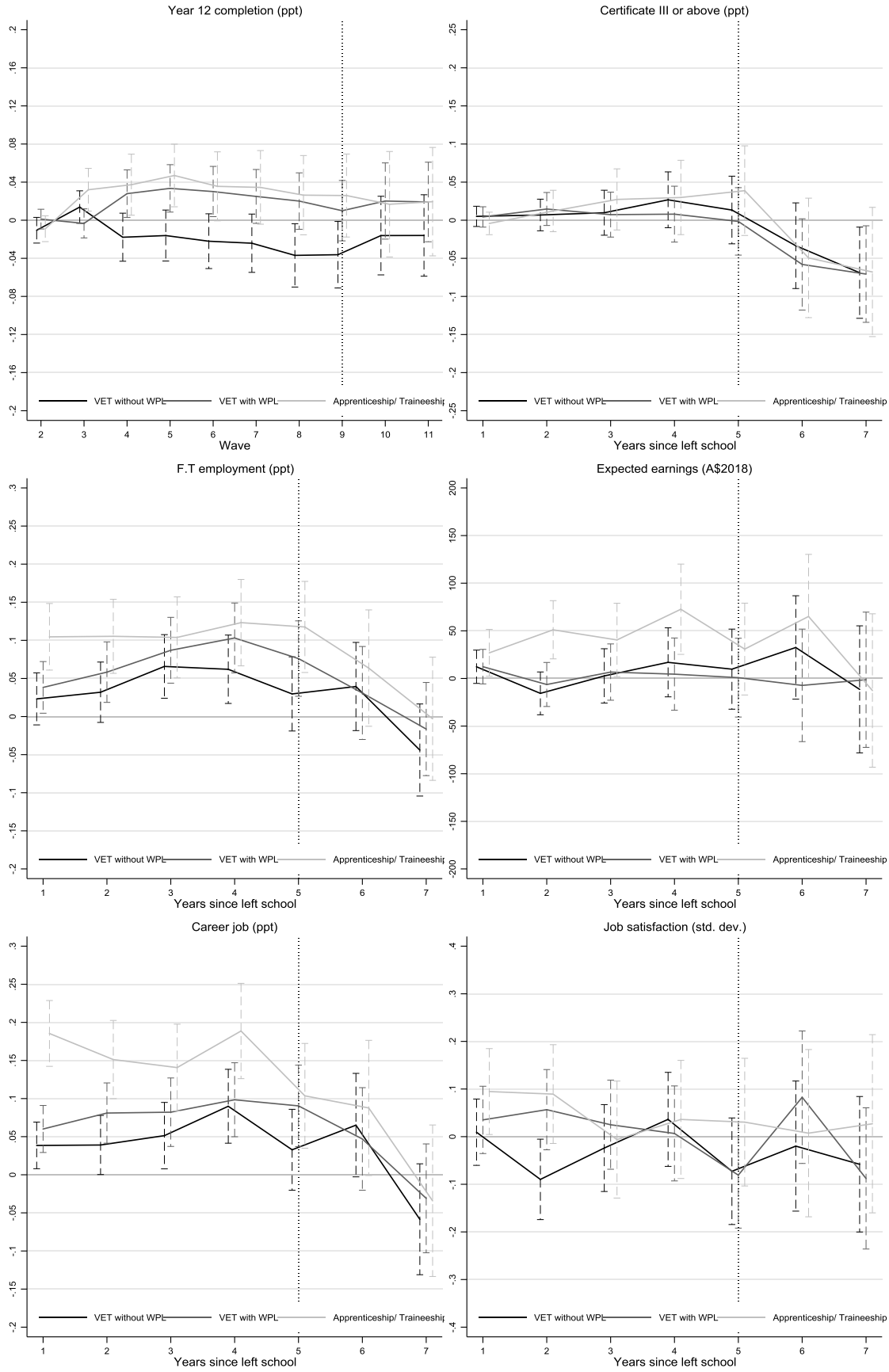
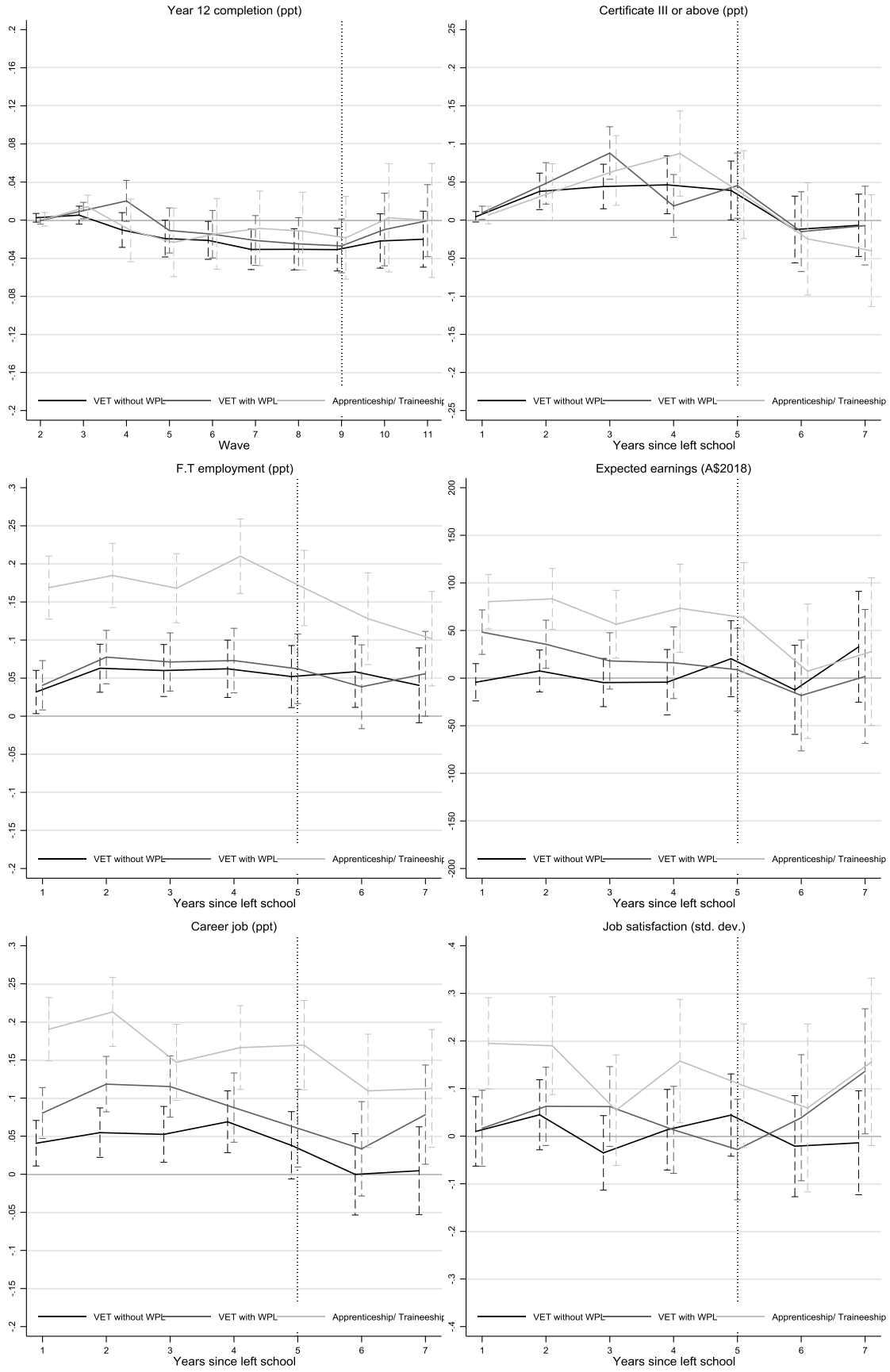


Figure 8: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those whose main activity is study in the first year out from school (regression results)



An alternative explanation for the positive long-run effects for participating in VET with workplace learning for those who go onto further study is that these post-secondary studies generated higher levels of general skills that payoff long-term in the labour market. To test this, we regressed self-reported average responses to questions of general skill acquisition from study against the same variables used as controls in other outcome models.[18] Results (presented in Table C.1 in appendix C) suggest the opposite, that those who participated in school-based VET programs (who are more likely to go on and study post-secondary VET rather than a bachelor degree) report lower levels of general skills being accumulated from their post-secondary study. This result suggests that if anything, the long-run benefits of school-based VET participation for those who go onto further study is reduced by a lower accumulation of general skills, although results are unchanged when we control for measures of general skills from study in the labour market regression models.

[18] These questions included the extent to which the student agrees (on a scale of 0 to 10 or 1 to 4, depending on the LSAY cohort) that the course improved their problem-solving skills, analytical skills, ability to work as a team member, confidence in tackling unfamiliar problems, communication skills and work planning.

Sub-group outcomes

A feature of our study is that by pooling three cohorts of LSAY we can generate enough observations to provide the statistical power to estimate long-run effects by sub-groups. In what follows below, we discuss results by gender, rural/metropolitan and indigenous and socio-economic status.

Given that the post-secondary education pathways for school-age children depend on their schooling achievement, it is possible that the outcomes of VET delivered in schools vary by academic achievement. To explore this issue, we estimate OLS regression models of outcomes from VET participation for the following sub-groups of students — those with PISA reading proficiency in the bottom 40% of their cohort; those with a reading proficiency in the middle quintile and those in the top 40%. Results are presented in Figures E.1, E.2 and E.3 of appendix E.

For those in the top and bottom 40% of PISA reading, results are much the same as across all achievement levels on average. However, for the middle 20%, we do observe more persistent full-time employment, job satisfaction and reported career job benefits, although the results are imprecisely estimated (large confidence intervals around the estimates). More persistent benefits in the middle is consistent with the hypothesis that VET may help students find good post-secondary VET pathways. A key finding of a recent study by Polidano and Ryan (2017) using LSAY 2003 was that students in the middle of the academic distribution in PISA (level 3 and 4) choose post-secondary VET courses that have lower expected graduate earnings, a proxy for skill demand, than those in the bottom (below level 3). Students in the middle have fewer university course choices than those in the top, and compared to those in the bottom, have less exposure to post-secondary VET pathways. Those in the middle are less likely than the bottom to have had a parent with a VET qualification and their early career planning is more likely to have involved university study. For students in the middle, taking a VET course with workplace learning while in school may help them find better career paths in VET, especially if they have missed-out on a university place.

Based on the patterns of the regression estimates (see Figures E.4-E.12), we find no strong evidence to suggest differences in outcomes from VET delivered in schools by gender; rural/metropolitan; indigenous/non-indigenous and socio-economic status. However, we must stress that the results for the subgroups, especially out to year 7, are imprecisely estimated because of the small sample sizes at this time. This is especially true for indigenous students, for which we only observe positive outcomes for apprenticeship/traineeship participation (between years 2 and 6 out from school). That said, one difference of note is in the expected

earnings by gender associated with apprenticeship/traineeship participation. For males, participating in school-based apprenticeship/traineeship programs is associated with being in a job 7 years out from school that has higher average annual (expected) earnings of $50,000 per year. In contrast for females, participating in school-based apprenticeship/traineeship programs is not associated with jobs that earn a premium in the labour market in year 7. This is likely to reflect differences in pay of gender-based occupations associated with apprenticeship/traineeship programs, especially the high pay of trade-based apprenticeships that are dominated by males.

6. Conclusions

Studies to date on VET programs delivered in schools have found mostly positive outcomes (Fullarton 2001; Anlezark, Karmel and Ong 2006; Lamb and Vickers 2006; Nguyen 2010; Black, Polidano and Tabasso 2011 and Polidano and Tabasso 2014; Misko, Korbel and Blomberg 2017), especially for school completion and initial labour market outcomes. However, a major limitation of these studies is that they only measure initial post-school study enrolments and outcomes of students who enter the labour market after school. This provides a very limited insight into the outcomes of school VET courses because they are silent on the long-run impacts on qualification attainment and post-study labour market outcomes. A likely reason for the short-run focus of studies to date is a paucity of long-run data. This has been largely limited to survey information from cohorts of the Longitudinal Survey of Australian Youth (LSAY), which by themselves have insufficient sample sizes (combined with high rates of attrition) to produce statistically robust results over the long term.

As far as we are aware, this is the first study to address this issue by integrating information from all available cohorts of LSAY (2003, 2006 and 2009) that contain data from the Program for International Student Assessment (PISA) to produce a longitudinal dataset with the statistical power to measure long-run effects from VET delivered in schools. Using OLS regression models, controlling for a rich set of factors that may affect selection into the programs and outcomes (including PISA scores in reading), our findings for initial post-secondary outcomes are consistent with previous studies. Specifically, we find that VET delivered in schools is associated with higher rates of full-time employment and transition to work in jobs that respondents report as being ‘career jobs’.

However, by tracking students longer-term, we show that this initial labour market advantage shrinks over time and is no longer evident for most students by seven years out from school. Our interpretation is that the initial advantage in employment is because VET provided in

schools opens-up alternative career paths to university study that direct young people to full-time employment sooner.

Interestingly, long-term labour market benefits (up to 7 years out from school), including improvements in rates of full-time employment and job satisfaction, are only found for those whose VET programs involve workplace learning and who continue study after school. One potential explanation is that VET programs in school are important in providing real-world experiences of work and employer connections that help young people find good VET post-secondary education pathways, including pathways that lead to ongoing skill development. The sorting hypothesis of workplace learning is consistent with other results that show similarly persistent results estimated for a sub-group of middle-achieving students in PISA. A recent study by Polidano and Ryan (2017) using LSAY found that, compared to students in the bottom of the distribution in PISA, students in the middle had greater difficulty finding pathways in VET that were associated with positive graduate outcomes. Further research to explore this issue in more detail could be pursued in the future using linked administrative records.

7. Policy discussion

It is important to stress that the lack of persistence of labour market benefits, on average, estimated in this study does not mean that there are no benefits to participation in school-based VET. The head start in the labour market is estimated to deliver extra earnings in the first seven years that are the equivalent to receiving lump-sum payments in the first year out from school of $26,408; $39,954 and $60,294 for classroom-based VET without workplace learning, classroom-based VET with workplace learning and apprenticeship/traineeships respectively.[19] To the extent that the extra earnings offer opportunities for other consumption and investment, with no longer-term negative impacts, this is a real benefit.

However, it is not clear that there are no longer-term negative impacts, especially associated with a reduced likelihood of higher-level qualifications. It is commonly argued that, by its nature, VET is good at preparing young people for skills that are in demand today. However, over time, the job-specific nature of VET training makes VET graduates more susceptible to technological change that diminishes their employability later in life. The strongest evidence of this to date is from a study by Hanushek et al. (2017), who compares outcomes of male VET and general education graduates across 11 OECD countries (not including Australia) over a working-life. The authors find that VET is associated with higher earnings and rates of employment up until around age 50, after which VET graduates are at a disadvantage.

[19] Assuming a 5 percent discount rate over the seven years.

However, the results of the Hanushek et al. study find that this pattern of outcomes is strongest in German speaking countries where investment in education and training is typically a 'one-shot' investment in youth, which is very different to the Australian context. Understanding outcomes of VET programs over a longer time-frame should be a focus of future research, an issue that can only be addressed using administrative datasets that contain outcome information, such as tax, household census and Centrelink data linked with LSAY and/or other administrative education records.

Results presented in this study suggest that the outcomes of VET delivered in school may be improved by measures to address barriers that limit opportunities for workplace learning. This could involve taking steps to address the barriers faced by registered training organisations (RTOs), including schools, in incorporating workplace learning components into their school programs. In the first instance, further research is needed to better understand the variation in student workplace learning opportunities and to identify potential barriers to employer participation, including employer beliefs about administrative and legal hurdles, the costs and benefits of being involved and the difficulties faced by career counsellors, VET coordinators and work-based learning coordinators in forming and maintaining employer networks.

A range of approaches could be undertaken to address these impediments, including employer incentive schemes. However, an initial focus should be to understand the nature and magnitude of any financial barriers for employers. Without an understanding of the employer barriers, the risk is that incentive payments may not address a specific barrier and may dilute the skill-demand signal associated with the availability of work placements, which may weaken any long-run employment benefits. This does not necessarily mean that incentive payments should be targeted to areas of skill demand. It is possible that a strong business case for work placements already exists in these areas, in which case the payments may have limited effect in stimulating extra student opportunities.

Evidence from this study suggests that VET delivered in schools can play a key role in directing students to post-secondary courses with good labour market prospects. Although addressing barriers to work placements can help in this regard, the underlying problem is that students are given very little information about graduate outcomes to help them find good pathways in VET from the over 1000 AQF courses available. This is consistent with a key finding (number 21) of the 2018 Victorian Parliamentary Inquiry into career advice in schools that, "Young people and their parents are not receiving enough information about labour market trends and emerging industries to inform students' career choices."

At present, easy-to-access information on the labour market prospects of various jobs is available online, such as from the Department of Jobs and Small Business 'Job Outlook' website.[20] However, up-to-date information on VET study outcomes is restricted to overall employment rates from the NCVER VET Student Outcomes publication and employment and salaries outcomes by aggregate field of study categories from the Quality Indicators for Learning and Teaching (QILT) website.[21] The paucity of more detailed graduate outcome information, such as graduate occupations, at a more granulated field-of-study level makes it hard for students to assess the likely outcomes from alternative VET pathways. Except for trades, there is only a weak relationship between the occupation that VET courses are designed to prepare students for and the jobs that graduates attain (Karmel et al. 2008), which means that job outlook information alone is insufficient to support course choice.[22] The authors of this report are currently collecting data that will be used to address the need for better information to inform student course choice.

[20] https://joboutlook.gov.au/.
[21] https://www.qilt.edu.au/.
[5] For example, the Karmel et al. (2008) shows that only 34% of VET graduates from programs designed for hospitality related jobs find work in the hospitality industry in the first year out from study.

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Appendix A: Data appendix

Alternative data

Table A.1: Key characteristics of LSAY participants compared to National VET in Schools Collection

	LSAY			VET in Schools Provider Collection		
	2003	2006	2009	2006	2009	2015
Female	48.7%	45.7%	49.9%	49.0%	48.2%	46.6%
Aboriginal or Torres Strait Islander	2.1%	3.8%	5.3%	3.5%	5.0%	6.3%
State/Territory						
New South Wales	40.6%	36.5%	34.9%	30.5%	24.0%	21.0%
Victoria	19.1%	23.7%	22.1%	22.2%	19.4%	20.0%
Queensland	18.2%	20.4%	24.4%	24.6%	37.5%	36.7%
South Australia	7.1%	6.6%	5.7%	7.5%	5.2%	5.1%
Western Australia	10.6%	7.2%	8.4%	10.0%	10.2%	13.0%
Tasmania	2.2%	3.1%	2.6%	1.6%	1.0%	1.9%
Australian Capital Territory	1.5%	1.5%	1.2%	2.6%	1.8%	1.4%
Northern Territory	0.7%	0.9%	0.7%	1.1%	1.0%	0.9%
Disability				1.1%	3.8%	4.7%
Non-English speaking background				3.2%	4.8%	3.5%
Major city				55.4%	55.1%	59.6%
SEIFA quintile of relative disadvantage						
Q1 (most disadvantaged)				15.2%	14.9%	22.2%
Q2				24.1%	23.6%	21.2%
Q3				24.6%	22.7%	21.6%
Q4				20.2%	22.8%	19.8%
Q5 (least disadvantaged)				16.0%	16.0%	15.1%
Number of observations	7,721	7,299	6,541	171,657	229,475	257,101

Notes: for the LSAY (cohorts 2003, 2006 and 2009) data, the sample is restricted to respondents who do any VET subjects in upper-secondary school in waves 2-4. The data is weighted by final weights at wave 4 for each cohort. Characteristics are at wave 1. VET in Schools Provider collection is from the NCVER VET data portal (https://www.ncver.edu.au/research-and-statistics/vocstats). Proportions estimated from the provider collection exclude those that are missing.

Linking average annual occupation earnings to LSAY

Average annual occupation earnings from ABS data is linked to current occupation information in LSAY for each year between 2004 and 2017. In ABS 'off-collection' years, we use the information from the previous year. A challenge in this process is linking the mis-match between ABS and LSAY occupation categories. The ABS occupation categories are 3-digit ASCO (2004); 3-digit ANZSCO (2006-2010) and 4-digit ANZSCO (2012-2016); while LSAY

categories are ASCO 4-digit (2004-05) and ANZSCO 4-digit (2006-2017). For 2004-05, we assign average earnings for 2004 at 3-digit ASCO to 4-digit ASCO information in LSAY. For 2006-2017, we assign average earnings occupation data either using 3-digit ANZSCO information (2006-2011) or 4-digit information (2012-17). Assigning occupation earnings information at the 3-digit level to the 4-digit level between 2004 and 2011 is not ideal because it will not pickup differences in occupation earnings that may be present at the 4-digit level. For example, 4-digit ANZCO occupations associated with teaching — Early Childhood Primary School Teachers (Pre-primary School); Teachers Middle School Teachers; Secondary School Teachers and Special Education Teachers — will be assigned the average 3-digit earnings for School Teachers. However, given that this approach is consistent across all occupation categories, it is hard to imagine that this process would systematically bias potential earnings estimates across the four groups of interest in this study.

It is important to note that the average occupation earnings information from ABS contains missing information for some occupations, mostly because the underlying survey data was insufficient to produce a reliable estimate. In these cases, we apply estimates for the occupation's 2-digit category, where possible. To convert the earnings data into present dollars (2018), we apply the Consumer Price Index for Australia between 2004 and 2017 (Australian Bureau of Statistics (ABS) 2018, Consumer Price Index, Australia, Sep 2018, cat. no. 6401.0).

Appendix B: Descriptive statistics

Figure B.1: Rates of year 12 completion, LSAY 2003, 2006, 2009

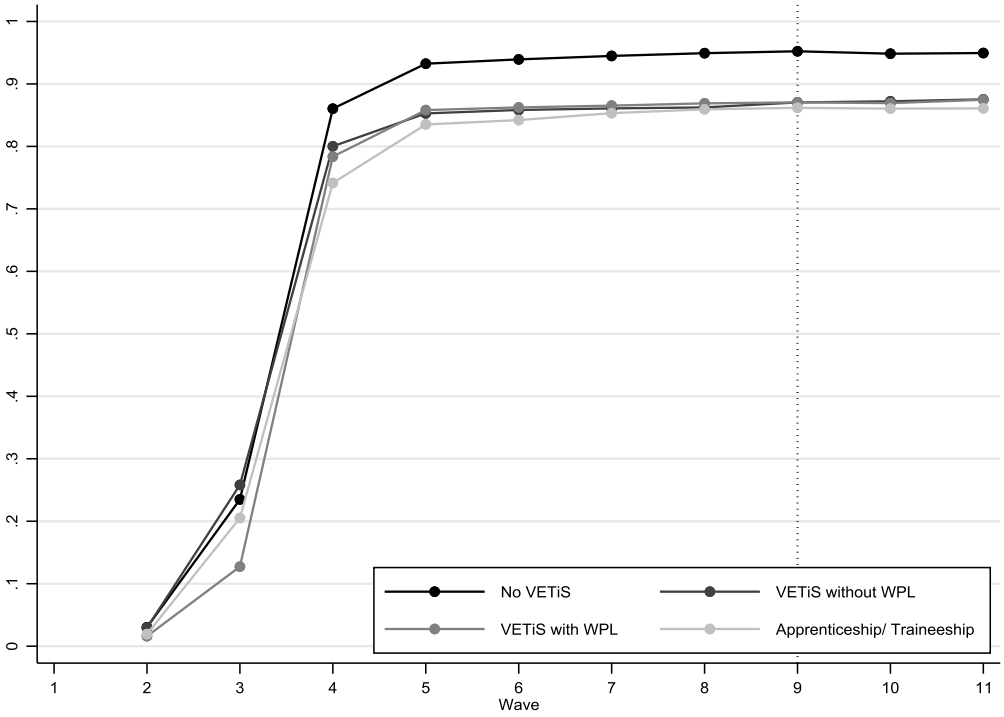


Figure B.2: Proportion of students whose highest qualification attained is a Certificate III or above, LSAY 2003, 2006, 2009

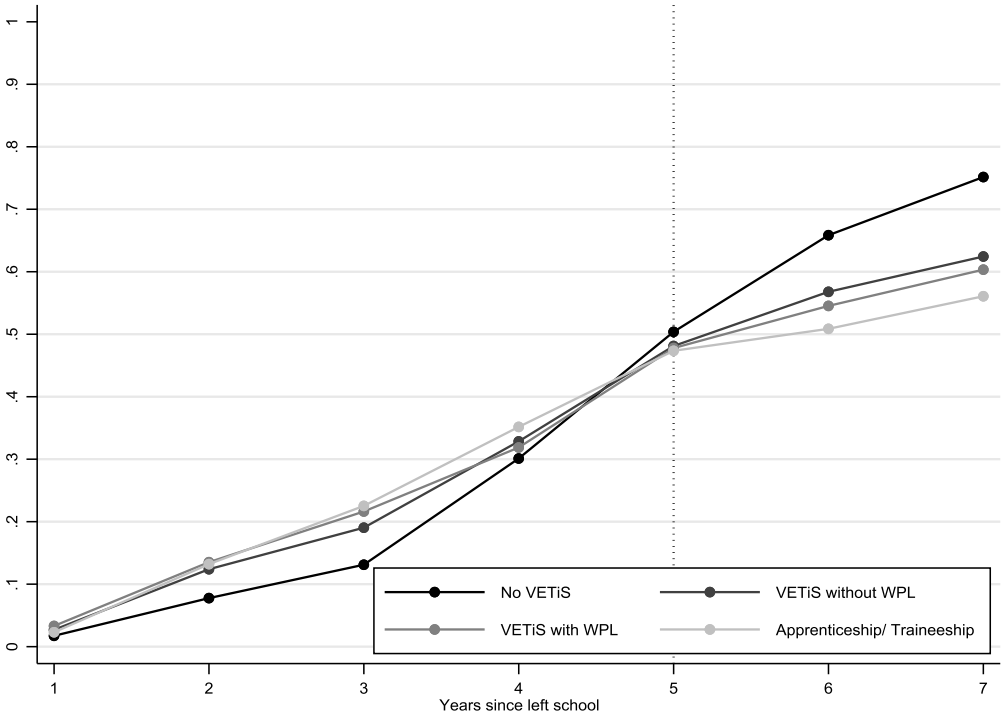


Figure B.3: Rates of Full-time employment, LSAY 2003, 2006, 2009

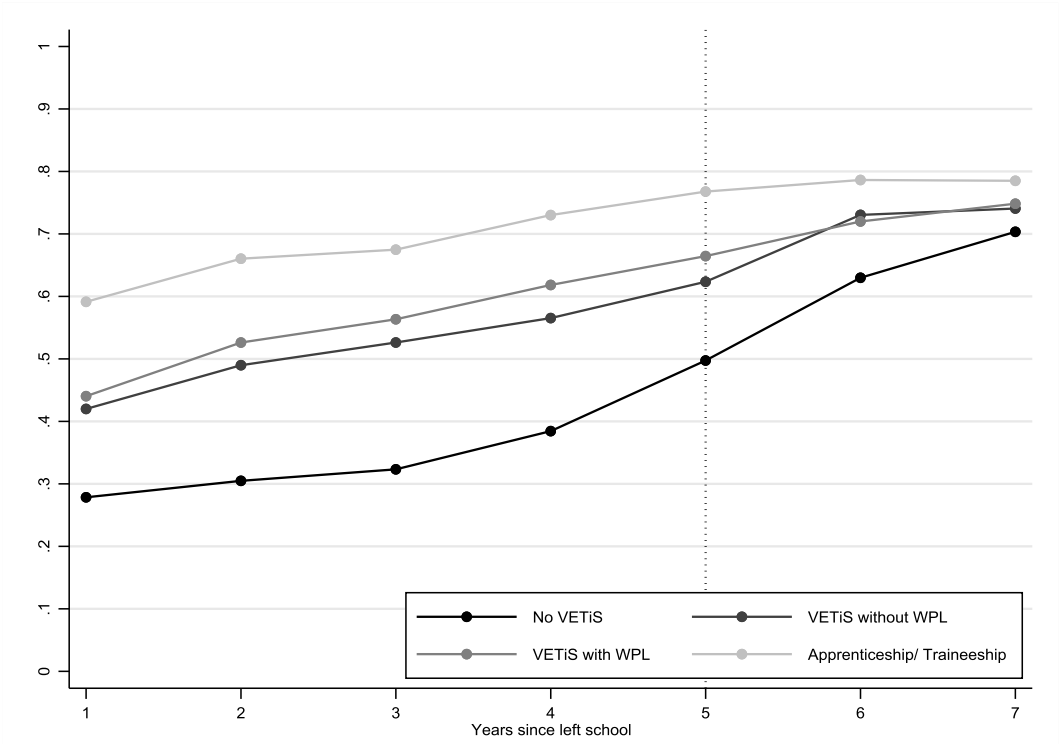


Figure B.4: Expected earnings of current occupation (A$2018), LSAY 2003, 2006, 2009

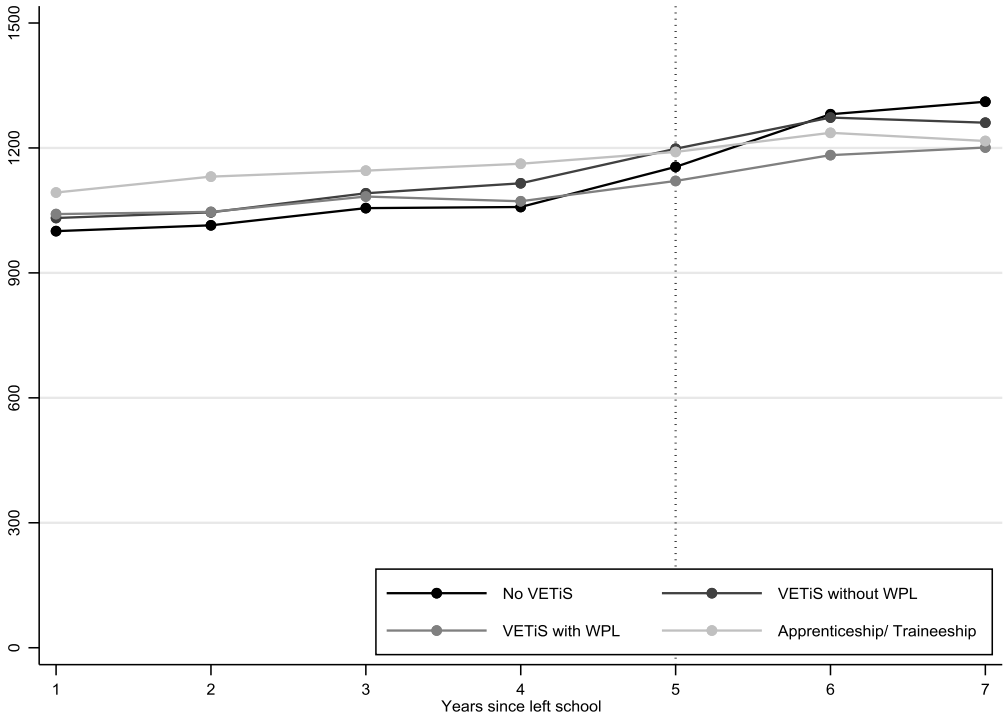


Figure B.5: Would like current job as a career, LSAY 2003, 2006, 2009

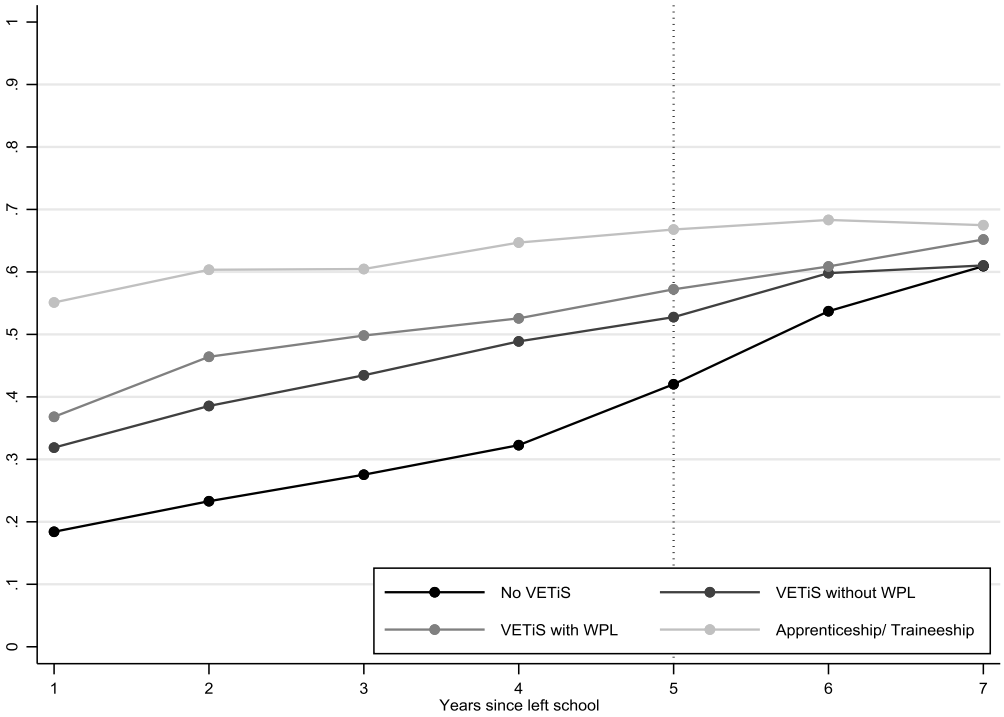
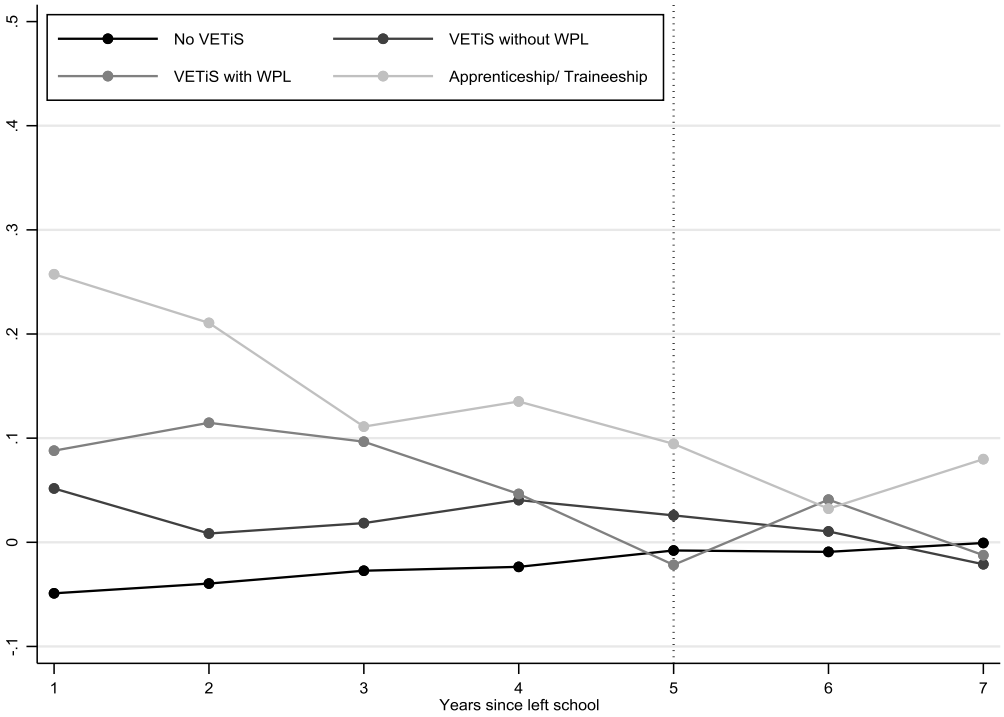


Figure B.6: Average job satisfaction (all seven items), LSAY 2003, 2006, 2009



Appendix C: Regression results for other labour market outcomes

Figure C.1: Percentage point differences in the rate of study (main activity) associated with upper-secondary VET participation, compared to non-participation (regression results)

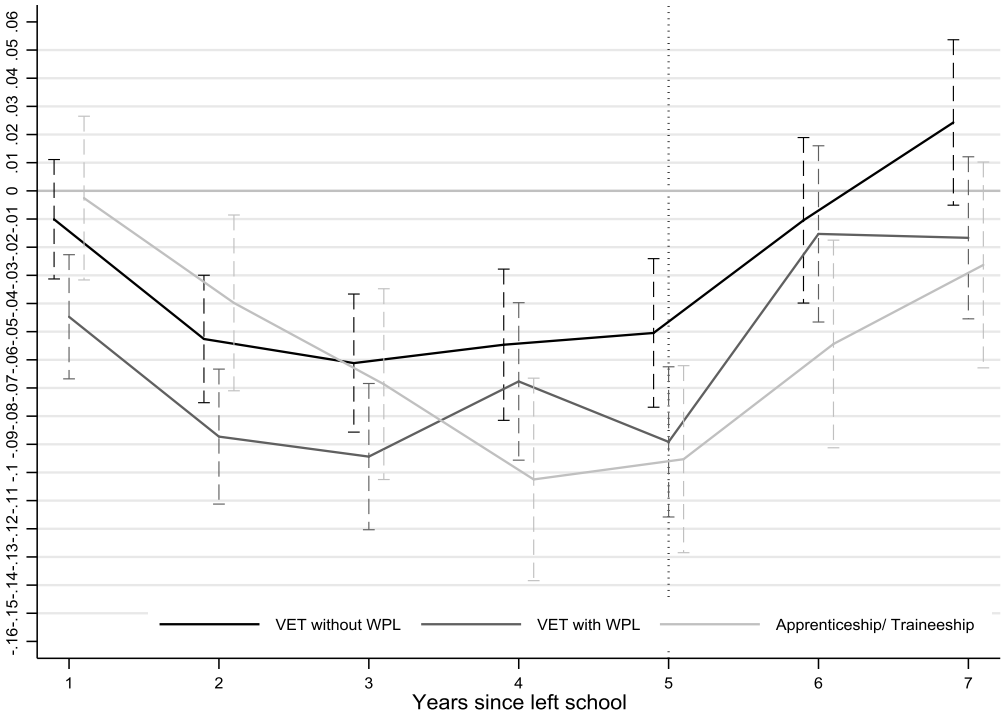


Figure C.2: Percentage point differences in the rate of work (main activity) associated with upper-secondary VET participation, compared to non-participation (regression results)

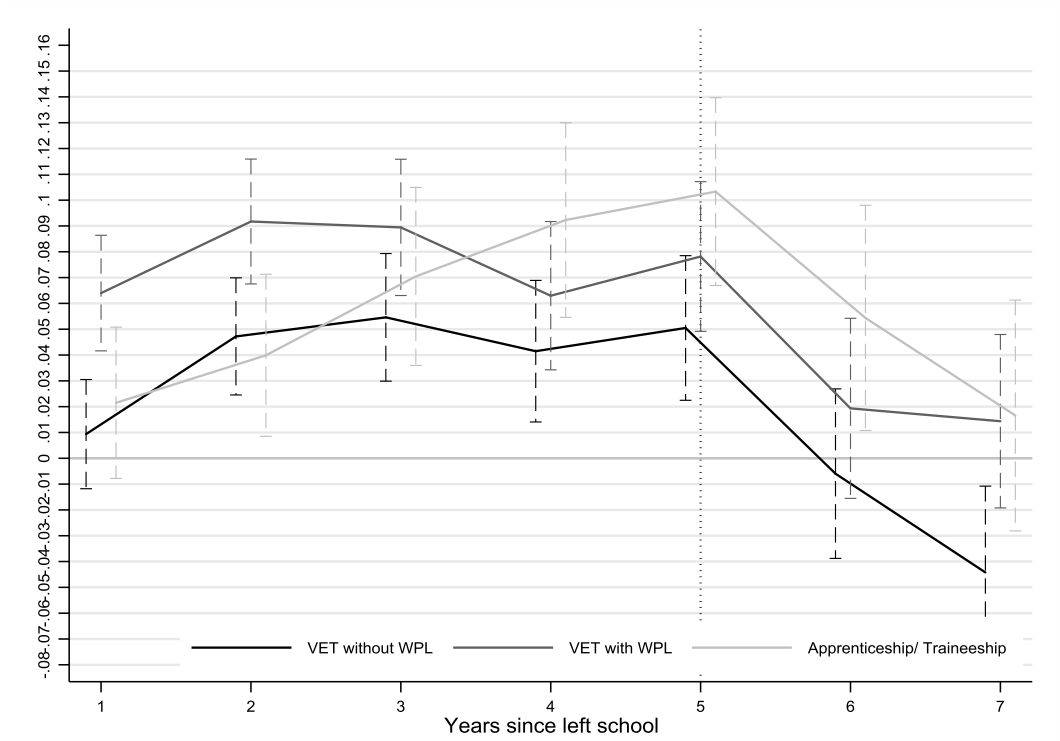


Figure C.3: Years difference in labour market experience associated with upper-secondary VET participation, compared to non-participation (regression results)

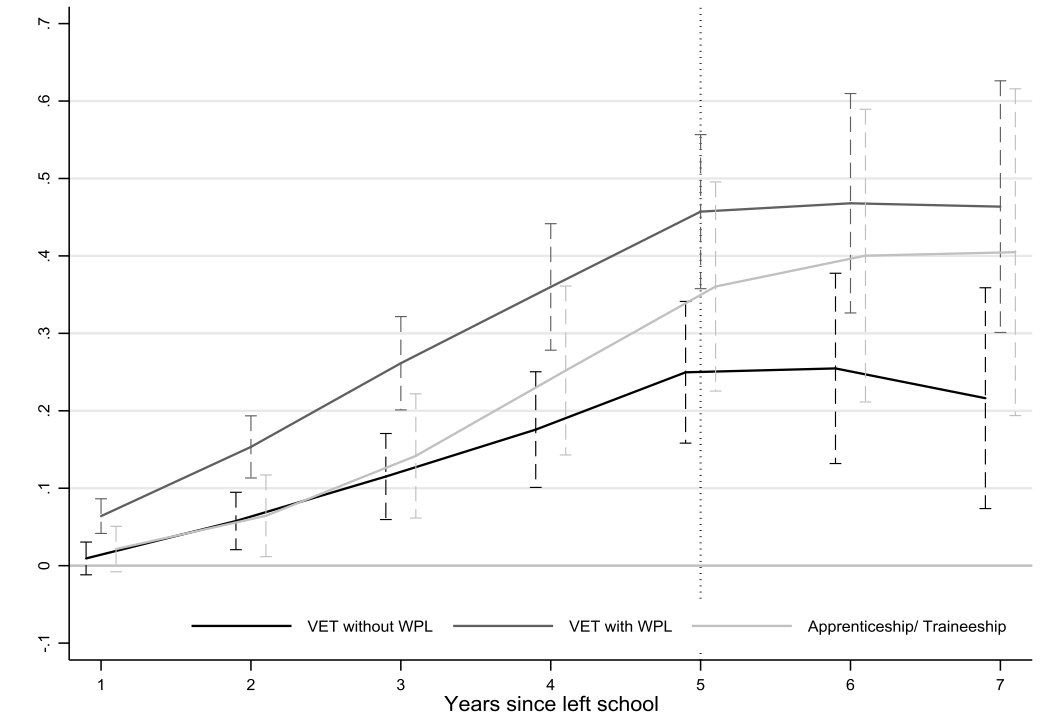


Figure C.4: Percentage difference in the weekly wage of full-time workers associated with upper-secondary VET participation, compared to non-participation (regression results)

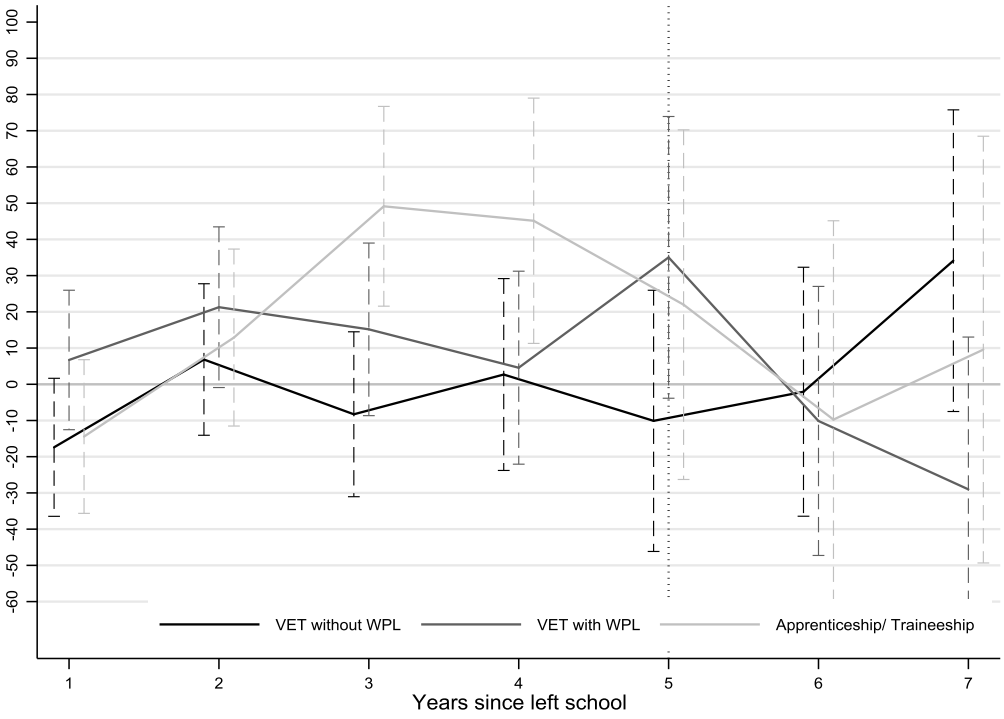


Figure C.5: Difference in the hourly wage rate (A$2018) associated with upper-secondary VET participation, compared to non-participation (regression results)

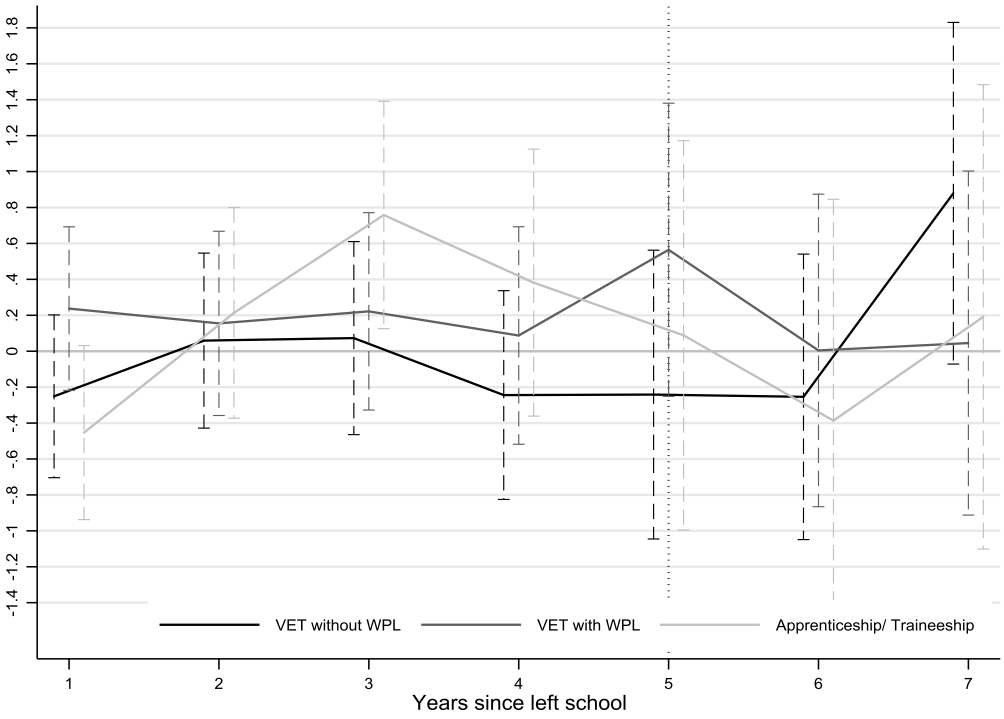


Table C.1: Difference in average reported general skill measures acquired from post-secondary study (standard deviations) associated with upper-secondary VET, compared to non-participation (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship		*Number of observations*
	Coefficient	s.e.	Coefficient	s.e.	Coefficient	s.e.	
General skills index, average item score, standardised	-0.115***	(0.037)	-0.074*	(0.041)	-0.151***	(0.057)	9,612
General skills index, weighted by factor loading in each year, standardised	-0.116***	(0.038)	-0.072*	(0.041)	-0.156***	(0.058)	9,353
General skills index, average item score for people with all items, standardised	-0.114***	(0.038)	-0.072*	(0.041)	-0.157***	(0.058)	9,353
Problem-solving skills	-0.049**	(0.020)	-0.031	(0.021)	-0.073**	(0.029)	9,578
Analytic skills	-0.084***	(0.020)	-0.062***	(0.022)	-0.076**	(0.031)	9,563
Ability to work as a team member	-0.041*	(0.023)	-0.024	(0.025)	-0.074**	(0.035)	9,549
Confidence in tackling unfamiliar problems	-0.032	(0.020)	-0.007	(0.022)	-0.023	(0.031)	9,569
Communication skills	-0.049**	(0.021)	-0.017	(0.023)	-0.098***	(0.033)	9,591
Work planning	-0.015	(0.021)	-0.027	(0.023)	-0.039	(0.033)	9,583
Overall satisfaction	-0.051**	(0.022)	-0.031	(0.024)	-0.055*	(0.033)	9,588
Improved career prospects	-0.029	(0.022)	-0.003	(0.026)	-0.053	(0.034)	9,535

Note: different initial scales: for 2003 & 2006: the initial scale (1 "Strongly agree" 2 "Agree" 3 "Disagree" 4 "Strongly disagree") has been reversed to have higher values indicate a positive outcome. For 2009: the initial scale (0 "Strongly disagree"… 10 "Strongly agree") has been grouped to match distribution for 2003-2006: 0; 1-4; 5-8; 9-10.

Appendix D: Regression results for VET participation by subgroup

Table D.1: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for those in the bottom 40% of reading proficiency in PISA (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.071***	(0.016)	0.058***	(0.015)	0.036**	(0.015)
'2009	-0.050***	(0.019)	0.089***	(0.018)	0.067***	(0.018)
Female	0.023*	(0.013)	0.019	(0.013)	-0.006	(0.013)
Aboriginal or Torres Strait Islander	-0.025	(0.024)	0.009	(0.023)	0.062**	(0.024)
Australian-born	-0.060***	(0.021)	-0.015	(0.020)	-0.009	(0.019)
English spoken at home	0.042**	(0.021)	0.019	(0.021)	0.013	(0.019)
Missing info on birth country and or language	-0.040	(0.032)	0.003	(0.033)	-0.022	(0.030)
State/Territory (ref: NSW)						
Victoria	-0.020	(0.021)	-0.113***	(0.021)	0.001	(0.020)
Queensland	-0.016	(0.025)	-0.138***	(0.024)	-0.004	(0.024)
South Australia	-0.038	(0.024)	-0.112***	(0.024)	-0.057***	(0.022)
Western Australia	-0.023	(0.027)	-0.095***	(0.027)	-0.023	(0.026)
Tasmania	-0.067**	(0.027)	-0.044	(0.029)	0.009	(0.027)
Australian Capital Territory	-0.072***	(0.027)	-0.163***	(0.027)	-0.043*	(0.026)
Northern Territory	-0.018	(0.036)	-0.127***	(0.035)	0.000	(0.034)
Region(ref: major city)						
Regional area	0.017	(0.016)	-0.002	(0.016)	-0.007	(0.015)
Rural area	0.034	(0.041)	-0.049	(0.039)	0.012	(0.040)

Father Australian-born	0.010	(0.016)	0.018	(0.016)	0.014	(0.015)
Father's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	-0.062**	(0.025)	-0.025	(0.026)	-0.017	(0.025)
Secondary school certificate	0.004	(0.021)	0.034*	(0.020)	-0.009	(0.020)
Post-secondary qualification	-0.059***	(0.019)	0.001	(0.019)	-0.022	(0.018)
University degree	-0.039*	(0.020)	-0.012	(0.020)	-0.015	(0.019)
Missing info on father's birth country and/or education	-0.040	(0.025)	0.015	(0.024)	-0.027	(0.023)
Mother Australian-born	-0.006	(0.017)	-0.011	(0.016)	0.003	(0.015)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	0.017	(0.026)	-0.005	(0.026)	-0.015	(0.025)
Secondary school certificate	-0.007	(0.019)	-0.013	(0.019)	0.017	(0.019)
Post-secondary qualification	0.026	(0.020)	0.029	(0.019)	0.010	(0.019)
University degree	0.019	(0.021)	-0.007	(0.020)	0.000	(0.019)
Missing info on mother's birth country and/or education	-0.032	(0.031)	-0.037	(0.031)	-0.019	(0.029)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.074***	(0.018)	0.013	(0.020)	-0.007	(0.019)
Year 11 or above	0.062**	(0.026)	-0.041	(0.026)	-0.062**	(0.025)
Student's intention for first year after school (ref: university)						
Other study	0.091***	(0.022)	0.114***	(0.021)	0.118***	(0.020)
Work	0.027	(0.028)	0.032	(0.028)	0.059**	(0.028)
Other	-0.004	(0.026)	-0.005	(0.027)	-0.010	(0.024)
Missing information on intentions	0.018	(0.021)	0.042**	(0.021)	0.027	(0.019)
Parent's intention for first year after school (ref: university)						
Other study	0.052**	(0.024)	0.025	(0.024)	0.062***	(0.023)
Work	0.002	(0.030)	-0.038	(0.029)	0.056*	(0.030)

Other	0.047**	(0.023)	-0.006	(0.022)	0.008	(0.021)
Missing information on intentions	0.018	(0.019)	-0.002	(0.018)	0.037**	(0.018)
Expected earnings of intended occupation at 30	-0.002***	(0.000)	-0.002***	(0.000)	-0.002***	(0.000)
Missing information on expected earnings of intended occ.	-0.089***	(0.027)	-0.138***	(0.027)	-0.107***	(0.027)
Government school at 15	0.001	(0.014)	-0.022	(0.014)	-0.018	(0.013)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	0.004	(0.015)	0.002	(0.015)	-0.041***	(0.015)
3rd lowest quintile	0.022	(0.020)	0.017	(0.019)	-0.010	(0.018)
4th lowest quintile	-0.004	(0.025)	-0.051**	(0.023)	-0.049**	(0.021)
Highest quintile	0.039	(0.053)	-0.014	(0.037)	0.032	(0.042)
Quintile of PISA reading score						
2nd lowest quintile	-0.021	(0.015)	-0.017	(0.014)	-0.033**	(0.014)
3rd lowest quintile	-	-	-	-	-	-
4th lowest quintile	-	-	-	-	-	-
Highest quintile	-	-	-	-	-	-
SES (normalised)	0.007	(0.006)	0.002	(0.006)	0.000	(0.005)
Any government payment	-0.015	(0.014)	-0.003	(0.014)	-0.011	(0.013)
Missing information on government payments	-0.021	(0.021)	0.028	(0.021)	-0.004	(0.020)
Average school peer SES (normalised)	-0.012	(0.020)	-0.011	(0.021)	0.009	(0.020)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.626***	(0.068)	0.283***	(0.066)	0.135**	(0.064)
Classroom-based VET with WPL	0.330***	(0.072)	0.750***	(0.070)	0.173**	(0.071)
Apprenticeship/ traineeship	0.380***	(0.104)	0.108	(0.096)	0.441***	(0.105)
Local unemployment rate	0.001	(0.003)	0.003	(0.003)	0.004	(0.002)
Number of observations	4,492		4,558		4,215	

Table D.4: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for those in the middle 20% of reading proficiency in PISA (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.024	(0.016)	0.038**	(0.015)	0.010	(0.012)
'2009	0.007	(0.018)	0.062***	(0.017)	0.013	(0.014)
Female	-0.007	(0.013)	0.022*	(0.012)	-0.013	(0.010)
Aboriginal or Torres Strait Islander	-0.043	(0.031)	0.033	(0.033)	0.037	(0.030)
Australian-born	0.016	(0.022)	-0.041**	(0.020)	0.002	(0.016)
English spoken at home	-0.005	(0.023)	0.002	(0.020)	0.006	(0.016)
Missing info on birth country and or language	0.088	(0.057)	0.056	(0.056)	0.057	(0.050)
State/Territory (ref: NSW)						
Victoria	-0.013	(0.021)	-0.093***	(0.022)	-0.001	(0.016)
Queensland	0.021	(0.025)	-0.095***	(0.024)	0.029	(0.020)
South Australia	-0.030	(0.023)	-0.122***	(0.023)	-0.015	(0.017)
Western Australia	-0.015	(0.025)	-0.085***	(0.025)	-0.001	(0.019)
Tasmania	-0.057**	(0.024)	-0.060**	(0.029)	0.000	(0.022)
Australian Capital Territory	0.005	(0.027)	-0.094***	(0.027)	0.023	(0.021)
Northern Territory	0.003	(0.037)	-0.016	(0.040)	-0.001	(0.034)
Region(ref: major city)						
Regional area	-0.023	(0.016)	-0.017	(0.016)	-0.002	(0.012)
Rural area	-0.006	(0.051)	0.021	(0.056)	0.065	(0.052)
Father Australian-born	-0.002	(0.016)	0.018	(0.015)	0.000	(0.012)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	-0.038	(0.029)	-0.037	(0.028)	0.004	(0.023)
Secondary school certificate	-0.060***	(0.022)	-0.033	(0.022)	0.005	(0.018)
Post-secondary qualification	-0.046**	(0.021)	-0.018	(0.021)	0.022	(0.017)
University degree	-0.038*	(0.021)	-0.033	(0.020)	0.003	(0.016)
Missing info on father's birth country and/or education	-0.030	(0.031)	-0.092***	(0.029)	0.012	(0.026)
Mother Australian-born	0.003	(0.016)	0.029*	(0.016)	-0.009	(0.013)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	-0.049*	(0.027)	-0.031	(0.027)	-0.006	(0.023)
Secondary school certificate	-0.037*	(0.021)	-0.020	(0.020)	-0.009	(0.017)
Post-secondary qualification	-0.022	(0.021)	-0.021	(0.020)	-0.024	(0.016)
University degree	-0.026	(0.020)	-0.024	(0.019)	0.005	(0.016)
Missing info on mother's birth country and/or education	-0.058	(0.036)	0.005	(0.038)	-0.018	(0.033)
School year at age 15 (ref: Year 9 or below)						
Year 10	-0.004	(0.023)	-0.026	(0.026)	0.036**	(0.017)
Year 11 or above	0.004	(0.028)	-0.121***	(0.029)	-0.002	(0.021)
Student's intention for first year after school (ref: university)						
Other study	0.097***	(0.026)	0.128***	(0.025)	0.097***	(0.022)
Work	0.016	(0.030)	0.099***	(0.029)	0.023	(0.024)
Other	0.024	(0.022)	0.033	(0.022)	-0.004	(0.016)
Missing information on intentions	0.022	(0.020)	0.055***	(0.020)	0.024	(0.016)
Parent's intention for first year after school (ref: university)						
Other study	0.025	(0.030)	0.069**	(0.029)	0.065**	(0.027)
Work	0.074**	(0.037)	-0.038	(0.034)	0.024	(0.032)
Other	0.005	(0.020)	0.014	(0.020)	0.008	(0.014)
Missing information on intentions	0.016	(0.018)	-0.022	(0.018)	0.023	(0.015)

Prestige of intended occupation at 30	-0.002***	(0.000)	-0.003***	(0.000)	-0.001***	(0.000)
Missing information on expected earnings of intended occ.	-0.111***	(0.032)	-0.226***	(0.032)	-0.108***	(0.028)
Government school at 15	-0.002	(0.013)	-0.017	(0.012)	-0.023**	(0.010)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	-0.068**	(0.034)	-0.122***	(0.032)	-0.032	(0.028)
3rd lowest quintile	-0.079**	(0.033)	-0.112***	(0.032)	-0.040	(0.027)
4th lowest quintile	-0.085**	(0.034)	-0.103***	(0.033)	-0.052*	(0.028)
Highest quintile	-0.121***	(0.036)	-0.120***	(0.034)	-0.075***	(0.028)
Quintile of PISA reading score						
2nd lowest quintile	-	-	-	-	-	-
3rd lowest quintile	-	-	-	-	-	-
4th lowest quintile	-	-	-	-	-	-
Highest quintile	-	-	-	-	-	-
SES (normalised)	-0.008	(0.006)	0.010	(0.008)	-0.011**	(0.005)
Any government payment	-0.018	(0.015)	0.011	(0.015)	-0.004	(0.012)
Missing information on government payments	-0.042**	(0.018)	-0.028	(0.019)	-0.021	(0.014)
Average school peer SES (normalised)	0.022	(0.021)	0.001	(0.020)	-0.006	(0.016)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.635***	(0.073)	0.276***	(0.071)	0.142**	(0.059)
Classroom-based VET with WPL	0.308***	(0.070)	0.533***	(0.072)	0.154***	(0.059)
Apprenticeship/ traineeship	-0.034	(0.101)	0.096	(0.102)	0.358***	(0.103)
Local unemployment rate	0.002	(0.003)	0.000	(0.003)	0.000	(0.002)
Number of observations	3,618		3,667		3,326	

Table D.5: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for those in the top 40% of reading proficiency in PISA (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.017**	(0.008)	0.016**	(0.007)	0.007	(0.005)
'2009	-0.005	(0.010)	0.019**	(0.009)	0.018***	(0.006)
Female	0.005	(0.006)	0.003	(0.006)	-0.001	(0.004)
Aboriginal or Torres Strait Islander	0.016	(0.023)	0.000	(0.021)	0.023	(0.019)
Australian-born	-0.023**	(0.011)	-0.002	(0.008)	-0.002	(0.006)
English spoken at home	-0.001	(0.012)	0.013	(0.009)	0.003	(0.006)
Missing info on birth country and or language	-0.003	(0.038)	-0.027	(0.030)	0.025	(0.029)
State/Territory (ref: NSW)						
Victoria	0.025**	(0.010)	-0.047***	(0.009)	0.011**	(0.005)
Queensland	0.045***	(0.012)	-0.045***	(0.011)	0.046***	(0.008)
South Australia	0.010	(0.011)	-0.052***	(0.010)	0.011*	(0.007)
Western Australia	0.022**	(0.011)	-0.048***	(0.010)	0.014**	(0.007)
Tasmania	-0.010	(0.012)	-0.018	(0.015)	0.007	(0.009)
Australian Capital Territory	0.026**	(0.012)	-0.036***	(0.011)	0.025***	(0.008)
Northern Territory	0.008	(0.019)	-0.005	(0.021)	0.013	(0.013)
Region(ref: major city)						
Regional area	-0.003	(0.009)	0.000	(0.008)	0.001	(0.006)
Rural area	0.005	(0.027)	-0.026	(0.026)	-0.014	(0.018)
Father Australian-born	0.016**	(0.007)	-0.002	(0.007)	0.000	(0.004)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	0.004	(0.017)	-0.011	(0.015)	0.010	(0.012)
Secondary school certificate	-0.009	(0.012)	-0.007	(0.012)	-0.001	(0.008)
Post-secondary qualification	0.002	(0.012)	0.018	(0.011)	0.018**	(0.008)
University degree	-0.019*	(0.011)	-0.017	(0.010)	0.007	(0.007)
Missing info on father's birth country and/or education	-0.015	(0.020)	-0.017	(0.019)	0.009	(0.014)
Mother Australian-born	0.000	(0.008)	-0.002	(0.007)	-0.005	(0.005)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	0.006	(0.016)	-0.012	(0.015)	-0.011	(0.011)
Secondary school certificate	0.021*	(0.012)	0.011	(0.011)	-0.006	(0.008)
Post-secondary qualification	0.026**	(0.012)	0.019*	(0.011)	-0.003	(0.008)
University degree	0.021*	(0.011)	0.002	(0.010)	-0.005	(0.007)
Missing info on mother's birth country and/or education	0.029	(0.029)	0.024	(0.026)	-0.047***	(0.013)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.020	(0.012)	0.034***	(0.012)	-0.001	(0.009)
Year 11 or above	-0.001	(0.015)	0.004	(0.014)	-0.016	(0.010)
Student's intention for first year after school (ref: university)						
Other study	0.131***	(0.020)	0.084***	(0.019)	0.089***	(0.016)
Work	0.044**	(0.019)	0.044**	(0.019)	0.025*	(0.014)
Other	0.010	(0.010)	0.023**	(0.009)	-0.002	(0.006)
Missing information on intentions	0.012	(0.012)	0.024**	(0.011)	0.025***	(0.008)
Parent's intention for first year after school (ref: university)						
Other study	0.030	(0.024)	0.068***	(0.024)	0.084***	(0.021)
Work	0.015	(0.022)	0.096***	(0.024)	0.042**	(0.019)
Other	0.008	(0.010)	0.016*	(0.009)	0.008	(0.006)
Missing information on intentions	0.014	(0.011)	0.002	(0.010)	0.002	(0.007)

Prestige of intended occupation at 30	-0.001***	(0.000)	-0.002***	(0.000)	-0.001***	(0.000)
Missing information on expected earnings of intended occ.	-0.101***	(0.020)	-0.202***	(0.021)	-0.101***	(0.016)
Government school at 15	0.000	(0.006)	-0.005	(0.006)	-0.003	(0.004)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	-0.117	(0.071)	0.006	(0.059)	-0.093	(0.062)
3rd lowest quintile	-0.131*	(0.069)	-0.044	(0.056)	-0.111*	(0.060)
4th lowest quintile	-0.156**	(0.069)	-0.064	(0.056)	-0.124**	(0.060)
Highest quintile	-0.169**	(0.069)	-0.076	(0.056)	-0.132**	(0.060)
Quintile of PISA reading score						
2nd lowest quintile	-	-	-	-	-	-
3rd lowest quintile	-	-	-	-	-	-
4th lowest quintile	-0.005	(0.007)	#DIV/0!	(0.000)	0.002	(0.004)
Highest quintile	-	-	-	-	-	-
SES (normalised)	0.002	(0.006)	-0.010**	(0.005)	-0.008**	(0.004)
Any government payment	0.017*	(0.009)	0.021***	(0.008)	0.001	(0.006)
Missing information on government payments	-0.007	(0.011)	0.006	(0.011)	-0.001	(0.007)
Average school peer SES (normalised)	-0.012	(0.010)	0.010	(0.010)	-0.003	(0.006)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.522***	(0.043)	0.103***	(0.033)	0.043	(0.028)
Classroom-based VET with WPL	0.152***	(0.037)	0.392***	(0.039)	0.096***	(0.026)
Apprenticeship/ traineeship	-0.049	(0.055)	0.125**	(0.055)	0.108**	(0.048)
Local unemployment rate	-0.002*	(0.001)	-0.003**	(0.001)	-0.001	(0.001)
Number of observations	9,708		9,543		9,075	

Table D.6: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for females (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	s.e.	Coefficient	s.e.	Coefficient	s.e.
Cohorts (ref: 2003)						
'2006	-0.037***	(0.009)	0.016*	(0.009)	0.011*	(0.007)
'2009	-0.020*	(0.010)	0.028***	(0.010)	0.025***	(0.008)
Female	-	-	-	-	-	-
Aboriginal or Torres Strait Islander	-0.036*	(0.019)	-0.004	(0.019)	0.044**	(0.018)
Australian-born	-0.013	(0.012)	-0.015	(0.011)	0.005	(0.008)
English spoken at home	-0.002	(0.014)	0.018	(0.012)	0.003	(0.010)
Missing info on birth country and or language	0.002	(0.031)	0.021	(0.031)	0.020	(0.027)
State/Territory (ref: NSW)						
Victoria	-0.009	(0.012)	-0.069***	(0.012)	0.005	(0.009)
Queensland	0.037***	(0.014)	-0.065***	(0.013)	0.048***	(0.011)
South Australia	0.002	(0.013)	-0.073***	(0.013)	-0.005	(0.009)
Western Australia	0.004	(0.014)	-0.054***	(0.013)	0.014	(0.010)
Tasmania	-0.017	(0.014)	-0.024	(0.017)	0.011	(0.012)
Australian Capital Territory	0.015	(0.015)	-0.058***	(0.015)	0.024**	(0.012)
Northern Territory	-0.005	(0.021)	-0.045**	(0.022)	0.016	(0.018)
Region(ref: major city)						
Regional area	-0.005	(0.009)	-0.002	(0.009)	-0.007	(0.007)
Rural area	0.023	(0.028)	-0.002	(0.028)	0.028	(0.025)
Father Australian-born	0.007	(0.009)	-0.006	(0.009)	0.002	(0.007)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	-0.028*	(0.017)	-0.004	(0.017)	0.000	(0.014)
Secondary school certificate	-0.019	(0.013)	0.003	(0.013)	-0.002	(0.010)
Post-secondary qualification	-0.016	(0.013)	0.001	(0.012)	-0.002	(0.010)
University degree	-0.036***	(0.012)	-0.020*	(0.012)	-0.002	(0.009)
Missing info on father's birth country and/or education	-0.036*	(0.018)	-0.023	(0.018)	0.000	(0.016)
Mother Australian-born	-0.004	(0.009)	0.011	(0.009)	-0.002	(0.007)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	0.008	(0.017)	-0.011	(0.016)	-0.006	(0.014)
Secondary school certificate	-0.002	(0.013)	-0.006	(0.012)	-0.007	(0.010)
Post-secondary qualification	0.012	(0.012)	0.018	(0.012)	-0.001	(0.009)
University degree	0.008	(0.012)	-0.006	(0.011)	0.000	(0.009)
Missing info on mother's birth country and/or education	-0.040	(0.026)	0.005	(0.027)	-0.046**	(0.019)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.036**	(0.015)	0.013	(0.016)	0.008	(0.013)
Year 11 or above	0.025	(0.017)	-0.033*	(0.018)	-0.016	(0.014)
Student's intention for first year after school (ref: university)						
Other study	0.124***	(0.018)	0.090***	(0.017)	0.071***	(0.015)
Work	0.037*	(0.020)	0.050***	(0.019)	0.041**	(0.017)
Other	0.006	(0.011)	0.023**	(0.011)	0.003	(0.008)
Missing information on intentions	0.014	(0.012)	0.037***	(0.013)	0.029***	(0.010)
Parent's intention for first year after school (ref: university)						
Other study	0.014	(0.021)	0.058***	(0.021)	0.056***	(0.019)
Work	0.044*	(0.023)	0.049**	(0.023)	0.034	(0.021)
Other	0.030***	(0.011)	0.016	(0.010)	0.010	(0.008)
Missing information on intentions	0.017	(0.011)	0.008	(0.011)	0.014	(0.009)

Prestige of intended occupation at 30	-0.002***	(0.000)	-0.003***	(0.000)	-0.001***	(0.000)
Missing information on expected earnings of intended occ.	-0.127***	(0.022)	-0.204***	(0.022)	-0.102***	(0.018)
Government school at 15	-0.005	(0.007)	-0.022***	(0.007)	-0.011**	(0.005)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	-0.019	(0.018)	-0.011	(0.018)	-0.033**	(0.016)
3rd lowest quintile	-0.018	(0.019)	-0.033*	(0.019)	-0.028*	(0.016)
4th lowest quintile	-0.046**	(0.020)	-0.047**	(0.019)	-0.049***	(0.016)
Highest quintile	-0.063***	(0.020)	-0.057***	(0.019)	-0.050***	(0.017)
Quintile of PISA reading score						
2nd lowest quintile	-0.018	(0.021)	-0.004	(0.021)	-0.060***	(0.020)
3rd lowest quintile	-0.039*	(0.022)	-0.021	(0.022)	-0.086***	(0.020)
4th lowest quintile	-0.041*	(0.023)	-0.041*	(0.023)	-0.090***	(0.021)
Highest quintile	-0.036	(0.024)	-0.057**	(0.023)	-0.093***	(0.021)
SES (normalised)	0.001	(0.005)	-0.005	(0.005)	-0.008**	(0.004)
Any government payment	-0.004	(0.009)	0.008	(0.009)	-0.002	(0.007)
Missing information on government payments	-0.024**	(0.012)	0.009	(0.013)	-0.009	(0.009)
Average school peer SES (normalised)	-0.001	(0.011)	-0.006	(0.012)	-0.004	(0.009)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.548***	(0.045)	0.174***	(0.042)	0.066*	(0.036)
Classroom-based VET with WPL	0.259***	(0.042)	0.526***	(0.043)	0.135***	(0.034)
Apprenticeship/ traineeship	0.040	(0.062)	0.128**	(0.061)	0.225***	(0.059)
Local unemployment rate	-0.001	(0.002)	-0.001	(0.002)	0.001	(0.001)
Number of observations	9,620		9,604		8,896	

Table D.7: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for males (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.034***	(0.010)	0.045***	(0.009)	0.018**	(0.008)
'2009	-0.011	(0.012)	0.066***	(0.011)	0.031***	(0.009)
Female	-	-	-	-	-	-
Aboriginal or Torres Strait Islander	0.011	(0.024)	0.023	(0.024)	0.047**	(0.023)
Australian-born	-0.039***	(0.013)	-0.010	(0.012)	-0.015	(0.010)
English spoken at home	0.030**	(0.014)	0.008	(0.013)	0.012	(0.011)
Missing info on birth country and or language	-0.021	(0.034)	-0.012	(0.033)	-0.019	(0.031)
State/Territory (ref: NSW)						
Victoria	0.021*	(0.012)	-0.077***	(0.013)	0.005	(0.010)
Queensland	0.006	(0.015)	-0.097***	(0.014)	0.001	(0.013)
South Australia	-0.023*	(0.014)	-0.087***	(0.014)	-0.021*	(0.012)
Western Australia	0.004	(0.015)	-0.082***	(0.014)	-0.011	(0.012)
Tasmania	-0.046***	(0.016)	-0.031	(0.019)	0.007	(0.016)
Australian Capital Territory	-0.021	(0.015)	-0.094***	(0.015)	-0.011	(0.012)
Northern Territory	0.017	(0.026)	-0.054**	(0.026)	-0.005	(0.023)
Region(ref: major city)						
Regional area	-0.001	(0.011)	-0.006	(0.010)	0.003	(0.009)
Rural area	0.004	(0.034)	-0.036	(0.033)	-0.006	(0.031)
Father Australian-born	0.013	(0.010)	0.023***	(0.009)	0.005	(0.008)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	-0.023	(0.020)	-0.041**	(0.019)	-0.001	(0.018)
Secondary school certificate	-0.019	(0.015)	-0.002	(0.014)	-0.005	(0.013)
Post-secondary qualification	-0.038***	(0.014)	0.015	(0.014)	0.017	(0.012)
University degree	-0.026**	(0.013)	-0.015	(0.013)	0.002	(0.011)
Missing info on father's birth country and/or education	-0.021	(0.023)	-0.015	(0.021)	-0.011	(0.019)
Mother Australian-born	0.001	(0.010)	-0.010	(0.009)	-0.004	(0.008)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	-0.021	(0.019)	-0.016	(0.019)	-0.014	(0.017)
Secondary school certificate	0.002	(0.014)	0.002	(0.013)	0.009	(0.012)
Post-secondary qualification	0.015	(0.015)	0.003	(0.014)	-0.010	(0.013)
University degree	0.008	(0.013)	-0.003	(0.013)	0.000	(0.012)
Missing info on mother's birth country and/or education	0.006	(0.027)	-0.003	(0.026)	-0.010	(0.024)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.042***	(0.013)	0.010	(0.015)	0.003	(0.013)
Year 11 or above	0.022	(0.017)	-0.034**	(0.017)	-0.026*	(0.015)
Student's intention for first year after school (ref: university)						
Other study	0.099***	(0.017)	0.121***	(0.017)	0.124***	(0.016)
Work	0.036*	(0.021)	0.053***	(0.020)	0.031*	(0.018)
Other	0.021	(0.013)	0.020	(0.013)	-0.014	(0.009)
Missing information on intentions	0.028**	(0.014)	0.052***	(0.014)	0.024**	(0.012)
Parent's intention for first year after school (ref: university)						
Other study	0.055***	(0.020)	0.046**	(0.020)	0.071***	(0.019)
Work	0.003	(0.024)	-0.017	(0.023)	0.058***	(0.022)
Other	-0.004	(0.013)	-0.003	(0.013)	0.003	(0.010)
Missing information on intentions	0.011	(0.013)	-0.006	(0.012)	0.024**	(0.010)

Prestige of intended occupation at 30	-0.001***	(0.000)	-0.002***	(0.000)	-0.001***	(0.000)
Missing information on expected earnings of intended occ.	-0.065***	(0.021)	-0.162***	(0.021)	-0.110***	(0.019)
Government school at 15	0.003	(0.008)	-0.007	(0.008)	-0.009	(0.007)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	0.008	(0.022)	-0.023	(0.021)	-0.053***	(0.021)
3rd lowest quintile	-0.003	(0.023)	-0.010	(0.022)	-0.057***	(0.021)
4th lowest quintile	-0.013	(0.024)	-0.044*	(0.022)	-0.077***	(0.021)
Highest quintile	-0.028	(0.025)	-0.056**	(0.023)	-0.086***	(0.022)
Quintile of PISA reading score						
2nd lowest quintile	-0.007	(0.019)	-0.005	(0.018)	-0.001	(0.017)
3rd lowest quintile	-0.019	(0.020)	-0.022	(0.019)	-0.029	(0.018)
4th lowest quintile	-0.036*	(0.021)	-0.042**	(0.020)	-0.035*	(0.018)
Highest quintile	-0.031	(0.022)	-0.040**	(0.020)	-0.032*	(0.019)
SES (normalised)	0.004	(0.006)	0.000	(0.005)	-0.004	(0.005)
Any government payment	0.006	(0.010)	0.014	(0.010)	-0.005	(0.009)
Missing information on government payments	-0.014	(0.013)	-0.004	(0.013)	-0.004	(0.011)
Average school peer SES (normalised)	-0.003	(0.012)	-0.009	(0.012)	-0.003	(0.010)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.615***	(0.048)	0.217***	(0.042)	0.116***	(0.039)
Classroom-based VET with WPL	0.177***	(0.045)	0.535***	(0.048)	0.111***	(0.040)
Apprenticeship/ traineeship	0.168**	(0.073)	0.053	(0.068)	0.312***	(0.072)
Local unemployment rate	0.000	(0.002)	-0.001	(0.002)	-0.001	(0.001)
Number of observations	8,198		8,164		7,720	

Table D.8: Table D.6: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for Indigenous students (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.018	(0.041)	-0.005	(0.038)	0.063	(0.039)
'2009	-0.063	(0.050)	0.089*	(0.049)	0.051	(0.049)
Female	-0.028	(0.033)	-0.028	(0.031)	-0.022	(0.031)
Aboriginal or Torres Strait Islander	-	-	-	-	-	-
Australian-born	0.078	(0.090)	-0.009	(0.101)	-0.002	(0.095)
English spoken at home	0.089	(0.078)	-0.045	(0.076)	-0.071	(0.083)
Missing info on birth country and or language	0.077	(0.095)	0.029	(0.100)	-0.072	(0.101)
State/Territory (ref: NSW)						
Victoria	0.085	(0.078)	-0.076	(0.076)	-0.007	(0.072)
Queensland	0.070	(0.057)	-0.131**	(0.055)	0.010	(0.055)
South Australia	0.050	(0.067)	-0.182***	(0.069)	-0.102*	(0.057)
Western Australia	0.034	(0.066)	-0.227***	(0.060)	0.103	(0.066)
Tasmania	-0.033	(0.060)	0.022	(0.060)	0.016	(0.060)
Australian Capital Territory	0.100	(0.077)	-0.175**	(0.072)	-0.106	(0.067)
Northern Territory	0.029	(0.076)	-0.157**	(0.070)	-0.047	(0.071)
Region(ref: major city)						
Regional area	0.053	(0.037)	-0.063*	(0.034)	0.002	(0.037)
Rural area	0.047	(0.091)	-0.045	(0.088)	0.067	(0.090)
Father Australian-born	-0.007	(0.054)	0.021	(0.049)	-0.083*	(0.050)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	0.076	(0.058)	-0.017	(0.060)	-0.046	(0.058)
Secondary school certificate	0.091	(0.055)	0.056	(0.052)	0.030	(0.051)
Post-secondary qualification	0.000	(0.041)	-0.004	(0.041)	0.003	(0.040)
University degree	-0.051	(0.044)	-0.017	(0.045)	0.031	(0.046)
Missing info on father's birth country and/or education	0.001	(0.060)	0.097*	(0.054)	0.028	(0.056)
Mother Australian-born	0.004	(0.056)	-0.015	(0.053)	0.060	(0.047)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	-0.026	(0.058)	0.019	(0.060)	0.023	(0.061)
Secondary school certificate	-0.016	(0.049)	-0.051	(0.046)	-0.018	(0.049)
Post-secondary qualification	0.017	(0.045)	0.036	(0.044)	-0.043	(0.043)
University degree	0.001	(0.049)	-0.032	(0.046)	-0.004	(0.047)
Missing info on mother's birth country and/or education	-0.118	(0.075)	-0.126*	(0.070)	-0.128*	(0.067)
School year at age 15 (ref: Year 9 or below)						
Year 10	-0.038	(0.073)	0.047	(0.073)	-0.003	(0.067)
Year 11 or above	-0.069	(0.081)	0.058	(0.080)	-0.078	(0.077)
Student's intention for first year after school (ref: university)						
Other study	0.024	(0.053)	0.087	(0.057)	0.017	(0.054)
Work	0.096	(0.070)	0.079	(0.066)	-0.004	(0.068)
Other	0.084	(0.059)	0.083	(0.064)	-0.013	(0.056)
Missing information on intentions	0.038	(0.055)	0.162***	(0.057)	-0.022	(0.058)
Parent's intention for first year after school (ref: university)						
Other study	0.061	(0.060)	0.007	(0.062)	0.067	(0.061)
Work	0.032	(0.067)	-0.105*	(0.060)	0.046	(0.064)
Other	-0.029	(0.052)	-0.067	(0.053)	0.081	(0.053)
Missing information on intentions	-0.037	(0.047)	-0.070	(0.048)	0.034	(0.048)

Prestige of intended occupation at 30	-0.002*	(0.001)	-0.002*	(0.001)	-0.002*	(0.001)
Missing information on expected earnings of intended occ.	-0.074	(0.066)	-0.102	(0.068)	-0.132*	(0.070)
Government school at 15	-0.041	(0.037)	-0.033	(0.037)	-0.026	(0.036)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	0.047	(0.054)	0.022	(0.050)	-0.073	(0.052)
3rd lowest quintile	0.037	(0.062)	-0.025	(0.060)	-0.092	(0.058)
4th lowest quintile	0.052	(0.074)	-0.022	(0.066)	-0.087	(0.066)
Highest quintile	-0.048	(0.074)	-0.046	(0.072)	-0.086	(0.076)
Quintile of PISA reading score						
2nd lowest quintile	-0.054	(0.056)	0.027	(0.052)	-0.058	(0.054)
3rd lowest quintile	-0.076	(0.066)	0.012	(0.060)	-0.089	(0.060)
4th lowest quintile	-0.099	(0.073)	-0.046	(0.070)	-0.124*	(0.068)
Highest quintile	0.015	(0.086)	-0.072	(0.076)	-0.100	(0.080)
SES (normalised)	-0.007	(0.011)	-0.021*	(0.012)	-0.023**	(0.011)
Any government payment	-0.005	(0.031)	0.042	(0.030)	-0.030	(0.030)
Missing information on government payments	-0.023	(0.068)	0.136*	(0.081)	0.057	(0.074)
Average school peer SES (normalised)	-0.004	(0.054)	-0.037	(0.053)	-0.043	(0.053)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.432**	(0.181)	0.209	(0.172)	0.214	(0.176)
Classroom-based VET with WPL	0.449***	(0.166)	0.622***	(0.157)	0.126	(0.152)
Apprenticeship/ traineeship	0.018	(0.181)	0.031	(0.181)	0.290	(0.228)
Local unemployment rate	0.012	(0.007)	0.003	(0.007)	0.011	(0.007)
Number of observations	751		784		751	

Table D.9: Table D.6: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for non-Indigenous students (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.035***	(0.007)	0.031***	(0.006)	0.011**	(0.005)
'2009	-0.015*	(0.008)	0.041***	(0.007)	0.025***	(0.006)
Female	0.008	(0.005)	0.011**	(0.005)	-0.005	(0.004)
Aboriginal or Torres Strait Islander	-	-	-	-	-	-
Australian-born	-0.025***	(0.009)	-0.011	(0.008)	-0.003	(0.006)
English spoken at home	0.011	(0.010)	0.011	(0.009)	0.009	(0.007)
Missing info on birth country and or language	-0.005	(0.024)	0.003	(0.024)	0.005	(0.021)
State/Territory (ref: NSW)						
Victoria	0.003	(0.008)	-0.072***	(0.009)	0.007	(0.007)
Queensland	0.022**	(0.010)	-0.079***	(0.010)	0.028***	(0.008)
South Australia	-0.011	(0.010)	-0.077***	(0.010)	-0.009	(0.007)
Western Australia	0.002	(0.010)	-0.061***	(0.010)	-0.002	(0.007)
Tasmania	-0.031***	(0.011)	-0.032**	(0.013)	0.008	(0.010)
Australian Capital Territory	-0.006	(0.011)	-0.073***	(0.010)	0.011	(0.008)
Northern Territory	0.004	(0.017)	-0.035**	(0.017)	0.019	(0.014)
Region(ref: major city)						
Regional area	-0.006	(0.007)	-0.001	(0.007)	-0.003	(0.006)
Rural area	0.012	(0.022)	-0.018	(0.022)	0.001	(0.019)
Father Australian-born	0.011*	(0.007)	0.007	(0.006)	0.005	(0.005)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	-0.033**	(0.013)	-0.020	(0.013)	0.005	(0.011)
Secondary school certificate	-0.025**	(0.010)	-0.002	(0.010)	-0.005	(0.008)
Post-secondary qualification	-0.030***	(0.010)	0.007	(0.009)	0.007	(0.008)
University degree	-0.033***	(0.009)	-0.018**	(0.009)	-0.002	(0.007)
Missing info on father's birth country and/or education	-0.033**	(0.015)	-0.025*	(0.014)	-0.007	(0.012)
Mother Australian-born	-0.001	(0.007)	0.002	(0.006)	-0.005	(0.005)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	-0.002	(0.013)	-0.013	(0.012)	-0.012	(0.011)
Secondary school certificate	0.001	(0.010)	0.000	(0.009)	0.002	(0.008)
Post-secondary qualification	0.012	(0.010)	0.010	(0.009)	-0.003	(0.008)
University degree	0.007	(0.009)	-0.005	(0.009)	-0.001	(0.007)
Missing info on mother's birth country and/or education	-0.007	(0.019)	0.008	(0.019)	-0.018	(0.016)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.040***	(0.010)	0.010	(0.011)	0.003	(0.009)
Year 11 or above	0.026**	(0.012)	-0.037***	(0.012)	-0.021**	(0.010)
Student's intention for first year after school (ref: university)						
Other study	0.119***	(0.013)	0.110***	(0.012)	0.106***	(0.011)
Work	0.032**	(0.015)	0.050***	(0.014)	0.036***	(0.012)
Other	0.010	(0.009)	0.018**	(0.009)	-0.005	(0.006)
Missing information on intentions	0.021**	(0.009)	0.038***	(0.009)	0.028***	(0.008)
Parent's intention for first year after school (ref: university)						
Other study	0.031**	(0.015)	0.052***	(0.015)	0.067***	(0.014)
Work	0.022	(0.017)	0.027	(0.017)	0.047***	(0.016)
Other	0.018**	(0.009)	0.012	(0.008)	0.005	(0.006)
Missing information on intentions	0.016*	(0.009)	0.002	(0.008)	0.018***	(0.007)

Prestige of intended occupation at 30	-0.001***	(0.000)	-0.002***	(0.000)	-0.001***	(0.000)
Missing information on expected earnings of intended occ.	-0.097***	(0.015)	-0.186***	(0.015)	-0.104***	(0.013)
Government school at 15	0.000	(0.005)	-0.014***	(0.005)	-0.010**	(0.004)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	-0.018	(0.014)	-0.022	(0.014)	-0.037***	(0.013)
3rd lowest quintile	-0.019	(0.015)	-0.028**	(0.014)	-0.031**	(0.013)
4th lowest quintile	-0.039***	(0.015)	-0.053***	(0.014)	-0.053***	(0.013)
Highest quintile	-0.052***	(0.016)	-0.062***	(0.015)	-0.058***	(0.013)
Quintile of PISA reading score						
2nd lowest quintile	-0.006	(0.014)	-0.004	(0.014)	-0.026**	(0.013)
3rd lowest quintile	-0.021	(0.015)	-0.018	(0.014)	-0.054***	(0.013)
4th lowest quintile	-0.031**	(0.015)	-0.038***	(0.015)	-0.058***	(0.014)
Highest quintile	-0.030*	(0.016)	-0.046***	(0.015)	-0.058***	(0.014)
SES (normalised)	0.003	(0.004)	0.000	(0.004)	-0.004	(0.003)
Any government payment	0.001	(0.007)	0.010	(0.007)	-0.001	(0.006)
Missing information on government payments	-0.019**	(0.009)	0.000	(0.009)	-0.009	(0.007)
Average school peer SES (normalised)	-0.003	(0.009)	-0.003	(0.008)	-0.005	(0.007)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.591***	(0.034)	0.191***	(0.030)	0.079***	(0.026)
Classroom-based VET with WPL	0.205***	(0.031)	0.520***	(0.033)	0.125***	(0.027)
Apprenticeship/ traineeship	0.098**	(0.049)	0.111**	(0.046)	0.260***	(0.047)
Local unemployment rate	-0.001	(0.001)	-0.001	(0.001)	0.000	(0.001)
Number of observations	17,067		16,984		15,865	

Table D.10: Table D.6: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for low SES students (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.039***	(0.015)	0.049***	(0.014)	0.033**	(0.013)
'2009	-0.035	(0.027)	0.064**	(0.026)	0.051**	(0.024)
Female	0.009	(0.012)	0.008	(0.012)	-0.009	(0.011)
Aboriginal or Torres Strait Islander	-0.013	(0.024)	0.033	(0.024)	0.070***	(0.023)
Australian-born	-0.049**	(0.021)	-0.033*	(0.020)	0.010	(0.016)
English spoken at home	0.025	(0.018)	0.017	(0.018)	0.007	(0.016)
Missing info on birth country and or language	-0.020	(0.038)	0.044	(0.040)	-0.004	(0.034)
State/Territory (ref: NSW)						
Victoria	0.008	(0.020)	-0.115***	(0.020)	0.034*	(0.018)
Queensland	0.024	(0.023)	-0.139***	(0.022)	0.022	(0.020)
South Australia	-0.023	(0.021)	-0.149***	(0.021)	-0.026	(0.018)
Western Australia	0.001	(0.023)	-0.119***	(0.023)	0.006	(0.020)
Tasmania	-0.022	(0.024)	-0.021	(0.027)	0.020	(0.022)
Australian Capital Territory	-0.045	(0.031)	-0.200***	(0.028)	0.000	(0.030)
Northern Territory	-0.002	(0.034)	-0.110***	(0.034)	0.014	(0.031)
Region(ref: major city)						
Regional area	0.002	(0.014)	0.009	(0.014)	0.017	(0.012)
Rural area	-0.022	(0.036)	-0.034	(0.035)	0.007	(0.033)
Father Australian-born	0.008	(0.016)	0.007	(0.015)	0.005	(0.014)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	-0.027	(0.021)	-0.015	(0.020)	-0.034*	(0.018)
Secondary school certificate	-0.037**	(0.017)	0.054***	(0.016)	-0.005	(0.015)
Post-secondary qualification	-0.043***	(0.016)	0.006	(0.016)	0.002	(0.014)
University degree	-0.058**	(0.029)	-0.037	(0.028)	-0.013	(0.025)
Missing info on father's birth country and/or education	-0.018	(0.021)	-0.026	(0.020)	0.000	(0.019)
Mother Australian-born	-0.005	(0.016)	0.004	(0.015)	-0.009	(0.014)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	0.005	(0.021)	-0.037*	(0.020)	0.009	(0.019)
Secondary school certificate	-0.012	(0.016)	-0.023	(0.015)	0.015	(0.014)
Post-secondary qualification	-0.006	(0.017)	0.030*	(0.016)	-0.003	(0.014)
University degree	0.023	(0.030)	0.002	(0.028)	-0.002	(0.025)
Missing info on mother's birth country and/or education	-0.067**	(0.027)	-0.026	(0.027)	-0.053**	(0.023)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.063***	(0.021)	0.045*	(0.023)	0.016	(0.021)
Year 11 or above	0.044*	(0.026)	-0.018	(0.027)	-0.012	(0.025)
Student's intention for first year after school (ref: university)						
Other study	0.086***	(0.021)	0.106***	(0.020)	0.080***	(0.019)
Work	0.033	(0.027)	0.057**	(0.026)	0.035	(0.024)
Other	0.007	(0.022)	-0.010	(0.022)	-0.006	(0.019)
Missing information on intentions	0.031	(0.020)	0.048**	(0.020)	0.045***	(0.017)
Parent's intention for first year after school (ref: university)						
Other study	0.044*	(0.023)	0.040*	(0.023)	0.050**	(0.022)
Work	0.065**	(0.029)	0.026	(0.028)	0.068**	(0.027)
Other	0.032	(0.020)	0.013	(0.019)	0.034*	(0.018)
Missing information on intentions	0.020	(0.017)	0.010	(0.017)	0.009	(0.015)

Prestige of intended occupation at 30	-0.002***	(0.000)	-0.002***	(0.000)	-0.002***	(0.000)
Missing information on expected earnings of intended occ.	-0.104***	(0.028)	-0.156***	(0.027)	-0.109***	(0.026)
Government school at 15	-0.008	(0.013)	-0.032**	(0.012)	-0.007	(0.011)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	0.007	(0.021)	-0.053***	(0.020)	-0.036*	(0.020)
3rd lowest quintile	0.009	(0.024)	-0.025	(0.023)	-0.020	(0.022)
4th lowest quintile	-0.013	(0.025)	-0.068***	(0.024)	-0.035	(0.022)
Highest quintile	-0.028	(0.028)	-0.090***	(0.027)	-0.041*	(0.024)
Quintile of PISA reading score						
2nd lowest quintile	-0.003	(0.021)	0.017	(0.021)	-0.034*	(0.020)
3rd lowest quintile	-0.019	(0.024)	-0.008	(0.023)	-0.071***	(0.022)
4th lowest quintile	-0.048*	(0.026)	-0.014	(0.025)	-0.082***	(0.023)
Highest quintile	-0.026	(0.029)	-0.021	(0.027)	-0.091***	(0.024)
SES (normalised)	0.005	(0.022)	-0.003	(0.022)	0.007	(0.020)
Any government payment	-0.026**	(0.012)	0.009	(0.012)	-0.011	(0.011)
Missing information on government payments	-0.033	(0.021)	0.012	(0.022)	0.010	(0.020)
Average school peer SES (normalised)	0.005	(0.019)	-0.006	(0.019)	0.002	(0.016)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.561***	(0.063)	0.256***	(0.059)	0.078	(0.055)
Classroom-based VET with WPL	0.368***	(0.063)	0.548***	(0.063)	0.160***	(0.058)
Apprenticeship/ traineeship	0.218**	(0.087)	0.115	(0.082)	0.300***	(0.087)
Local unemployment rate	0.001	(0.002)	-0.001	(0.002)	0.003	(0.002)
Number of observations	4,595		4,627		4,242	

Table D.11: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for middle SES students (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.049***	(0.012)	0.038***	(0.012)	0.001	(0.010)
'2009	-0.009	(0.015)	0.046***	(0.013)	0.029**	(0.011)
Female	-0.002	(0.010)	0.017*	(0.010)	-0.009	(0.008)
Aboriginal or Torres Strait Islander	-0.020	(0.025)	-0.015	(0.024)	0.024	(0.024)
Australian-born	-0.022	(0.017)	-0.012	(0.016)	-0.017	(0.013)
English spoken at home	0.007	(0.019)	0.016	(0.017)	0.007	(0.014)
Missing info on birth country and or language	-0.020	(0.038)	-0.024	(0.036)	-0.007	(0.033)
State/Territory (ref: NSW)						
Victoria	-0.010	(0.016)	-0.068***	(0.016)	-0.003	(0.012)
Queensland	0.026	(0.019)	-0.063***	(0.018)	0.023	(0.015)
South Australia	-0.025	(0.017)	-0.053***	(0.018)	0.002	(0.014)
Western Australia	-0.017	(0.018)	-0.055***	(0.018)	0.002	(0.015)
Tasmania	-0.069***	(0.018)	-0.040*	(0.022)	0.012	(0.018)
Australian Capital Territory	0.009	(0.022)	-0.064***	(0.021)	0.005	(0.017)
Northern Territory	-0.009	(0.028)	-0.050*	(0.028)	0.014	(0.024)
Region(ref: major city)						
Regional area	0.014	(0.012)	-0.013	(0.012)	-0.013	(0.010)
Rural area	0.054	(0.037)	0.020	(0.037)	0.034	(0.034)
Father Australian-born	0.023**	(0.012)	0.019*	(0.011)	0.001	(0.009)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	-0.029	(0.020)	-0.051**	(0.020)	0.011	(0.017)
Secondary school certificate	-0.002	(0.016)	-0.041***	(0.016)	0.003	(0.013)
Post-secondary qualification	-0.019	(0.015)	-0.024	(0.015)	0.016	(0.012)
University degree	-0.017	(0.016)	-0.039**	(0.016)	0.008	(0.013)
Missing info on father's birth country and/or education	-0.030	(0.025)	-0.033	(0.024)	-0.010	(0.019)
Mother Australian-born	-0.003	(0.012)	-0.008	(0.012)	0.008	(0.009)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	-0.019	(0.020)	0.001	(0.020)	-0.042**	(0.017)
Secondary school certificate	0.009	(0.016)	0.002	(0.015)	-0.025*	(0.013)
Post-secondary qualification	0.030*	(0.016)	0.004	(0.015)	-0.019	(0.013)
University degree	0.013	(0.016)	-0.009	(0.015)	-0.022	(0.013)
Missing info on mother's birth country and/or education	0.020	(0.034)	0.008	(0.032)	-0.023	(0.026)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.025	(0.018)	-0.001	(0.019)	0.002	(0.015)
Year 11 or above	0.018	(0.022)	-0.054**	(0.022)	-0.029	(0.018)
Student's intention for first year after school (ref: university)						
Other study	0.114***	(0.021)	0.111***	(0.021)	0.131***	(0.019)
Work	0.038	(0.024)	0.043*	(0.022)	0.040**	(0.019)
Other	0.026	(0.016)	0.042***	(0.016)	-0.006	(0.011)
Missing information on intentions	0.022	(0.016)	0.055***	(0.016)	0.013	(0.013)
Parent's intention for first year after school (ref: university)						
Other study	0.018	(0.024)	0.050**	(0.024)	0.065***	(0.022)
Work	-0.005	(0.027)	-0.005	(0.026)	0.041*	(0.024)
Other	-0.016	(0.015)	0.014	(0.015)	0.008	(0.011)
Missing information on intentions	0.020	(0.015)	0.010	(0.015)	0.032***	(0.012)

Prestige of intended occupation at 30	-0.001***	(0.000)	-0.003***	(0.000)	-0.002***	(0.000)
Missing information on expected earnings of intended occ.	-0.095***	(0.026)	-0.197***	(0.027)	-0.124***	(0.024)
Government school at 15	-0.005	(0.010)	0.006	(0.009)	-0.017**	(0.008)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	0.006	(0.023)	0.035	(0.022)	-0.045**	(0.020)
3rd lowest quintile	-0.003	(0.024)	0.008	(0.023)	-0.036*	(0.021)
4th lowest quintile	-0.021	(0.025)	-0.020	(0.024)	-0.061***	(0.022)
Highest quintile	-0.046*	(0.026)	-0.028	(0.025)	-0.071***	(0.023)
Quintile of PISA reading score						
2nd lowest quintile	-0.029	(0.024)	-0.009	(0.023)	-0.022	(0.021)
3rd lowest quintile	-0.052**	(0.025)	-0.031	(0.024)	-0.051**	(0.022)
4th lowest quintile	-0.061**	(0.026)	-0.050**	(0.025)	-0.046**	(0.022)
Highest quintile	-0.046*	(0.028)	-0.057**	(0.026)	-0.040*	(0.023)
SES (normalised)	0.017	(0.030)	0.009	(0.031)	-0.012	(0.025)
Any government payment	0.018	(0.012)	0.011	(0.011)	0.003	(0.009)
Missing information on government payments	-0.026*	(0.015)	-0.021	(0.015)	-0.030**	(0.012)
Average school peer SES (normalised)	-0.009	(0.016)	0.003	(0.016)	0.005	(0.014)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.561***	(0.057)	0.157***	(0.052)	0.073	(0.045)
Classroom-based VET with WPL	0.112**	(0.055)	0.584***	(0.056)	0.139***	(0.047)
Apprenticeship/ traineeship	0.022	(0.083)	0.069	(0.081)	0.301***	(0.075)
Local unemployment rate	0.002	(0.002)	0.002	(0.002)	0.001	(0.002)
Number of observations	5,938		5,932		5,499	

Table D.12: Percentage point difference in the rate of upper-secondary VET participation associated with student and school factors for high SES students (regression results)

	Classroom-based VET without WPL		Classroom-based VET with WPL		Apprenticeship/ traineeship	
	Coefficient	S.e.	Coefficient	S.e.	Coefficient	S.e.
Cohorts (ref: 2003)						
'2006	-0.015*	(0.009)	0.018**	(0.008)	0.012*	(0.006)
'2009	-0.010	(0.013)	0.040***	(0.012)	0.021**	(0.009)
Female	0.010	(0.007)	0.006	(0.007)	0.003	(0.005)
Aboriginal or Torres Strait Islander	-0.016	(0.028)	-0.019	(0.027)	0.031	(0.027)
Australian-born	-0.013	(0.012)	0.001	(0.010)	0.001	(0.008)
English spoken at home	0.001	(0.015)	-0.001	(0.013)	0.003	(0.010)
Missing info on birth country and or language	0.008	(0.046)	-0.022	(0.042)	0.031	(0.040)
State/Territory (ref: NSW)						
Victoria	0.016	(0.011)	-0.054***	(0.011)	0.000	(0.007)
Queensland	0.020	(0.014)	-0.055***	(0.012)	0.038***	(0.010)
South Australia	0.016	(0.013)	-0.058***	(0.012)	-0.011	(0.008)
Western Australia	0.021	(0.013)	-0.047***	(0.012)	0.002	(0.008)
Tasmania	-0.009	(0.014)	-0.035**	(0.017)	-0.004	(0.012)
Australian Capital Territory	0.001	(0.013)	-0.046***	(0.012)	0.011	(0.009)
Northern Territory	0.007	(0.024)	-0.008	(0.026)	0.001	(0.021)
Region(ref: major city)						
Regional area	-0.023**	(0.011)	-0.008	(0.011)	-0.008	(0.008)
Rural area	0.033	(0.041)	-0.033	(0.037)	0.006	(0.034)
Father Australian-born	-0.002	(0.009)	-0.003	(0.008)	0.003	(0.006)
Father's highest education level (ref: Year 10 or below)						

Year 11 (or equivalent)	0.001	(0.028)	0.021	(0.028)	0.040	(0.026)
Secondary school certificate	0.003	(0.021)	-0.004	(0.018)	-0.014	(0.016)
Post-secondary qualification	0.004	(0.020)	0.039**	(0.018)	-0.009	(0.015)
University degree	-0.009	(0.018)	0.000	(0.016)	-0.010	(0.014)
Missing info on father's birth country and/or education	-0.056**	(0.028)	0.026	(0.031)	-0.031	(0.024)
Mother Australian-born	0.004	(0.009)	0.009	(0.008)	-0.006	(0.006)
Mother's highest education level (ref: Year 10 or below)						
Year 11 (or equivalent)	0.019	(0.026)	0.005	(0.025)	-0.003	(0.019)
Secondary school certificate	0.017	(0.018)	0.006	(0.017)	0.014	(0.014)
Post-secondary qualification	0.019	(0.018)	0.005	(0.017)	0.005	(0.013)
University degree	0.022	(0.016)	-0.002	(0.015)	0.014	(0.012)
Missing info on mother's birth country and/or education	0.069*	(0.041)	0.033	(0.041)	0.033	(0.037)
School year at age 15 (ref: Year 9 or below)						
Year 10	0.032**	(0.013)	0.001	(0.015)	-0.005	(0.012)
Year 11 or above	0.014	(0.016)	-0.028*	(0.017)	-0.023*	(0.013)
Student's intention for first year after school (ref: university)						
Other study	0.137***	(0.024)	0.093***	(0.022)	0.089***	(0.020)
Work	0.014	(0.023)	0.049**	(0.024)	0.017	(0.020)
Other	0.000	(0.011)	0.019*	(0.011)	0.002	(0.006)
Missing information on intentions	0.008	(0.013)	0.025*	(0.013)	0.023**	(0.011)
Parent's intention for first year after school (ref: university)						
Other study	0.048	(0.030)	0.087***	(0.029)	0.099***	(0.028)
Work	0.000	(0.030)	0.046	(0.032)	0.023	(0.027)
Other	0.034***	(0.012)	0.003	(0.011)	-0.010	(0.007)
Missing information on intentions	0.001	(0.012)	-0.015	(0.011)	0.013	(0.009)

Prestige of intended occupation at 30	-0.001***	(0.000)	-0.002***	(0.000)	-0.001***	(0.000)
Missing information on expected earnings of intended occ.	-0.087***	(0.023)	-0.194***	(0.023)	-0.087***	(0.018)
Government school at 15	0.004	(0.007)	-0.019***	(0.007)	-0.008	(0.005)
Quintile of PISA mathematics score (ref: lowest quintile)						
2nd lowest quintile	-0.078***	(0.027)	-0.023	(0.027)	-0.046*	(0.025)
3rd lowest quintile	-0.068**	(0.028)	-0.045*	(0.027)	-0.060**	(0.025)
4th lowest quintile	-0.088***	(0.028)	-0.047*	(0.027)	-0.075***	(0.024)
Highest quintile	-0.098***	(0.029)	-0.056**	(0.027)	-0.080***	(0.025)
Quintile of PISA reading score						
2nd lowest quintile	0.004	(0.027)	-0.033	(0.028)	-0.027	(0.027)
3rd lowest quintile	-0.001	(0.028)	-0.029	(0.028)	-0.049*	(0.026)
4th lowest quintile	0.004	(0.028)	-0.063**	(0.028)	-0.060**	(0.026)
Highest quintile	-0.010	(0.029)	-0.074***	(0.028)	-0.060**	(0.026)
SES (normalised)	0.003	(0.006)	-0.004	(0.006)	-0.004	(0.004)
Any government payment	0.012	(0.012)	0.010	(0.011)	-0.002	(0.009)
Missing information on government payments	-0.008	(0.012)	0.019	(0.013)	0.002	(0.009)
Average school peer SES (normalised)	0.000	(0.012)	-0.013	(0.012)	-0.012	(0.009)
School peer VET participation (ref: no VET)						
Classroom-based VET without WPL	0.605***	(0.052)	0.188***	(0.043)	0.112***	(0.038)
Classroom-based VET with WPL	0.218***	(0.043)	0.423***	(0.048)	0.086**	(0.034)
Apprenticeship/ traineeship	0.018	(0.071)	0.070	(0.071)	0.179***	(0.069)
Local unemployment rate	-0.003	(0.002)	0.000	(0.002)	-0.001	(0.001)
Number of observations	7,285		7,209		6,875	

Appendix E: Regression results of VET outcomes by sub-group

Figure E.1: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those in the bottom 40% of reading in PISA (regression results)

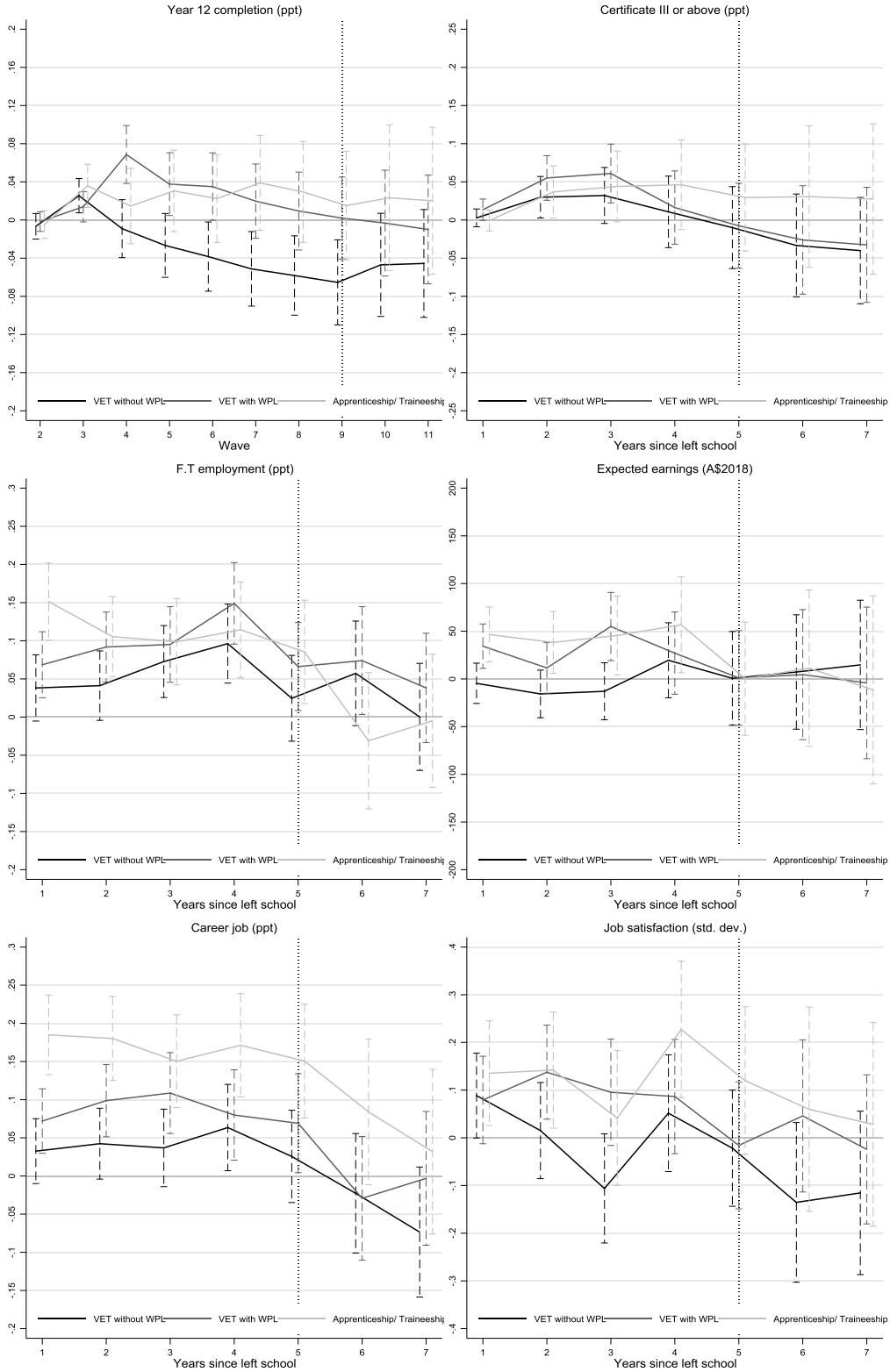


Figure E.2: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those in the middle 20% of reading in PISA (regression results)

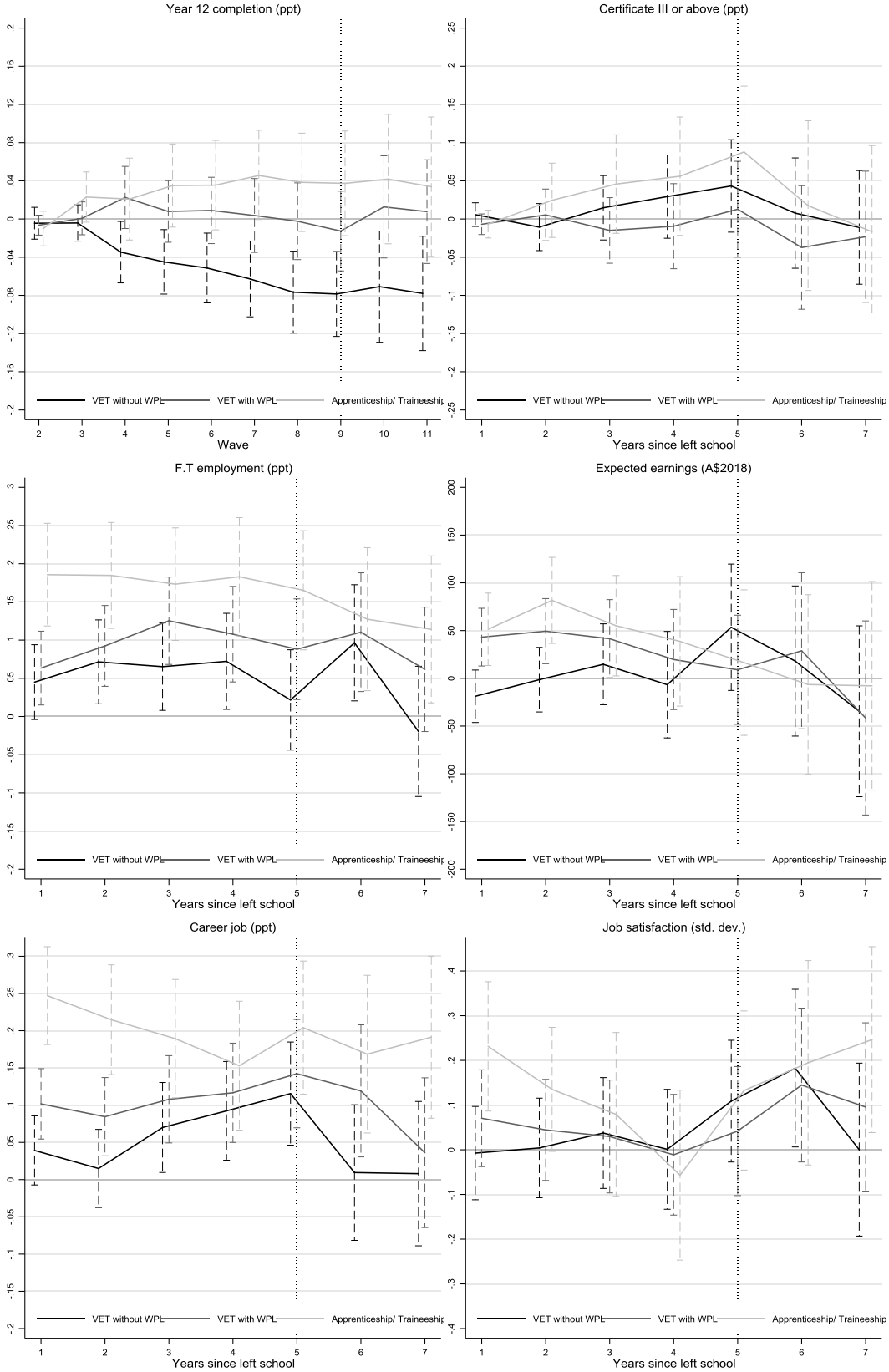


Figure E.3: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those in the top 40% of reading in PISA (regression results)

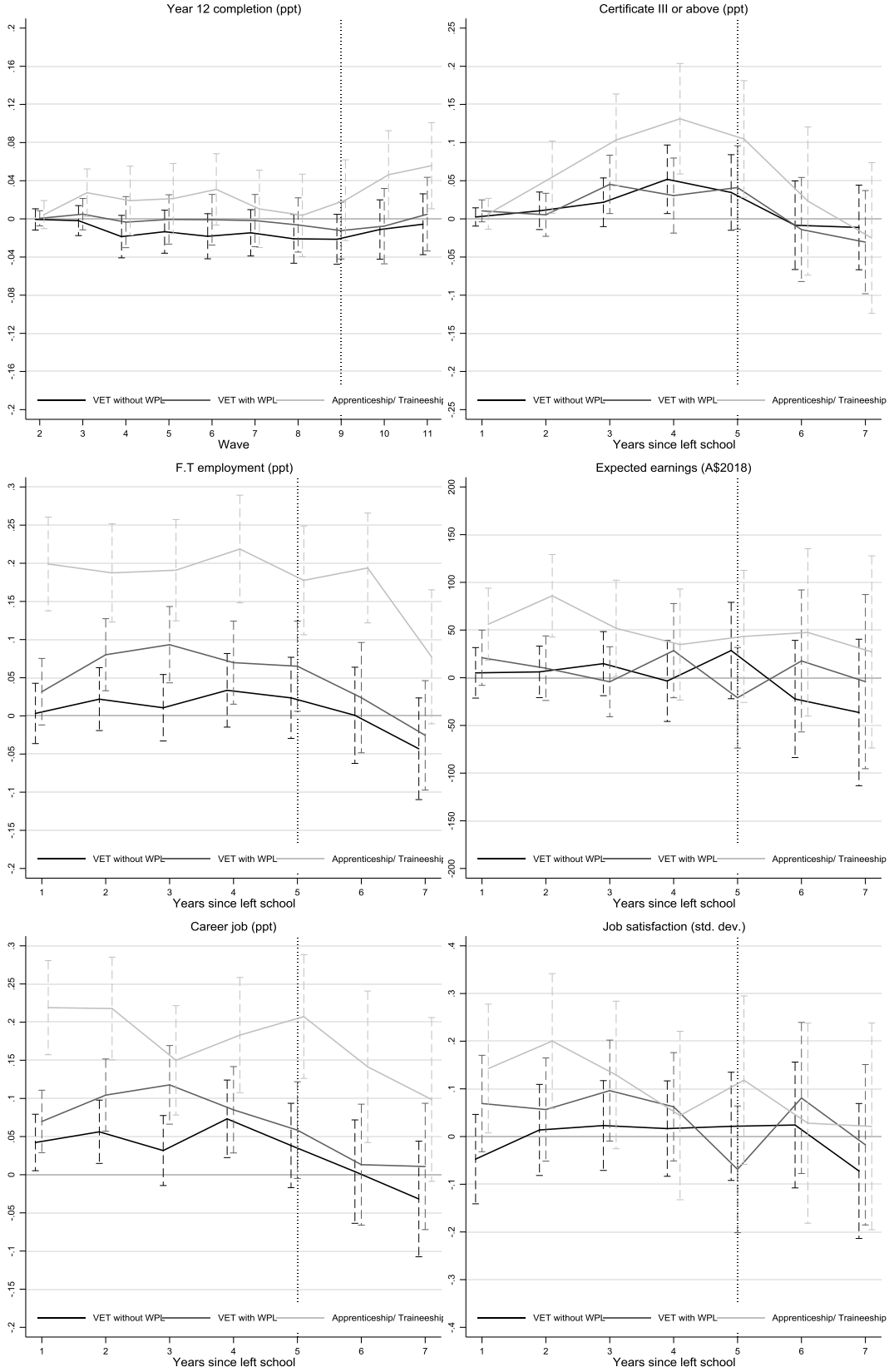


Figure E.4: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for females (regression results)

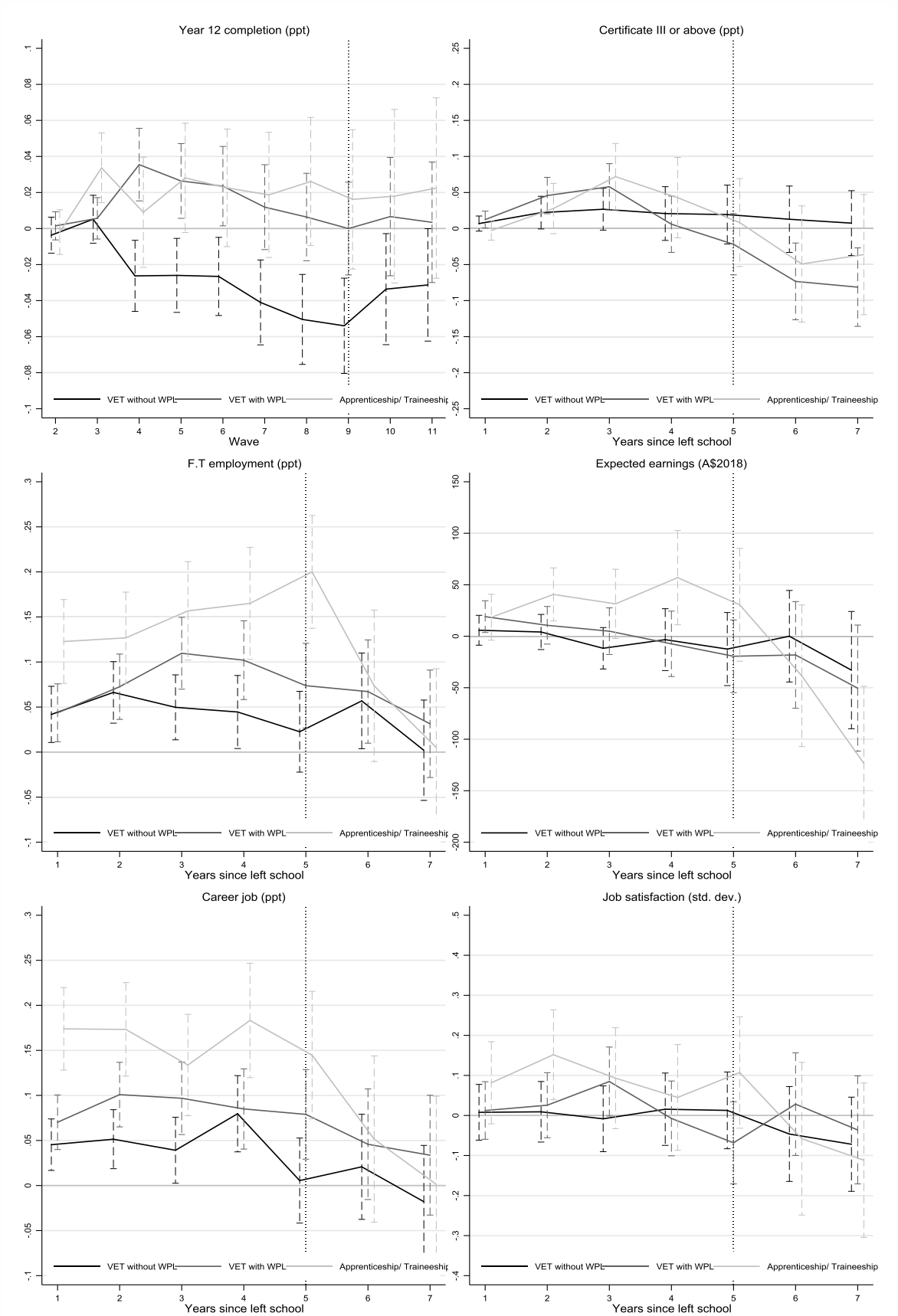


Figure E.5: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for males (regression results)

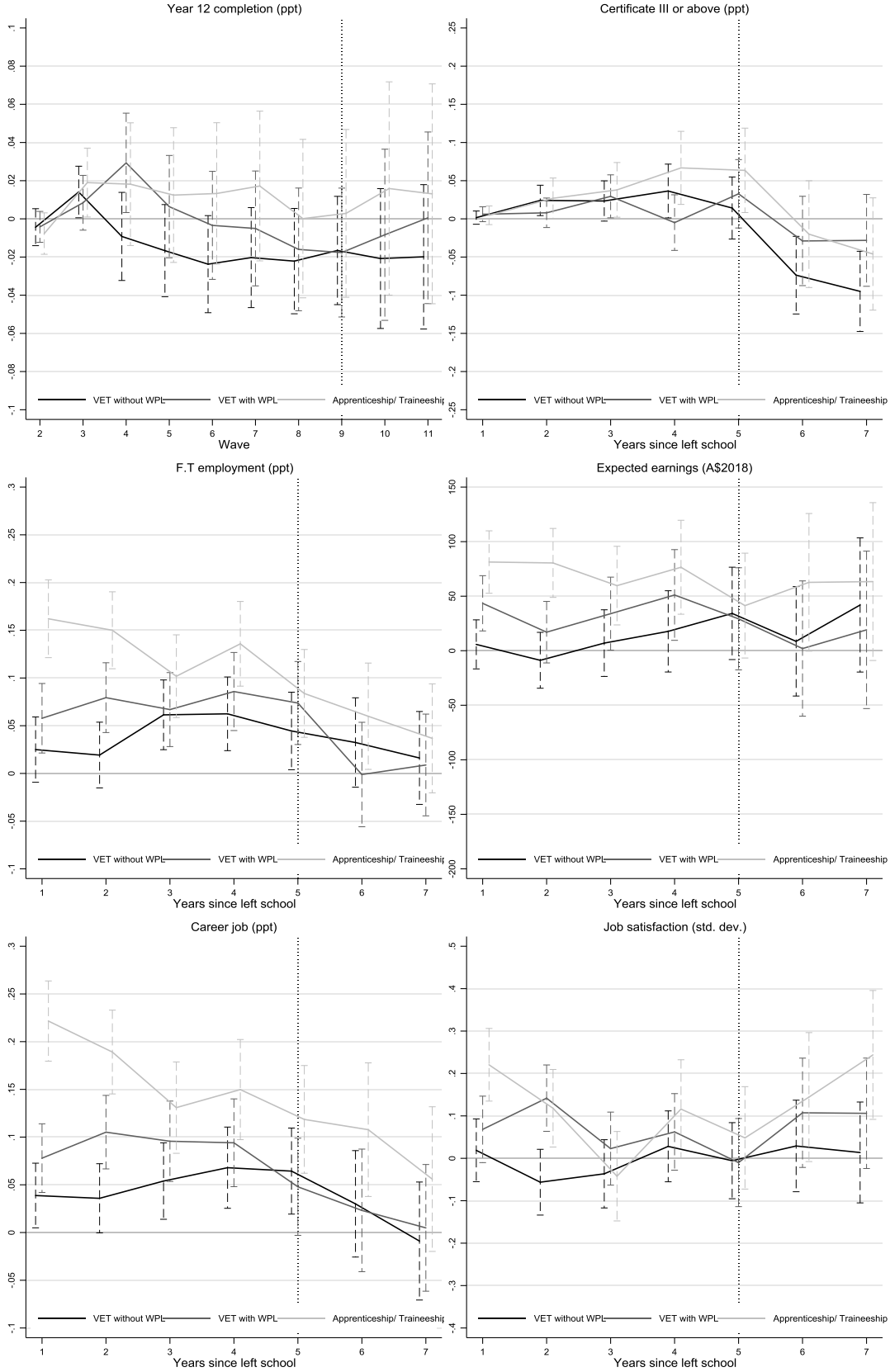


Figure E.6: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for indigenous students (regression results)

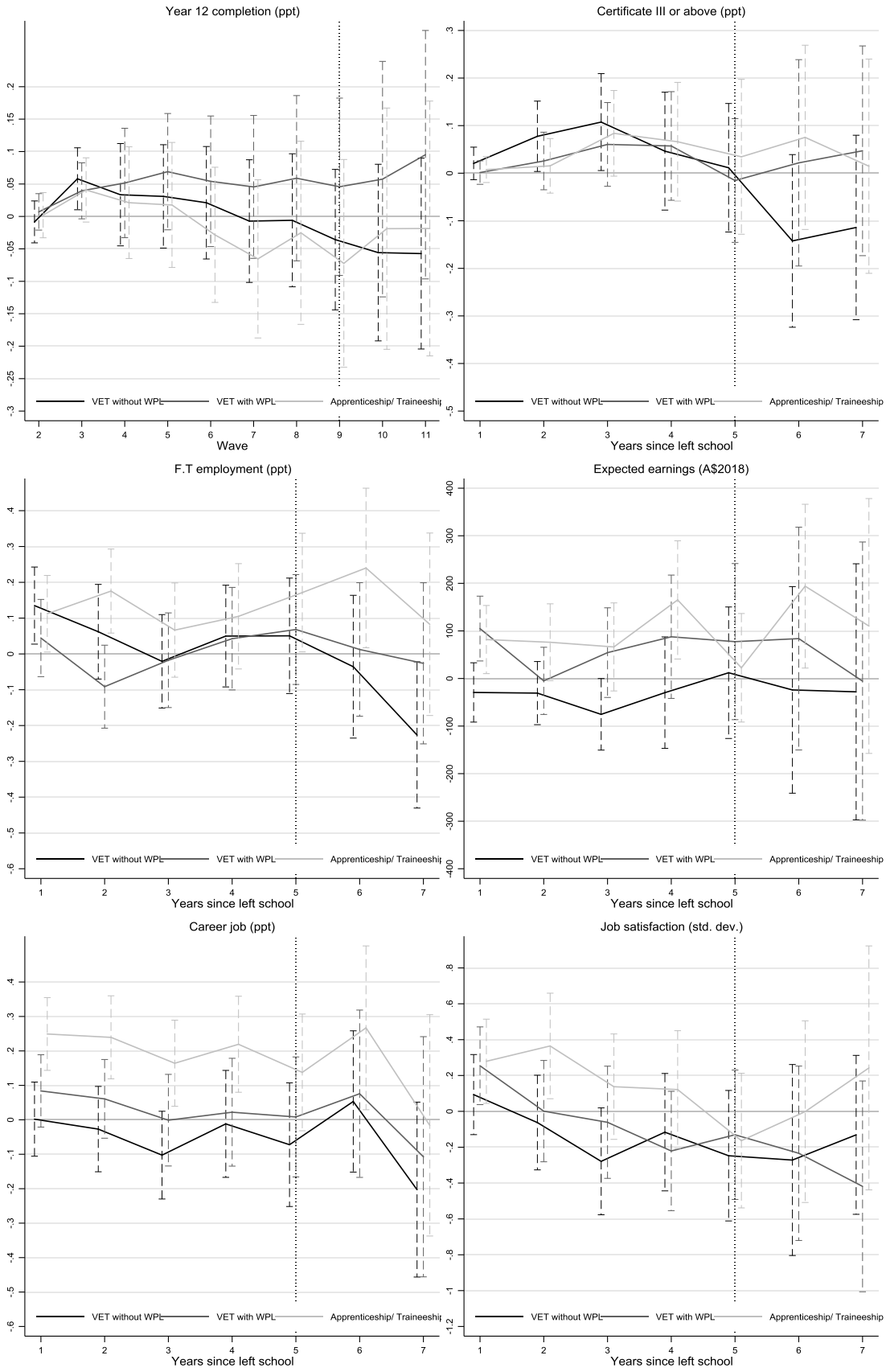


Figure E.7: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for non-indigenous students (regression results)

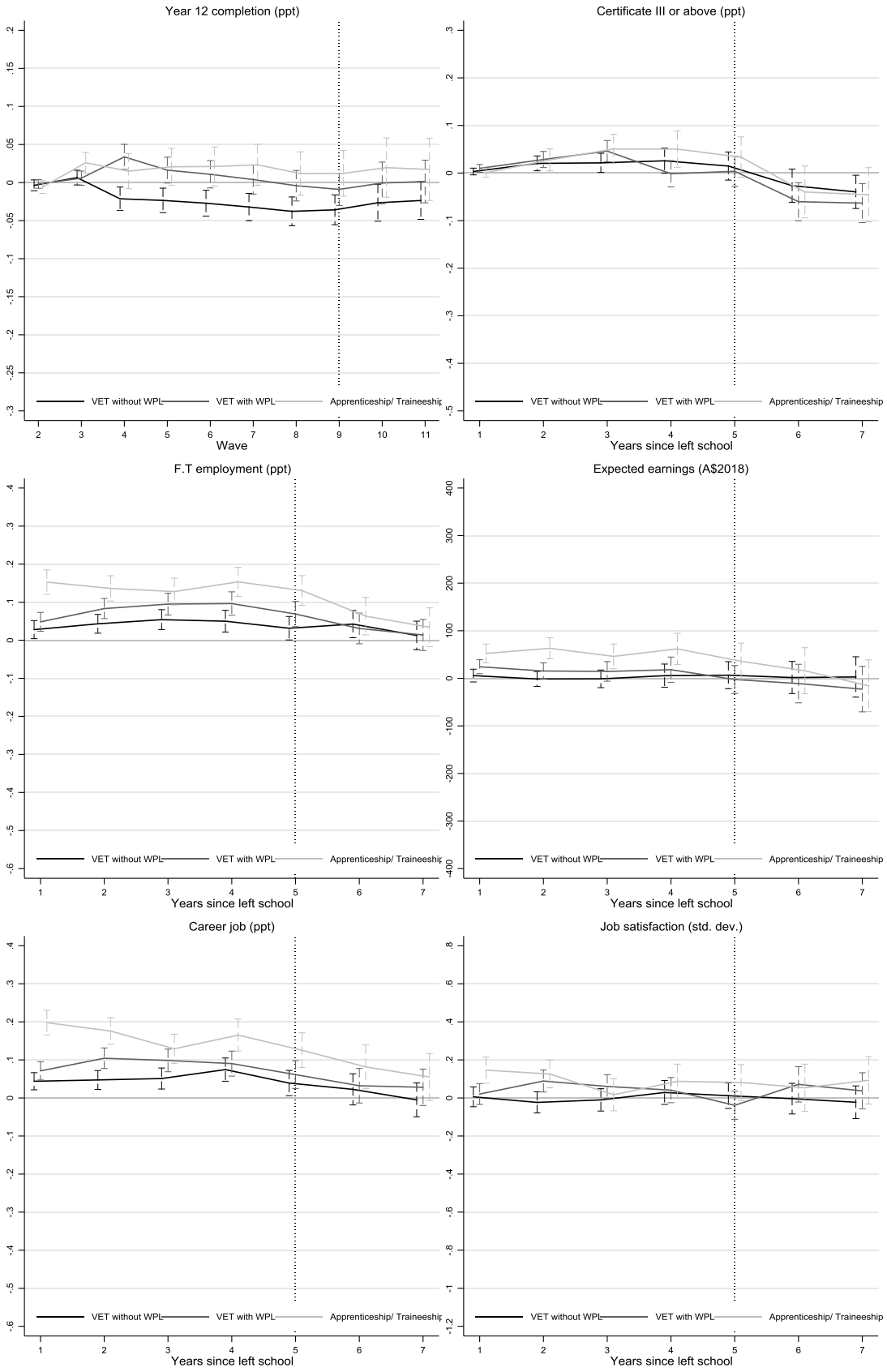


Figure E.8: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for low SES students (regression results)

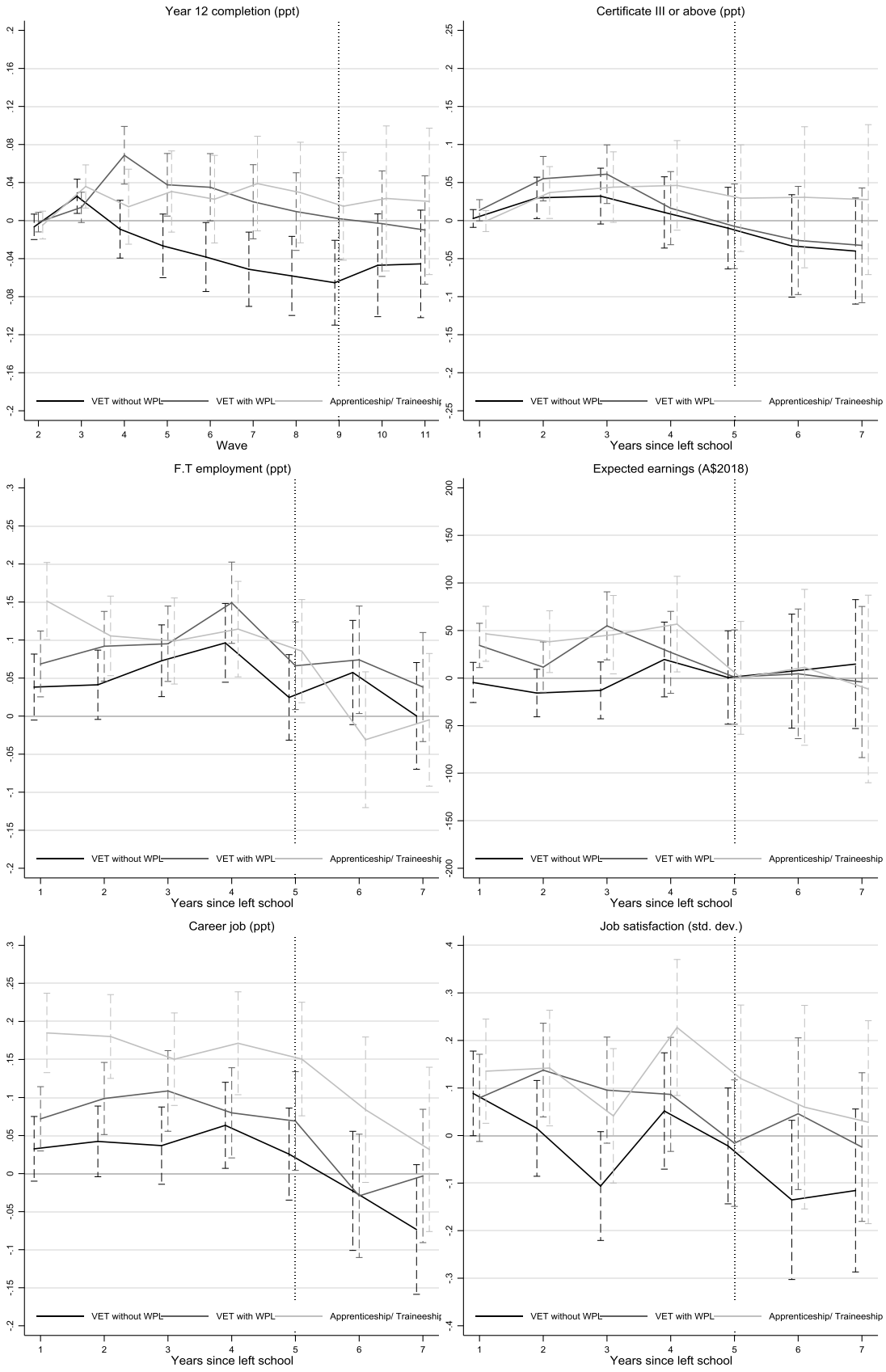


Figure E.9: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for middle SES students (regression results)

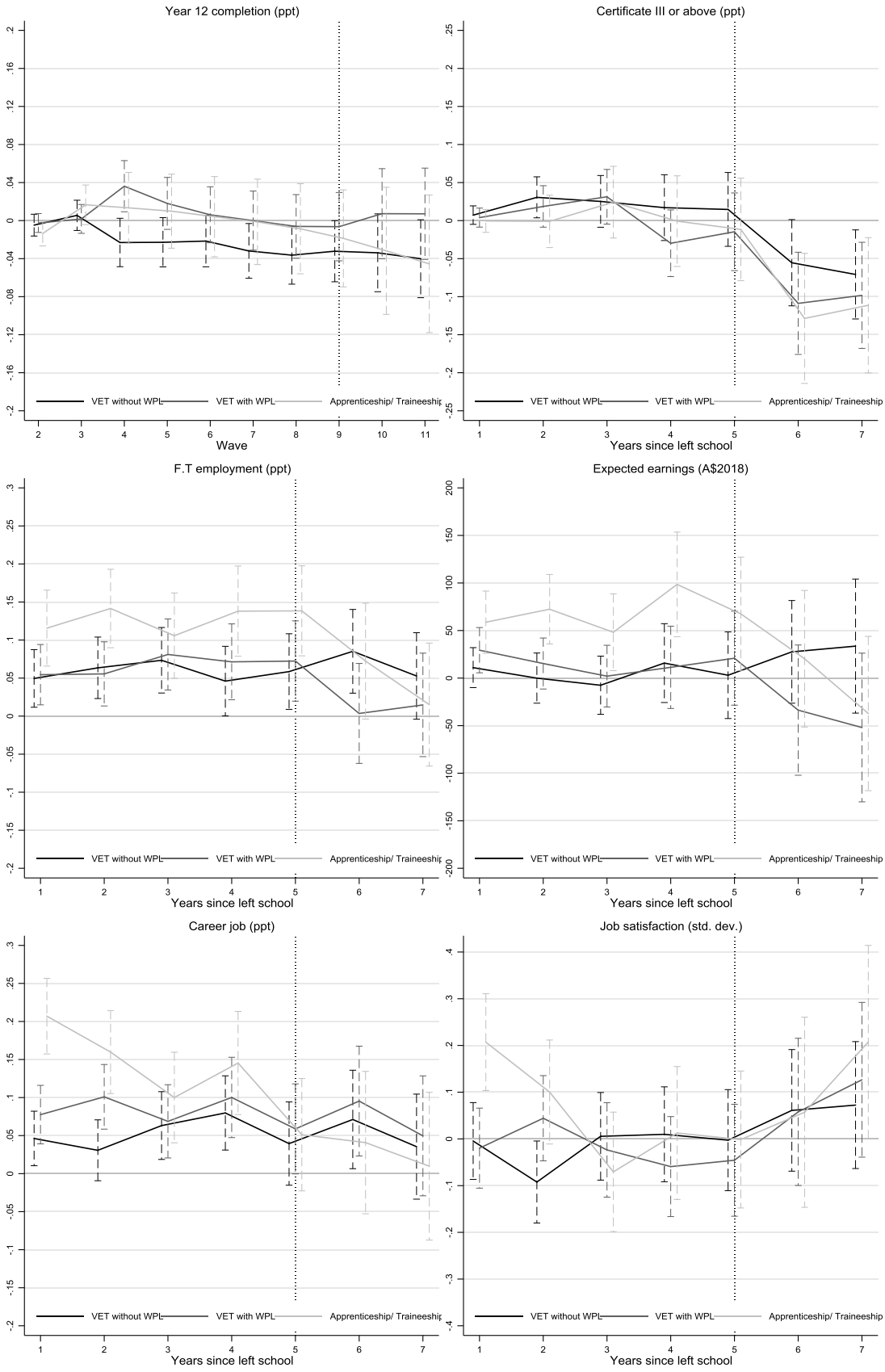


Figure E.10: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for high SES students (regression results)

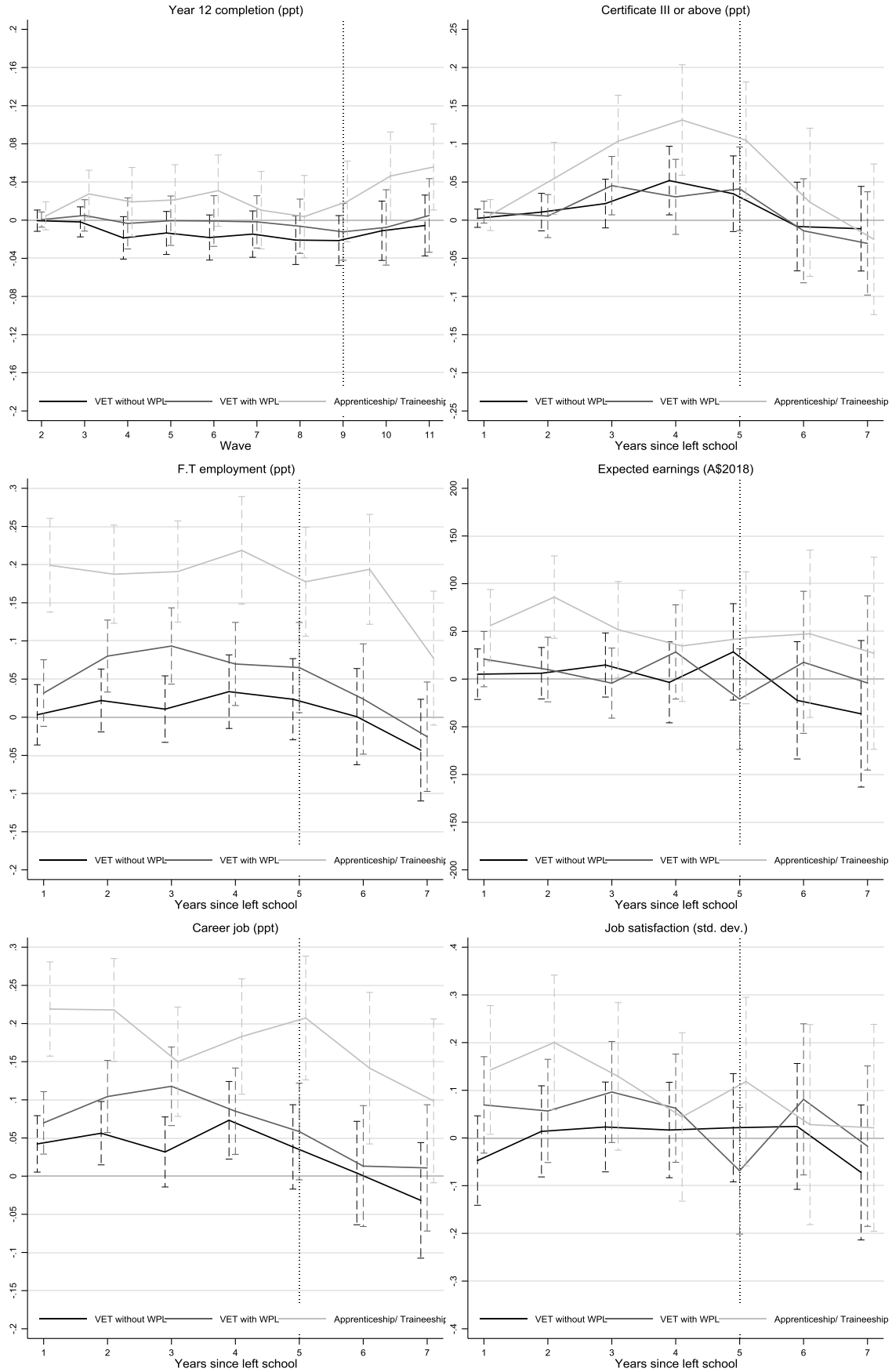


Figure E.11: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for metropolitan students (regression results)

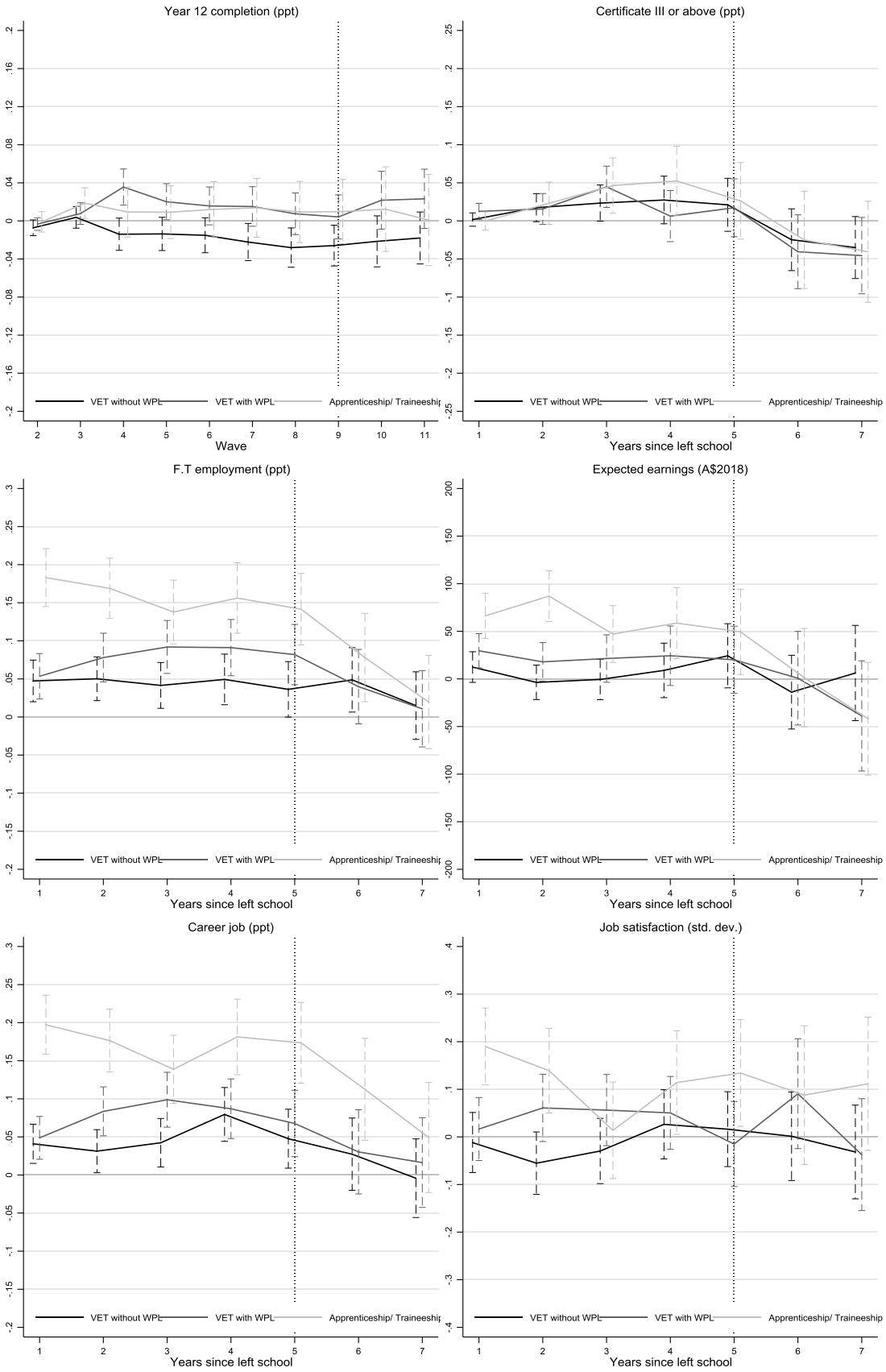
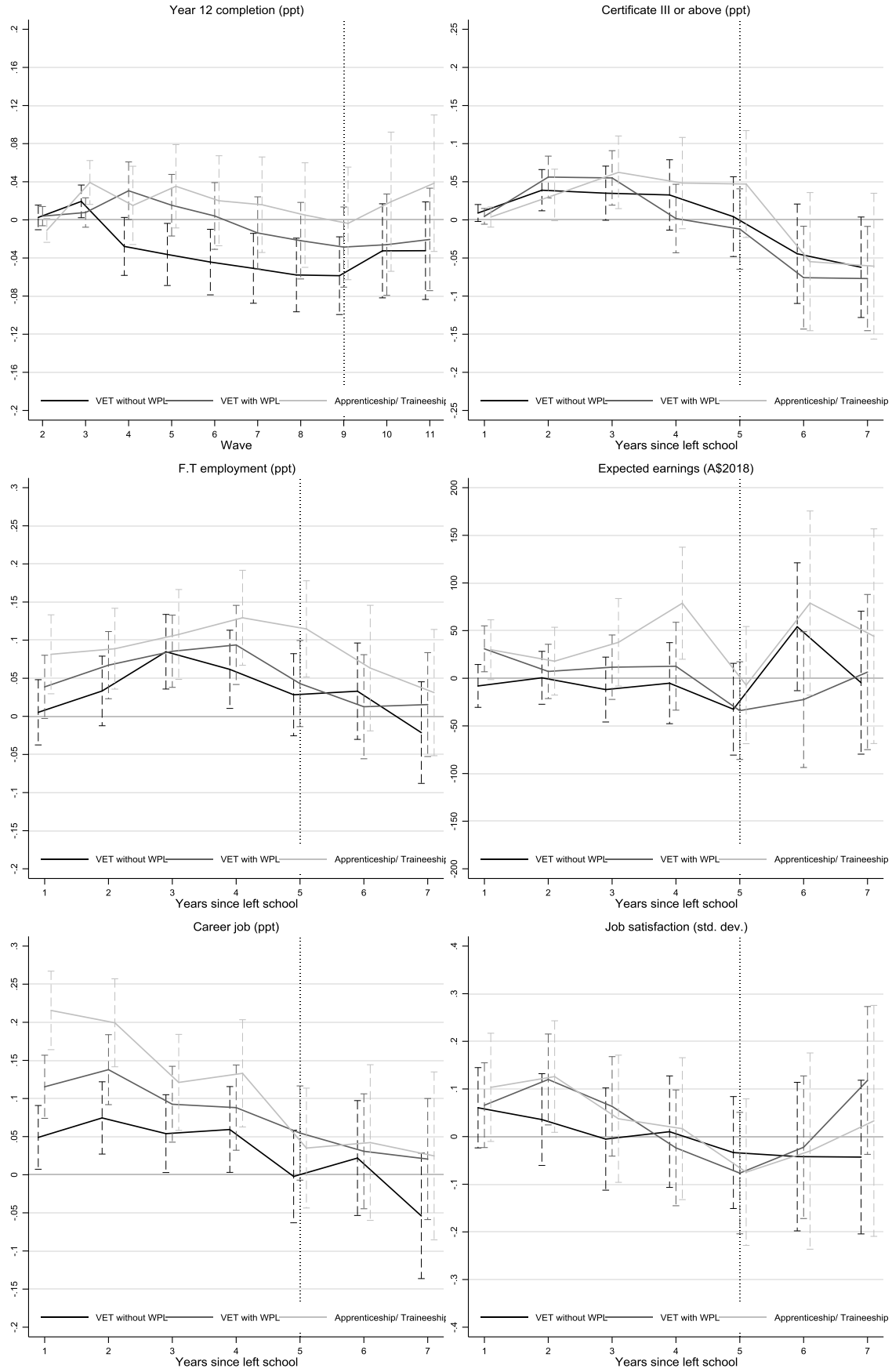


Figure E.12: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for provincial students (regression results)



Appendix F: Sensitivity tests

Throughout the analysis above we have identified a range of judgements/assumptions that have been made about the data and the research methodology that are contestable, but which may also impact on the results. To test that the results are not being driven by these, we conduct a series of robustness checks by estimating models of VET outcomes under alternative judgements/assumptions including:

1. the use of PSM models rather than OLS regression;
2. OLS models estimated on a sub-group that responds in all years of LSAY;
3. OLS models estimated using 2003 and 2006 LSAY only;
4. OLS models estimated using alternative definitions of participation in VET delivered in schools — VET participation restricted to those for whose year 11 VET status is not truncated (exclude those in year 12 in wave 2); VET participation is restricted to involvement in last year of school; VET participation restricted to those with no missing year 11 and 12 VET status data;
5. OLS models estimated excluding NSW.

The motivation for the first check is to see if results vary if we were to use an alternative observational study approach, namely PSM. As discussed in section 4, PSM has the potential advantage over OLS in that it restricts the analysis to individuals who share common observed characteristics. To the extent that unobserved differences are correlated with observed differences, PSM may reduce the extent of bias by excluding those that do not share common characteristics. We estimate PSM results using two approaches, kernel density and nearest neighbour. The difference between the two approaches is that Kernel matching approach utilises information from several matched or 'like' control group observations rather than just a handful, as is the case for Nearest Neighbour. The use of multiple matched control group observations means that kernel has the advantage of being able to more precisely estimate relationships. The downside is that Kernel may be more prone to bias because the control observations are not as closely matched or alike as Nearest Neighbour (Smith & Todd 2005). When estimating the Nearest Neighbour, for students who took VET, we restrict the generation of the matched control group to 5 individuals who were most like the focal student but did not participate in VET. For the Kernel matching, we also impose common support restriction on the selection of the matched control group, which means that members of the control group who are very different from the treatment group are excluded.

However, we stress that PSM does not adjust for differences in the unobserved characteristics of those who do and do not participate in VET, therefore, PSM results say nothing about the potential for bias from this source. Alternative approaches that control for observed and unobserved differences require either randomisation in the intensity/availability of treatment, for example, a randomised controlled trial, or exploits variation in the intensity/availability of treatment across schools that is associated with factors that are unrelated to outcomes, for example, step-wise regional rollout of a VET program or differences in the rollout of programs across states.

The second check is a simple robustness check for the impacts of attrition. All else being equal, if the process of non-random attrition from the survey does fundamentally change the composition of the sample in ways that we do not control for, then we should expect that results that are generated on a sub-sample that remain in the survey for the entire period (up to wave 9 in LSAY 2009) should be very different.

As discussed above, at the time of analysis data from LSAY 2009 was only available to wave 9 (5 years out from school). Therefore, it is possible that the diminishing benefits of VET participation estimated in sections 6.2 and 6.3 may be because VET graduates in the 2003 and 2006 cohorts (who are observed through to 7 years out from school and not 5 years) faced less favourable labour market conditions than graduates from the 2009 cohort. In robustness check 3, we test whether the incomplete data from LSAY 2009 impacts results by re-estimating the main results using LSAY 2003 and 2006 only.

The final check is to test whether the results are sensitive to the definition of VET participation that we adopt in this study, that is, any VET participation in year 11 or 12 between waves 2 and 4. As discussed in section 3, this definition has the problem that students who are already in year 12 in wave 2 are missing information on their year 11 VET participation. This means that students in year 12 in wave 2 who did VET in year 11 and not year 12 are wrongly allocated to the group who did no VET. To test the sensitivity of the results to this treatment, we exclude those in year 12 in wave 2 from the analysis so that the allocation to VET program, including allocation to no VET, is based on observations in both year 11 and year 12. Another robustness check related to the definition of VET participation is to restrict it to the last year of school (year 11/12), which may have the greatest impact. A final check related to the definition of VET participation is to restrict the sample to those whose VET status is observed in both year 11 and 12, where VET participation is identified by participation in either year. This means that only students who persist to year 12 are included in this sample.

Figure F.1: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation (PSM outcome estimates, kernel density matching with common support)

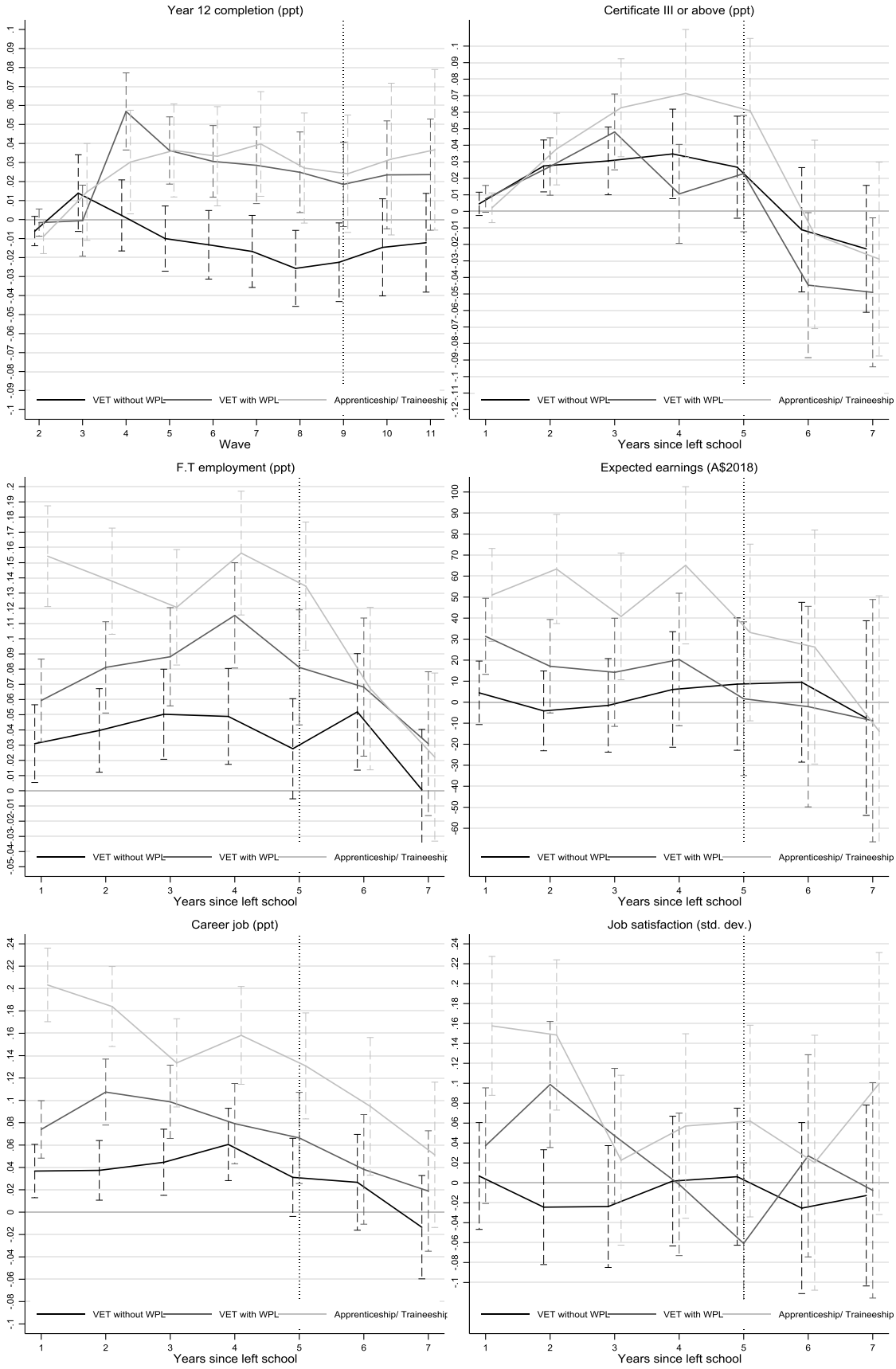


Figure F.2: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those in the bottom 40% of reading in PISA (PSM outcome estimates, nearest neighbour matching (closest 5))

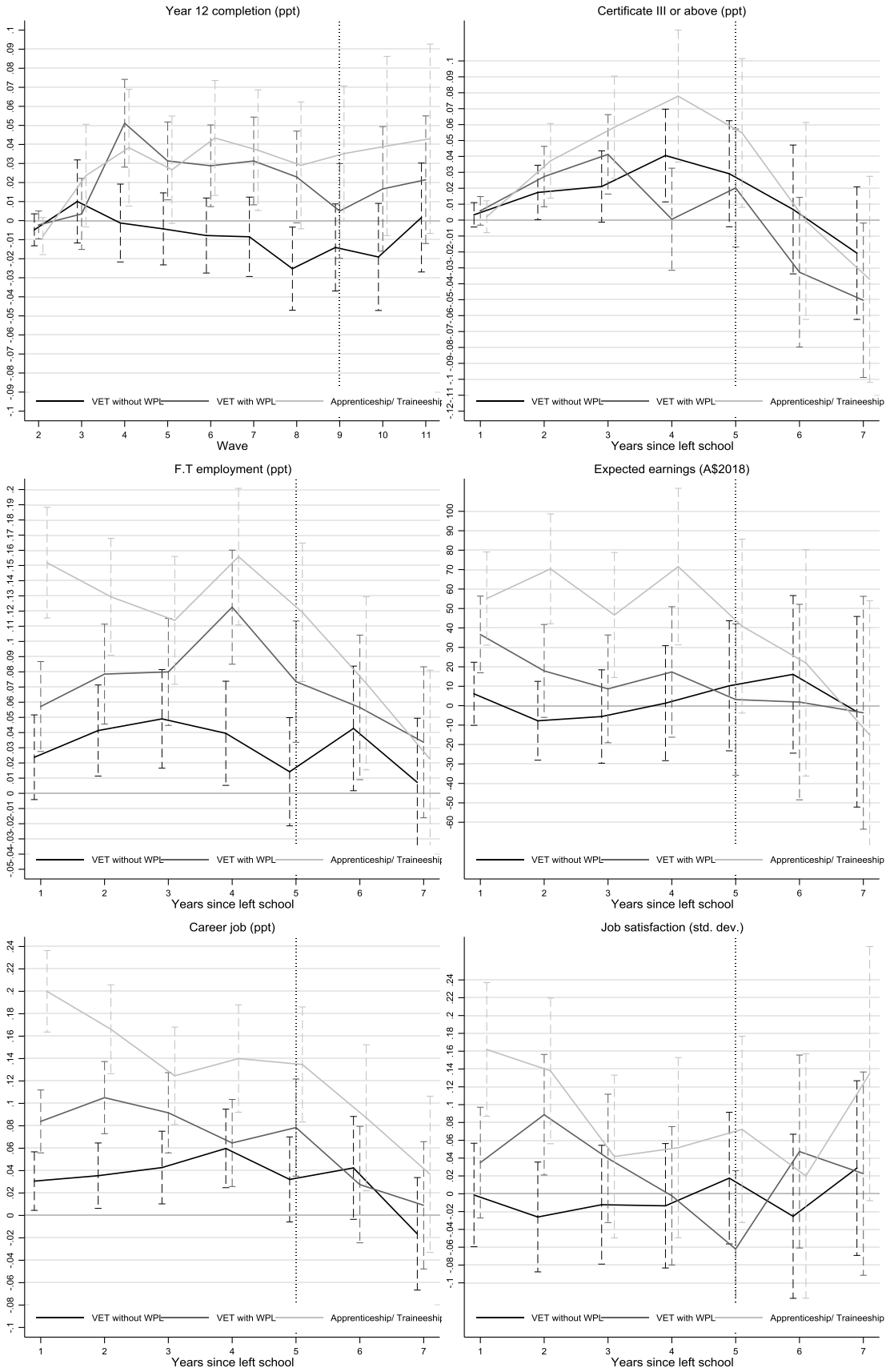


Figure F.3: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those who are surveyed in each wave of LSAY (regression results)

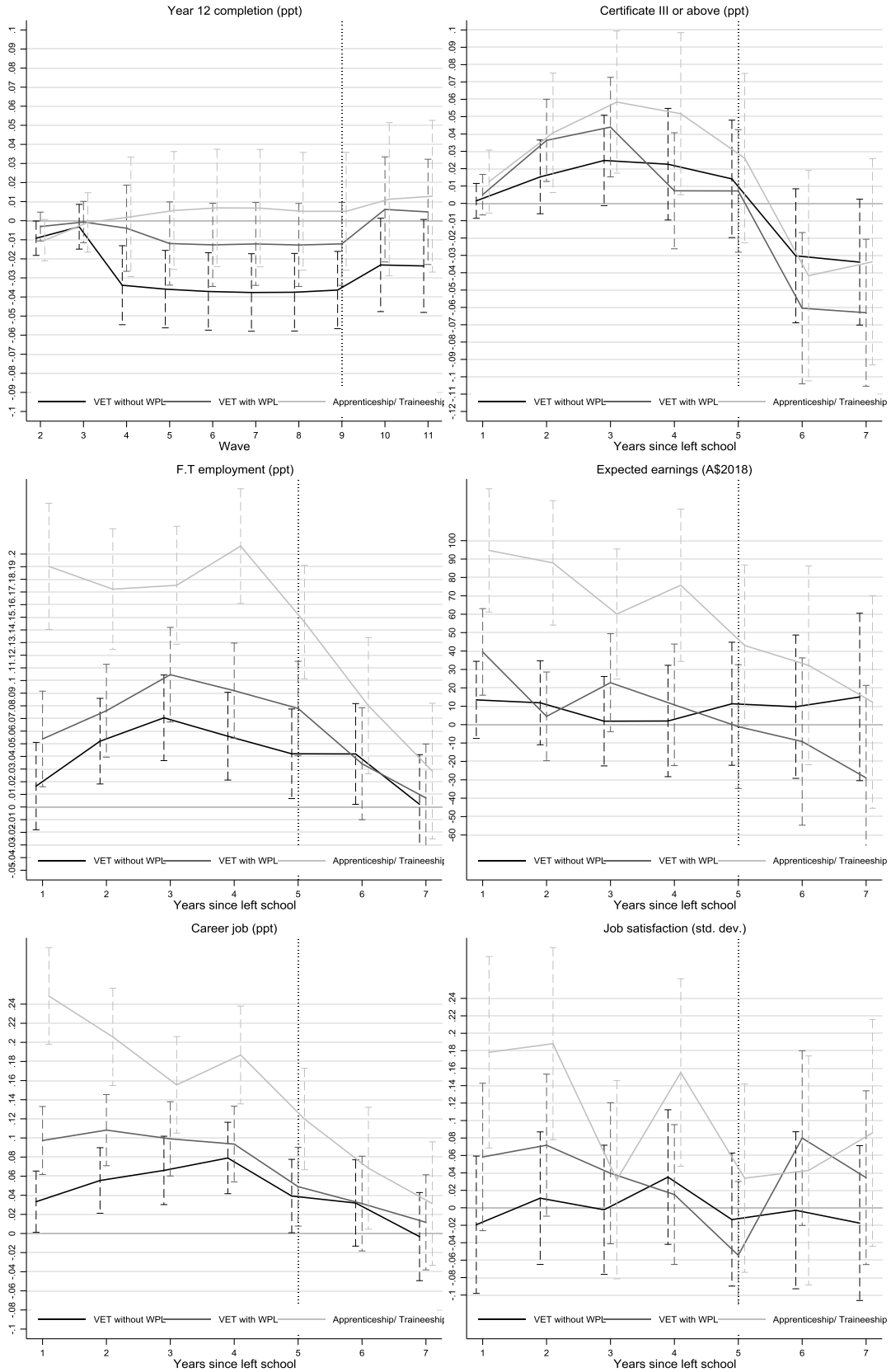


Figure F.4: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those in LSAY 2003 and 2006 only (regression results)

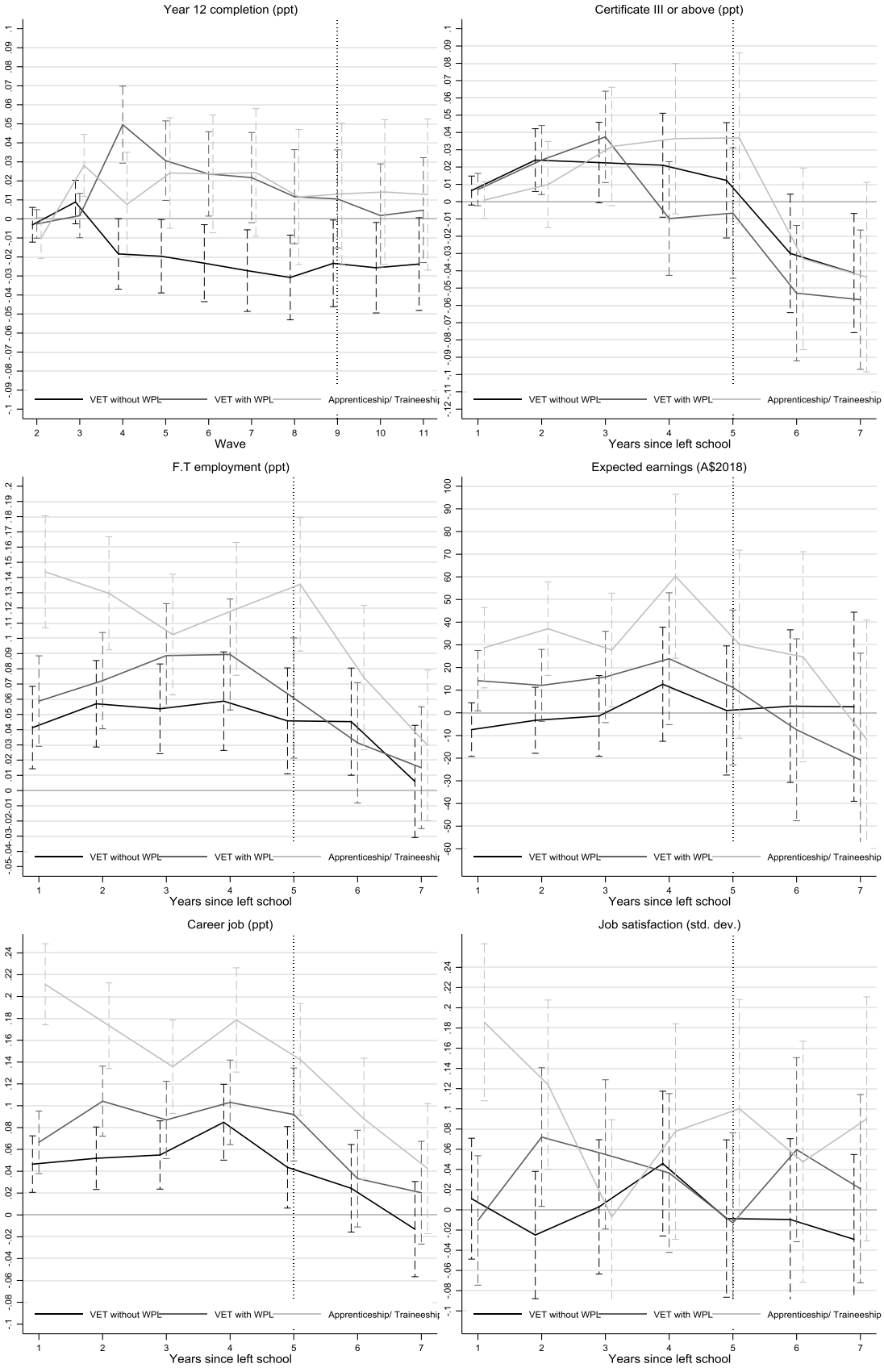


Figure F.5: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those whose year 11 VET status is not truncated (regression results)

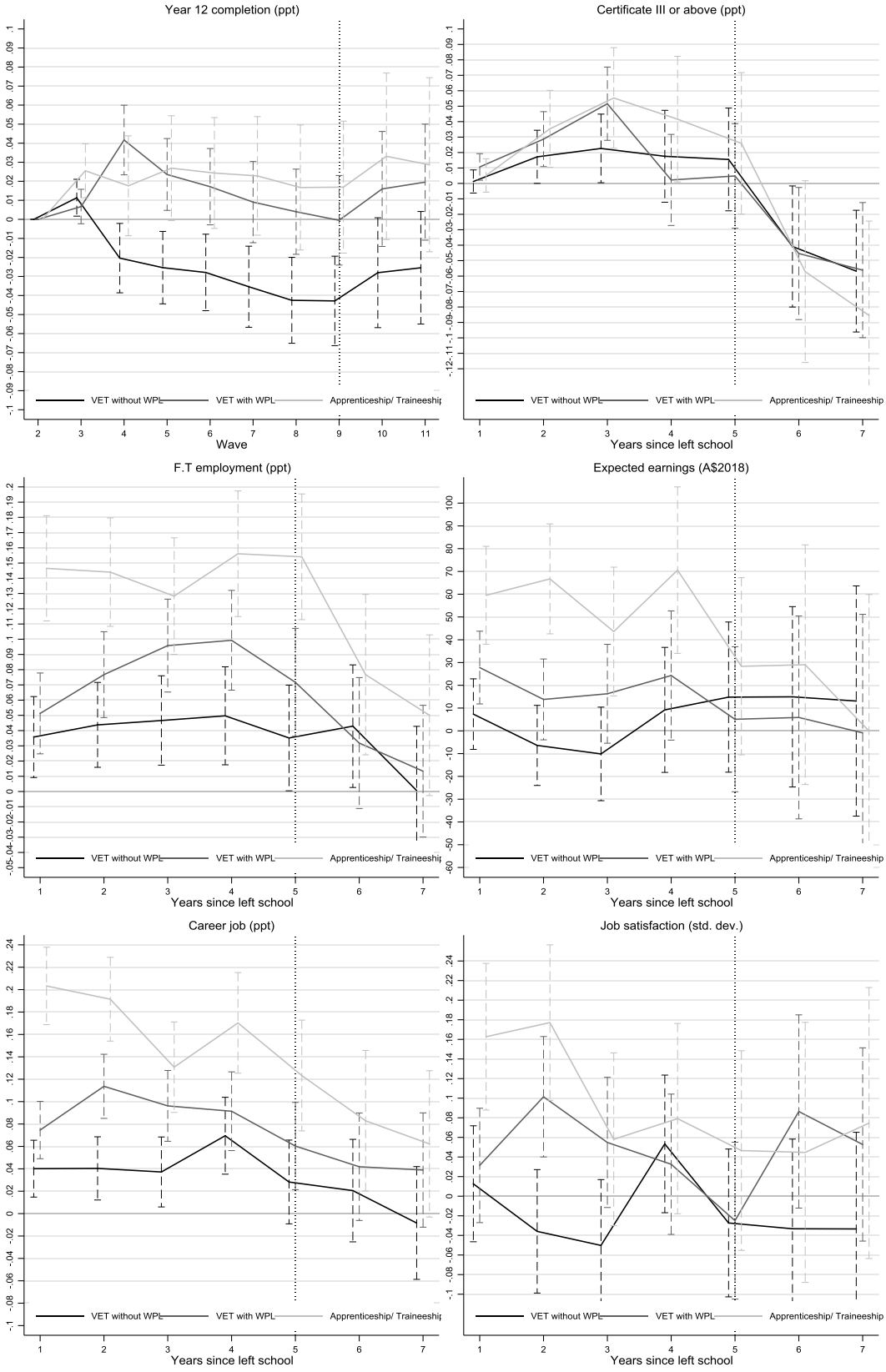


Figure F.6: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for those who take VET in their last year of school (year 11/12) (regression results)

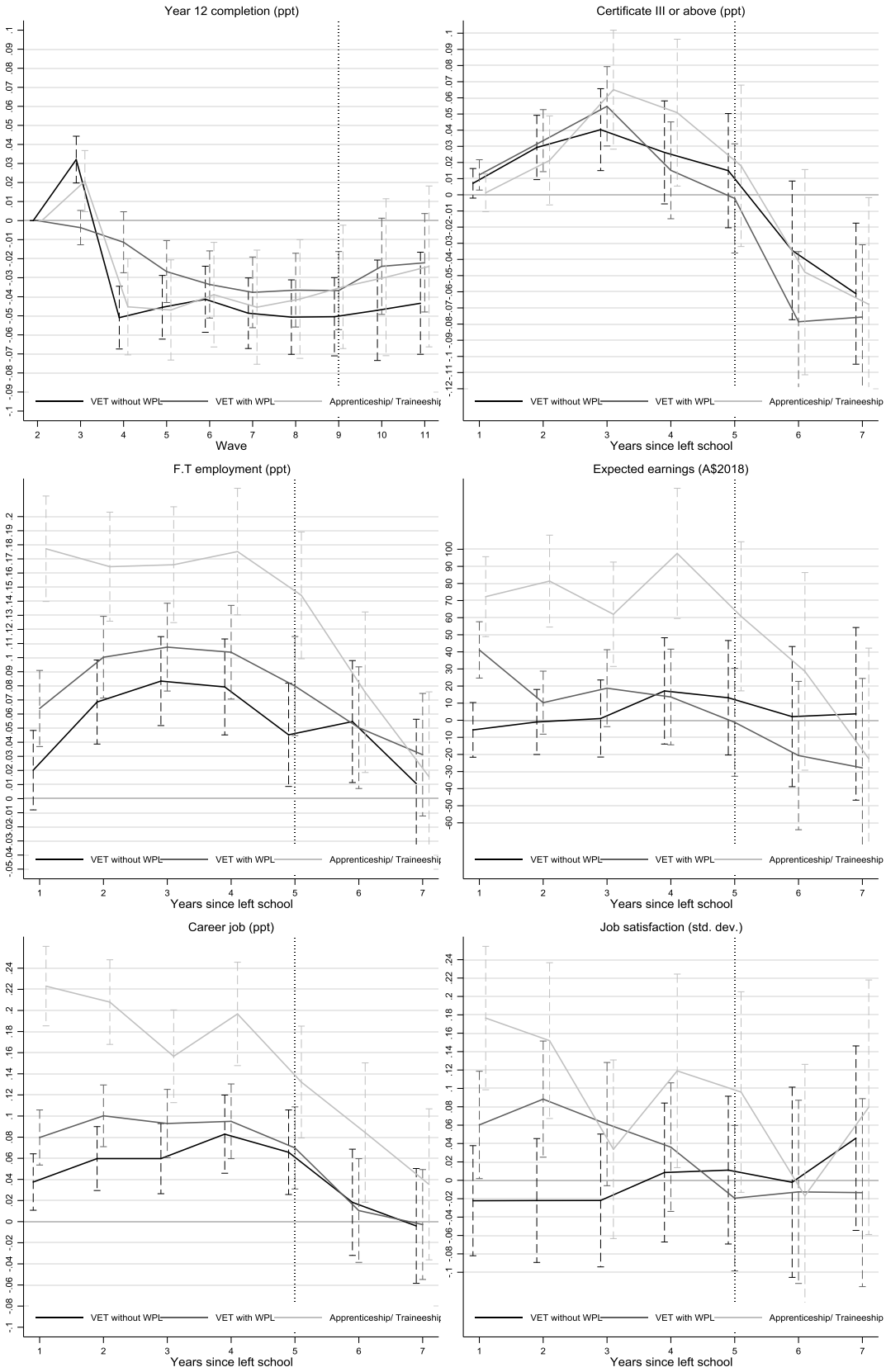


Figure F.7: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation for whose VET status is observed in year 11 and year 12 (regression results)

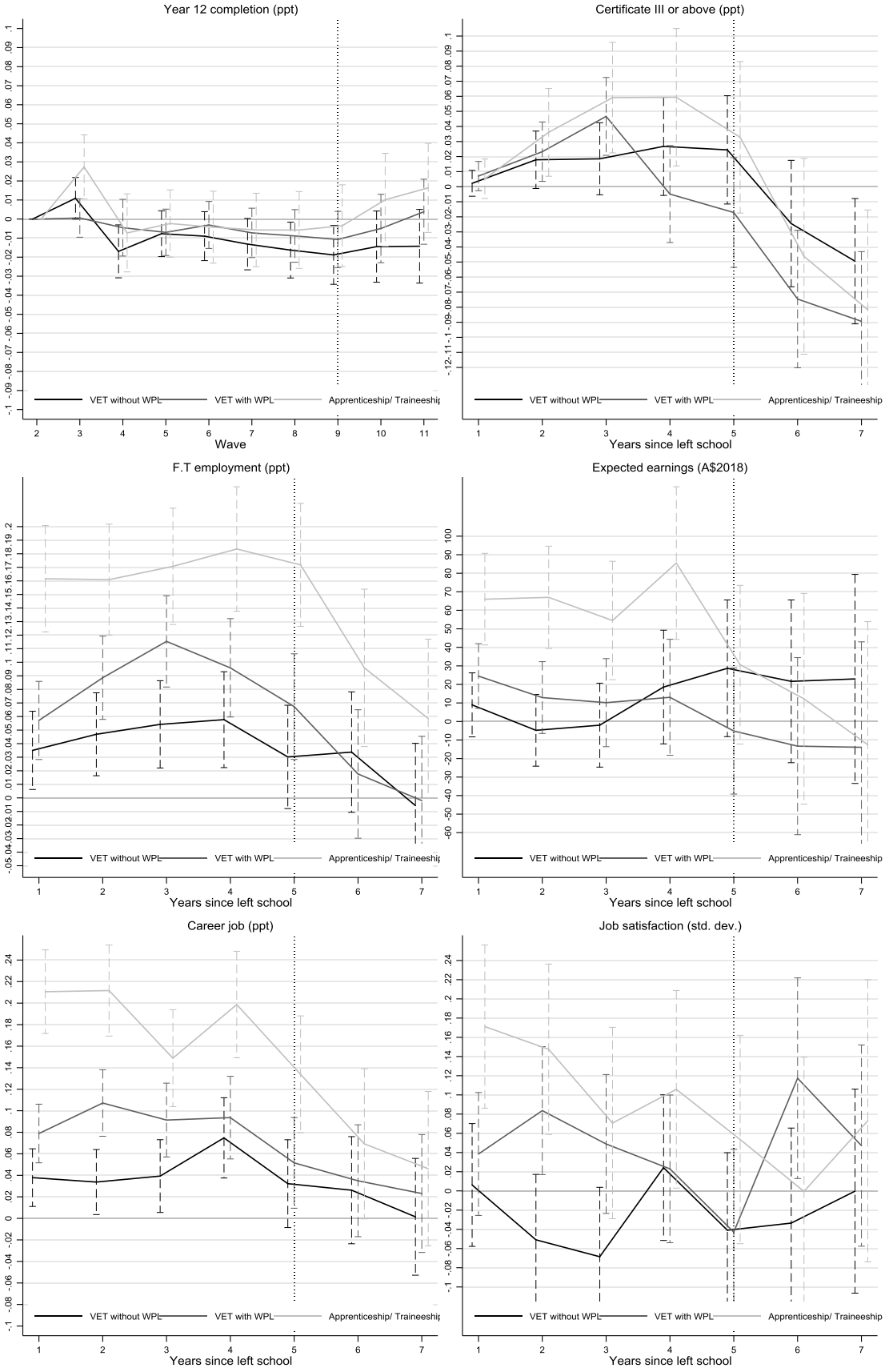
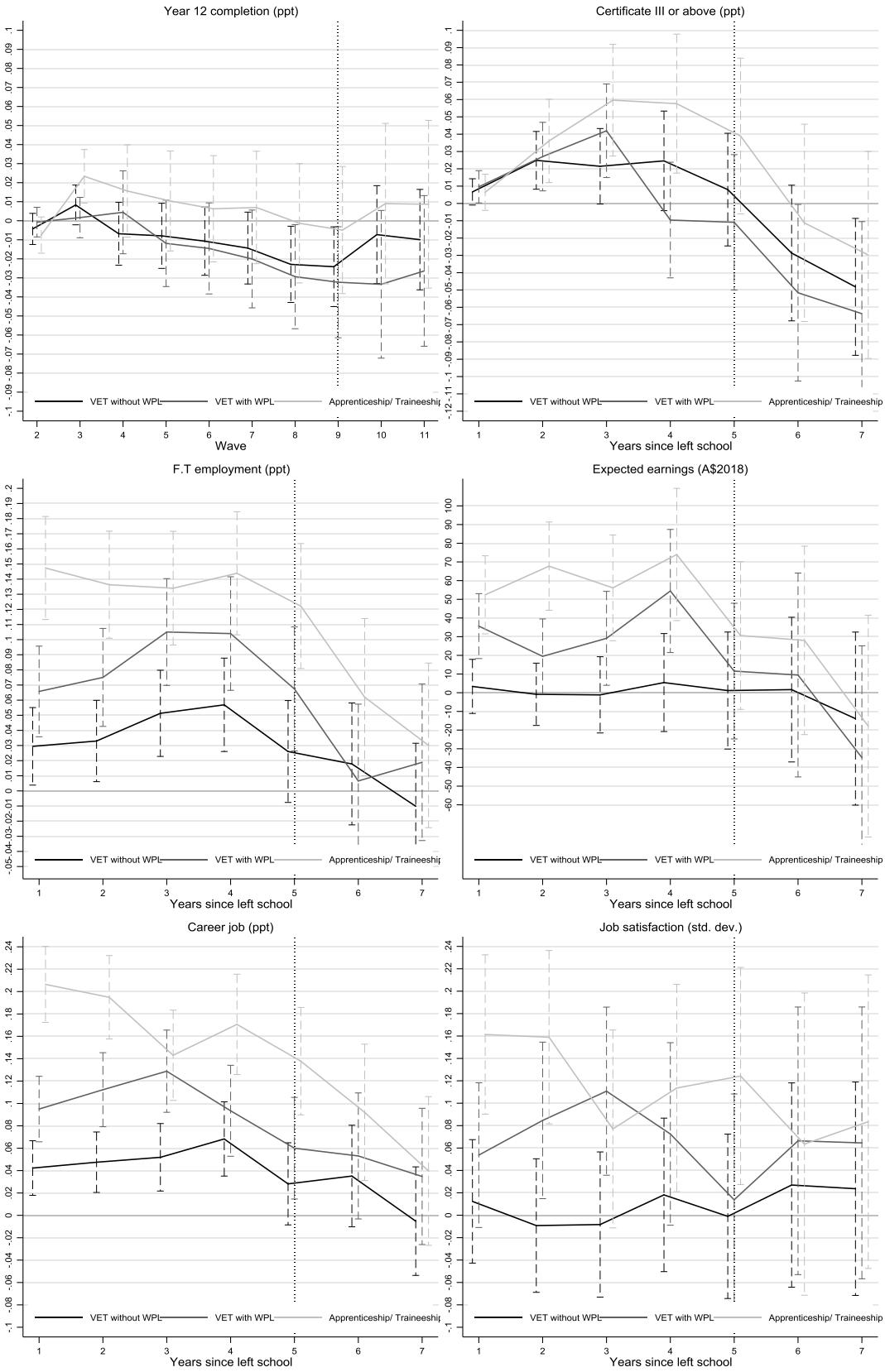


Figure F.8: Difference in outcomes associated with upper-secondary VET participation, compared to non-participation excluding NSW students (regression results)



Results from the robustness checks above (Figures F.1-F.8) yield outcomes that are very consistent with the standard results presented in section 6.2, which suggests that our results are not sensitive to decisions taken regarding the data development and modelling approach. One exception is that the positive results for school completion appear sensitive to alternative definitions of VET participation. Specifically, we find no positive school completion effect when VET participation is restricted to the last year of school and when the sample is restricted to those whose VET status is observed in year 11 and 12 (Figures F.6 and F.7).

Restricting VET participation to the last year of school means that students who did VET in year 11, but not in year 12, are reclassified as being non-participants (control group members) instead of participants. Our interpretation is that those who did only VET in year 11 and not year 12 enrol in VET for very different reasons than for preparation for labour market entry or further VET study, for example to acquire skills to help them find a better job while studying at university. Thus, because these students were not at risk of disengagement from school, they should not be treated as VET students for the purposes of examining school completion outcomes.

Restricting the sample to those who are observed in year 11 and year 12 provides a limited opportunity to observe any impact of VET participation on school completion given that enrolment in year 12 is a necessity for inclusion in the sample. The conclusion from this result is that any school completion benefits from VET delivered in schools must be from retaining students to year 12, not in helping them complete year 12.